GREENSpot

Wallerawang
Battery Energy Storage System

Environmental Impact Statement

January 2022

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STATEMENT OF VALIDITY

Submission of Environmental Impact Statement Prepared under Part 4, Division 4.12(8) of the *Environmental Planning and Assessment Act 1979*, and Schedule 2, Part 3, Clause 7(1)(e) of the *Environmental Planning and Assessment Regulation 2000*	
Environmental Assessment prepared by	
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Address:	Level 16, 580 George Street Sydney NSW 2000
In respect of:	Greenspot Wallerawang Pty Ltd
Applicant Name:	Greenspot Wallerawang Pty Ltd
Applicant Address:	Wallerawang Power Station, 1 Main Street Wallerawang NSW 2845
Proposed development:	The Project involves the construction and operation of a large-scale Battery Energy Storage System (BESS) at Wallerawang, NSW. The BESS will be up to 500 Megawatts (MW) and would provide up to 1,000 Megawatt hours (MWh) of battery storage capacity or up to two hours of storage duration. Key features of the Project include: • Large-scale BESS including battery enclosures, inverters and transformers • 33/330 kV switchyard • Overhead transmission line connection between the BESS and the nearby TransGrid Wallerawang 330 kV substation • Ancillary elements including site access from the Castlereagh Highway, internal access roads and parking, site office and amenities, stormwater and fire management infrastructure, utilities, signage, fencing, security systems and landscaping. Site establishment and construction would include: • Clearing of vegetation and grubbing to remove tree stumps within the forestry area. • Civil works for site levelling within the BESS area, 330 kV switchyard and ancillary areas. • Trenching and installation of cable from the battery to the 33/330 kV switchyard. • Installation of footings for battery enclosures, inverters, switch rooms and transformers, including pilings and concrete. • Delivery, installation and fit out of the BESS including battery modules, inverters and medium voltage transformers. • Delivery, installation and fit out of transformers and switchgear for the 33/330 kV switchyard. • Installation of overhead transmission line towers, including pilings and concrete, and stringing of the line

Submission of Environmental Impact Statement Prepared under Part 4, Division 4.12(8) of the *Environmental Planning and Assessment Act 1979*, and Schedule 2, Part 3, Clause 7(1)(e) of the *Environmental Planning and Assessment Regulation 2000*	
	• Construction of ancillary elements including, offices and amenities, installation of services, water and sewage management, fire systems and signage. • Installation of permanent fencing and security systems. • Testing and commissioning.
Land to be developed:	A summary of the legal description (i.e. Lot and Deposited Plan (DP) references) of the Project Site includes: • Lot 3, DP 1018958 • Lot 4, DP 1016725 • Lot 3, DP 1181412 • Lot 3, DP 1226927 • Lot 4, DP 1226927 • Lot 91, DP1043967.
Environmental Impact Statement:	An Environmental Impact Statement (EIS) is attached which addresses all matters in accordance with Part 4, Division 4.12(8) of the *Environmental Planning and Assessment Act 1979*, and Schedule 2, Part 3, Clause 7(1)(e) of the *Environmental Planning and Assessment Regulation 2000*. I certify that I have prepared the contents of this EIS in accordance with the Secretary's Environmental Assessment Requirements (SEARs) (No. SSD-14540514) dated 18 March 2021, and that to the best of my knowledge, the information contained within this EIS is not false or misleading.
Signature:	
Name:	Heather Tilley
Date:	20/01/2022

Acronyms and Abbreviations

Term	Definition
ABS	Australian Bureau of Statistics
ACHA	Aboriginal Cultural Heritage Assessment
AC	Alternating current
AEMO	Australian Energy Market Operator
AEP	Annual Exceedance Probability
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
APZ	Asset protection zone
BAM	Biodiversity Assessment Method
BAMC	Biodiversity Assessment Method Calculator
BC Act	*Biodiversity Conservation Act 2016*
BCF	Biodiversity Conservation Fund
BCT	Biodiversity Conservation Trust
BDAR	Biodiversity Development Assessment Report
BESS	Battery Energy Storage System
BoM	Bureau of Meteorology
Council	Lithgow City Council
CEMP	Construction Environmental Management Plan
CFFMP	Construction Flora and Fauna Management Plan
cm	centimetre
CNMP	Construction Noise Management Plan
CTMP	Construction Traffic Management Plan
DA	Development Application
DAWE	Department of Agriculture, Water and the Environment (Federal)
DC	Direct current
DDR	Decommissioning, demolition and rehabilitation program
DEC	Former Department of Environment and Conservation (now Environment, Energy and Science)
DECC	Former Department of Environment and Climate Change (now Environment, Energy and Science)
DECCW	Former NSW Department of Environment, Climate Change and Water (now DPIE)
Delta	Former owner of the Wallerawang Power Station
DoP	Former Department of Planning (now DPIE)
DP	Deposited Plan

Term	Definition
DPE	NSW Department of Planning and Environment
DPIE	NSW Department of Planning, Infrastructure and Environment
EES	Environment, Energy and Science Group (Part of the NSW DPIE)
EIS	Environmental Impact Statement
EMF	Electromagnetic fields
EnergyAustralia	Previous owner of the Wallerawang Power Station
EP&A	*Environmental Planning and Assessment Act 1979*
EP&A Regs	*Environmental Planning and Assessment Regulation 2000*
EPA	Environment Protection Authority
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999 (Commonwealth)*
EPI	Environmental Planning Instrument
EPL	Environment Protection License
ERA	Environmental Risk Analysis
ESCP	Erosion and Sediment Control Plan
FFDI	Forest Fire Danger Index
FM Act	*Fisheries Management Act 2994*
FRNSW	Fire and Rescue NSW
GDE	Groundwater dependent ecosystems
GHG	Greenhouse gas
GML	General mass limit
GPT	Gross pollutant trap
GW	Gigawatt
GWh	Gigawatt hours
ha	Hectares
HAZID	Hazard Identification
Heritage Act	*Heritage Act 1977*
HML	Higher mass limit
HVAC	Heating, ventilation and air conditioning
HV	High voltage
ICNG	Interim Construction Noise Guideline
IPC	Independent Planning Commission
IPA	Inner protection area
ISEPP	*State Environmental Planning Policy (Infrastructure) 2007*
ISP	2020 Integrated System Plan for the National Electricity Market
kV	kilovolt

Term	Definition
kW	kilowatt
L	litres
LCC	Lithgow City Council
LGA	Local government area
Lithgow LEP	*Lithgow Local Environmental Plan 2014*
LSBS	Large-scale battery storage
m	metres
MNES	Matters of National Environmental Significance
MSL	Mean sea level
MW	Megawatt
MWh	Megawatt hours
MV	Medium voltage
NARCliM	NSW and ACT Regional Climate Modelling Project
NCC	National Construction Code
NEM	National Electricity Market
NEPM	National Environment Protection Measures
NML	Noise Management Level
NorBE	Neutral or Beneficial Effect
NPI	National Pollutant Inventory
NPfI	Noise Policy for Industry 2017
NPW Act	*National Parks & Wildlife Act 1974*
OEH	Former Office of Environment and Heritage
OEMP	Operation Environmental Management Plan
OOHW	Out-of-hours work
OSOM	Over Size Over Mass
PAD	Potential Archaeologic Deposit
PBP	Planning for Bushfire Protection 2019
PHA	Preliminary Hazard Assessment
POEO Act	*Protection of the Environment Operations Act 1997*
The Project	The Project for which approval is being sought, namely the construction, operation and maintenance of a Battery Energy Storage System known as the 'Wallerawang 9 Battery'.
The Project Site	Within the buffer lands of the decommissioned Wallerawang Power Station, located at 1 Main Street, Wallerawang NSW. The area where the Project would be located incorporates the following lots: Lot 3, DP 1018958, Lot 4, DP 1016725, Lot 3, DP 1181412, Lot 3, DP 1226927, Lot 4, DP 1226927.

Term	Definition
PSI	Preliminary Site Investigation
RAP	Registered Aboriginal Party
REZ	Renewable Energy Zone
RNP	Road Noise Policy 2010
Roads Act	*Roads Act 1993*
RORB	Rainfall runoff model
SAII	Serious and irreversible impact species
SEARs	Secretary's Environmental Assessment Requirements
SDWC SEPP	*State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011*
SEPP 33	*State Environmental Planning Policy No. 33 – Hazardous and Offensive Development*
SEPP 55	*State Environmental Planning Policy No. 55 - Managing Land Contamination Planning Guidelines Remediation of Land*
SEPPs	State Environmental Planning Policies
SISD	Safe Intersection Sight Distance
SoHI	Statement of Heritage Impacts
SRD SEPP	*State Environmental Planning Policy (State and Regional Development) 2011*
SSD	State Significant Development
TEC	Threatened Ecological Communities
TfNSW	Transport for New South Wales
TIS	NSW Transmission Infrastructure Strategy 2018
TIA	Transport Impact Assessment
TN	Total Nitrogen
TP	Total Phosphorus
TSS	Total Suspended Solids
v	Volt
WARR Act	*Waste Avoidance and Resource Recovery Act 2001*
WPS	Wallerawang Power Station

Executive Summary

Introduction

This Environmental Impact Statement (EIS) has been prepared on behalf of Greenspot Wallerawang Pty Ltd (Greenspot) to support a State Significant Development (SSD) application under Part 4, Division 4.7 of the *Environmental Planning and Assessment 1979* (EP&A Act). Division 4.7 of the EP&A Act identifies the Minister for Planning and Public Spaces, through the New South Wales (NSW) Department of Planning, Industry and Environment (DPIE), as the consent authority for development that is identified as SSD.

Greenspot (the Proponent) is seeking development consent for the construction, operation and maintenance of a Battery Energy Storage System (BESS) within the buffer lands of the decommissioned Wallerawang Power Station site. The BESS will be up to 500 Megawatts (MW) and would provide up to 1,000 Megawatt hours (MWh) of battery storage capacity (two hours of storage at maximum discharge rate). To reflect the legacy of the Wallerawang Power Station and acknowledge the long-term role the Power Station played in the NSW energy sector, the battery will be known as the **'Wallerawang 9 Battery'** (the Project).

This EIS has been prepared by Arcadis Australia Pacific Pty Limited (Arcadis) on behalf of Greenspot Pty Ltd to support an application for the approval of the Project. It has been prepared in accordance with the Secretary's Environmental Assessment Requirements (SEARs) provided for the Project in accordance with Section 4.12(8) of the EP&A Act and Schedule 2 the *Environmental Planning and Assessment Regulation 2000* (EP&A Regs).

Project Site and background

The Project is located approximately 10 kilometres northwest of Lithgow, one kilometre east of the main township of Wallerawang, and about 115 kilometres west of the Sydney Central Business District (CBD).

Greenspot acquired the old Wallerawang Power Station and buffer lands (including Lake Wallace) (an area comprising approximately 613 ha), from EnergyAustralia in September 2020 with the aim of repurposing the site. Repurposing of the power station and buffer lands is proposed to be undertaken as part of a Master Plan for the site known as the Greenspot 2845 Activity Hub.

The Project Site is located within in the buffer lands immediately south of the old Power Station, with the BESS planned to be constructed on a parcel of land of approximately 22-hectares. The BESS will be accessed from the Castlereagh Highway at Wallerawang, NSW. Figure ES-1 shows the local context of the Project.

Figure ES-1 Local context of the Project Site

The Project Site is located within the following application lots:

- Lot 3, DP 1018958 (BESS facility and office)
- Lot 4, DP 1016725 (BESS facility)
- Lot 3, DP 1181412 (Overhead transmission line, Lake Wallace and Coxs River, west of the Project Site)
- Lot 3, DP 1226927 (Includes the access road)
- Lot 4, DP 1226927 (Includes the access road)
- Lot 91, DP1043967 (TransGrid 330kV Substation)
- Castlereagh Highway (east of the Project site).

The Project Site is surrounded by buffer areas, areas with industrial and rural land uses, and residential areas. The wider area also includes several abandoned open cut mines and operating underground coal mines.

The closest residential receivers are located to the east of the Castlereagh Highway, about 150 metres southeast of the Project Site (at the closest point to the intersection of Castlereagh Highway and the access road to the Project Site). It is anticipated that the BESS will be located in the north-west of the Project Site, as close as possible to the TransGrid Wallerawang 330kV Substation, located approximately 320 metres east of the Project Site. Figure ES-2 shows the local context of the Project.

The Applicant and Project objectives

Greenspot's vision for the site as a whole, which has been given the working name of 'Greenspot 2845 Activity Hub', is that it will become a leading example of a master-planned precinct:

- Underpinned by energy generation and storage, and well designed and resilient water infrastructure
- With freight and logistics capabilities
- Which enables a range of businesses in the industrial and agricultural sectors together with commercial, residential, tourism, sport and recreational uses and significant public amenity
- Which, above all, creates long term jobs and is a significant contributor to the successful rejuvenation of the local and regional economy.

As important and catalytic first step in this vision, the Proponent is seeking development consent for the construction, operation and maintenance of a BESS - the Project. The objectives of the Project are to:

- Improve the security, resilience and sustainability of NSW's electricity grid
- Deliver a project that would serve as a significant enabler for the 'Greenspot 2845 Activity Hub'
- Minimise adverse impacts on the environment and community during construction and operation
- Provide an ongoing and consistent power supply (as part of a larger network) for the Lithgow community and Central West and Orana Region
- Provide critical energy storage to facilitate the greater introduction of renewables into the electricity network to meet NSW's household and industry demand for energy.

Project need

NSW is undergoing an energy sector transformation which will change how energy is generated and used throughout the State. Over the last 10-15 years there has been a steady increase in the number of renewable projects generating electricity for use in the National Electricity Market (NEM), as more of the State's coal-fired power stations are retired.

Wind and solar generation provide intermittent generation and need to be complemented with firm and flexible technologies such as hydro, batteries, bioenergy, concentrated solar power, demand management and gas-fired generators. When intermittent generators are unable to satisfy demand, other technologies which can provide electricity on demand (dispatchable firm generation, i.e. gas and battery storage) are able to satisfy electricity demand, provided there is sufficient firm dispatchable capacity.

Without the development and operation of short and long-term dispatchable capacity to support increasing investment in renewable energy into REZs, there is the potential for a future deficit in capacity with the reliability of the NSW power supply system exposed. In a worst-case scenario, this can lead to load shedding or blackout events. The need for the Project can be separated into two key parts including:

- To support the NSW Government's strategy for a reliable, affordable and sustainable electricity future that supports a growing economy. BESS facilities, such as the Project, will provide enabling infrastructure for expanding the renewable energy industry in NSW, particularly in the Central-West Orana REZ. As such, the Project will play a significant role in the transformation of the NSW energy sector.
- To serve as a significant enabler for the repurposing of the power station and buffer lands as part of a Master Plan, with the greater redevelopment of the site being critical to enhancing the economy by supporting long term sustainable job growth and improving social outcomes and the liveability of the region.

Project alternatives

A number of alternative scenarios to achieve the Project objectives were considered, and included:

- **The 'Do Nothing' scenario**: This option was rejected as it would not support the NSW Government's broader plans and strategies to make energy more affordable, secure investment in new power sources and network infrastructure and ensure new technologies deliver benefits for customers.
- **Build the Project**: The Project would leverage its strategic location of being 320 metres east of the existing TransGrid Wallerawang 330 kV Substation and south of the old Wallerawang Power Station. Building a large-scale BESS is expected to contribute to the reduction in the cost of supplying electricity to consumers in NSW. It is envisaged that the Project would also play a part in the energy network expected to power the physical redevelopment of the former Wallerawang Power Station and would form part of a broader sustainable energy supply strategy for the 'Greenspot 2845 Activity Hub
- **Site selection refinement**: Greenspot completed a site selection exercise for the Project, both within the Wallerawang Power Station site and also surrounding land. The Project Site has been refined since the submission of the Scoping Report as a result of design development, consultation with key stakeholders and to reduce the environmental impact.
- **The 'Preferred Option'**: After assessing two potential site locations within the Wallerawang Power Station site and surrounding land, the selected Project Site was considered as the preferred location for the BESS facility. This was based on the Project Site's proximity to the existing TransGrid Wallerawang 330 kV Substation, where no third-party easements or access across private property would be required and compatibility with existing land use zoning and permissibility.

Project description

The Project would involve the construction and operation of a large-scale Battery Energy Storage System (BESS) at Wallerawang, NSW. The BESS will be up to 500 MW and would provide up to 1,000 MWh of battery storage capacity (two hours capacity at maximum discharge rate).

Key features of the Project include:

- Large-scale BESS including battery enclosures, inverters and transformers
- 33/330 kV switchyard
- Overhead transmission line connection between the BESS and the nearby TransGrid Wallerawang 330 kV substation
- Ancillary elements including site access from the Castlereagh Highway, internal access roads and parking, site office and amenities, stormwater and fire management infrastructure, utilities, signage, fencing, security systems and landscaping.

Site establishment and construction would include:

- Clearing of vegetation and grubbing to remove tree stumps within the forestry area.
- Civil works for site levelling within the BESS area, 330 kV switchyard and ancillary areas.
- Trenching and installation of cable from the battery to the 33/330 kV switchyard.
- Installation of footings for battery enclosures, inverters, switch rooms and transformers, including pilings and concrete.
- Delivery, installation and fit out of the BESS including battery modules, inverters and medium voltage transformers.
- Delivery, installation and fit out of transformers and switchgear for the 33/330 kV switchyard.
- Installation of overhead transmission line towers, including pilings and concrete, and stringing of the line
- Construction of ancillary elements including, offices and amenities, installation of services, water and sewage management, fire systems and signage.
- Installation of permanent fencing and security systems.
- Testing and commissioning.

Operation

Figure ES-2 details the operational features of the Project. The Project would be operational 24 hours, seven days a week, and would generally be managed and monitored remotely with the exception of site maintenance. Ongoing operational would require up to five operational personnel.

Figure ES-2 Project Site operational layout

Planning Approval Pathway and Statutory Context

The Project is considered State Significant Development (SSD) under Clause 8 of the *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP), as the Project would be classified as electricity generating works on land that is permitted with development consent under Clause 34 of the *State Environmental Planning Policy (Infrastructure) 2007,* and would have a capital investment value greater than $30 million. Clause 34(1) of ISEPP specifically refers to:

'development for the purpose of electricity generating works may be carried out by any person with consent on the following land –

(a) in the case of electricity generating works comprising a building or place used for the purpose of making or generating electricity using waves, tides or aquatic thermal as the relevant fuel source—on any land

(b) in any other case—any land in a prescribed rural, industrial or special use zone.'

The relevant local planning instrument is *Lithgow Local Environmental Plan 2014* (Lithgow LEP). The Project Site is zoned IN3 (Heavy Industrial), SP2 (Infrastructure) Electricity generating works / road infrastructure and RU1 (Primary Production). As the Project is SSD under the SRD SEPP, the Lithgow LEP 2014 does not apply to the extent of any inconsistency with the SRD SEPP.

Consultation

Agency, organisation and community consultation has been undertaken since the start of the acquisition of the Wallerawang Power Station in September 2020 and has continued throughout the development of the Project to-date.

Agency consultation

A number of agencies and interested stakeholder were consulted during the preparation and assessment of the Project, including:

- Department of Planning, Industry and Environment (DPIE)
- DPIE (Biodiversity, Conservation and Science)
- DPIE (Water and the Natural resources Access Regulator (NRAR) (Water Knowledge Office)
- Heritage NSW (as Delegate of Heritage Council of NSW)
- Lithgow City Council
- Water NSW
- Transport for New South Wales (TfNSW)
- TransGrid
- Forestry Corporation of NSW
- John Holland (as the operator of the Country Regional Rail Network)
- NSW Rural Fire Service
- NSW Treasury
- Department of Regional NSW.

These agencies and stakeholders were consulted via meetings, telephone conversations, email and/or letter correspondence. Key issues raised included:

- Traffic and transport
- Noise and vibration
- Soils and contamination
- Biodiversity
- Aboriginal Heritage
- Non-Aboriginal Heritage
- Hazards and Risk

These and other issues have been addressed throughout this EIS.

Community consultation

Community and stakeholder engagement activities regarding the Project commenced in late 2020 and have continued throughout the development of the EIS. Community consultation activities undertaken to date include:

- A dedicated website (www.greenspot.com.au)
- Through social media including a Facebook page and LinkedIn profile
- Community newsletters and newspaper articles
- Site visits.

Environmental issues

A summary of the environmental issues, as identified within the SEARs is provided in Table ES-1. Potential constraints have been mapped in Figure ES-3.

Table ES-1 Summary of the environmental issues

Environment issue	Potential construction and operational impacts
Traffic and Transport	A Traffic Impact Assessment (TIA) was undertaken by Arcadis (Section 8 and Appendix C). The TIA assessed potential traffic impacts on the local road networks surrounding the Project (including Castlereagh Highway, Unnamed Access Road and Great Western Highway) generated by the Project. Turn warrant assessments of the proposed access to the Project Site during construction and operation indicate that based on the expected peak hour traffic volumes for construction vehicles, basic left turn (BAL) and basic right turn (BAR) treatments would be sufficient for the access to accommodate the construction stage turn movement volumes. **Construction** Construction traffic movements are anticipated to comprise: • Up to 100 two-way light vehicle movements per day (total of 100 light vehicle movements per day in both directions) associated with workers coming to site • Up to 20 two-way heavy vehicle movements per day (total of 20 heavy vehicle movements per day in both directions), associated with transport of equipment, and materials including batteries

Environment issue	Potential construction and operational impacts
	• Up to 36 Over Size Over Mass (OSOM) movement across the construction period is anticipated. The Project Site access would be formalised to accommodate B-Double movements, which is the largest design vehicle expected to use the access during construction (for regular use). This formalised access would also be sufficient to also accommodate the Over Size Over Mass (OSOM) delivery vehicle turn paths. The intersection would be formalised in accordance with *Austroads Guide to Road Design Part 4 Intersections and Crossings* (Austroads, 2021), turn treatments for rural roads. The posted speed of Castlereagh Highway be reduced from 100 km/h to 80 km/h for the duration of construction activities on the Project Site and only along the road section fronting the Project Site. To assess the worst-case scenario, it was assumed that there would be 36 OSOM deliveries, comprising 12 MV transformer deliveries, 20 MV switchgear deliveries and up to four HV transformer deliveries over the construction period. Heavy vehicle movements associated with the transport of equipment, materials and batteries would be uniformly distributed across the shift periods. This would entail two heavy vehicle trips per hour. The majority of construction and delivery traffic would be coming from the south, predominantly from Lithgow and Sydney via the Great Western Highway. These movements would be undertaken in accordance with applicable licences and permits. OSOM movements would be scheduled outside of peak periods where feasible and may occur outside of standard construction hours. These movements would be infrequent and would be undertaken in accordance with the Project Construction Traffic Management Plan (CTMP) and applicable licences and permits. OSOM deliveries are not anticipated to result in a significant impact on the road network during construction. Vehicle access to and from the Project Site is provided off the Castlereagh Highway which would be formalised to accommodate the OSOM vehicle turn paths. Formalising the access would include a paved road surface for up to 40 m into the site to eliminate any gravel spill over onto the Castlereagh Highway and would also require minor pavement widening to allow for lateral movements of vehicles when decelerating into the access. Traffic generated during construction of the Project is not expected to compromise safety or function of the surrounding road network and impacts during morning and evening peak periods are expected to be minimal. Swept path analysis has shown that the proposed access layout would be sufficient to accommodate the design vehicle turn path requirements for both B-doubles and OSOM vehicles. **Operation** The estimated workforce would consist of a small number of workers (up to five staff) and should have minimal impacts on the road network. It is expected that there may be some irregular heavy vehicle movements during the operational stage for maintenance activities, such as replacing of transformers etc, however these movements are expected to be infrequent and would have a negligible impact on the road network. Therefore, the Project would have a negligible impact on surrounding road network performance. **Mitigation measures** Measures to manage traffic during construction of the Project would be included in the Construction Traffic Management Plan (CTMP). Further, site-specific control plans (TCPs) would be prepared as part of the CTMP to outline how construction vehicles would move in and out of the Project site and ensure the safety of pedestrians moving through the site. An

Environment issue	Potential construction and operational impacts
	Operational Traffic Management Plan (OTMP) will be developed as part of the OEMP for the Project.
Noise and Vibration	An assessment of the potential construction and operational noise and vibration impacts associated with the Project was undertaken by Resonate (Section 9 and Appendix D). Noise was characterised for two 'noise catchment areas' (NCA), with NCA01 being a residential area in Wallerawang township west of the Project and NCA02 located east of the Project near the closest residential receivers. A range of noise management levels and vibration criteria were developed in accordance with the relevant NSW guidelines and policies. **Construction** Established total sound power levels for a range of equipment likely to be used during construction were used to predict potential noise from construction. Exceedances of between 2-3 dB(A) and 3-12 dB(A) for residential properties in NCA01 and NCA02 respectively may occur. The predicted noise levels at receivers are generally low in the context of typical construction noise, however, there are a number of exceedances of noise management level could occur due to the relatively low background noise levels of NCAs. **Operation** Primary noise sources for operation of the Project have been calculated based on an indicative battery system that would meet the Project requirements. The sound power levels for the operational battery units vary, depending on the cooling requirements of the battery and operational fan loads or 'fan duty'. Modelling for three assessment scenarios was undertaken using the CONCAWE algorithm within SoundPLAN v8. Using these noise sources, the following assessment scenarios were modelled: • Scenario 1: Base case: Without mitigation (80% fan duty without noise barriers) • Scenario 2: Reduced source sound power levels and noise barriers (40% fan duty with noise barriers). • Scenario 3: Further reduced source sound power levels and noise barriers (20% fan duty with noise barriers). Based on historic climatic conditions, the units are expected to operate at 20% fan duty most of the time with periods of 40% fan duty when under load or warmer ambient conditions during the day and evening periods. During the night-time period, the units would operate at 20% fan duty with the exception of around 1.65 days per year (during particularly warm periods), where they would operate at 40% for night-time periods. A realistic 'worst case' scenario would be associated with 40% fan duty while 20% fan-duty would be associated with the 'standard' operational conditions. The average predicted exceedance for Scenario 2 is 1.5 dB(A) to the west and 2.6 dB(A) to the east. Typically, these exceedances would be considered *not perceptible / just perceptible,* while for Scenario 3, no non-residential / rural primary production receivers are predicted to exceed the established criteria. The operation of the Project would result in steady state continuous noise emissions without impulsive noise events. Therefore, sleep disturbance impacts are not anticipated. Compliance with Project criteria could be achieved with 20% fan duty (which would occur for the majority of the time for this battery solution). Detailed design will ensure compliance with the Project specific noise criteria. If and where required, this will include adjustments to the choice of equipment and/or refinements to the facility layout.

Environment issue	Potential construction and operational impacts
	Mitigation measures A Construction Noise and Vibration Management Plan (CNVMP) would be prepared and implemented as part of the Construction Environmental Management Plan (CEMP) and would identify feasible and reasonable approaches to reduce noise and vibration impacts during construction of the Project. Works would be programmed to occur during standard working hours only. If works must occur out of hours for justified reasons, the out of hours works would be separately assessed with appropriate noise mitigation and community consultation implemented as necessary based on the level of predicted impact. The Operational Environmental Management Plan (OEMP) would include measures and processes for managing noise resulting from the operation of the Project, including a process for managing complaints.
Soils and Contamination	A desktop assessment of soils and contamination was undertaken in consideration of the relevant guidelines and legislation, including *State Environmental Planning Policy 55 – Remediation of Land (SEPP55)* and *Contaminated Land Management (CLM) Act 1997*. Database searches and a review of publicly available information included acid sulfate soil (ASS) risk maps, soil resource information, the NSW EPA's contaminated land records and notified sites list, review of the geology, topography, hydrology, hydrogeology and groundwater. An evaluation of aerial photographs to assist in assessing historical land uses and conditions within and surrounding the Project Site. When considering the guidelines and legislation, and the history of Project Site, it is not considered to be a contaminated land area. (Chapter 10). **Construction** Construction of the Project could increase the risk of erosion and sedimentation and potentially impact on sensitive receiving environments, including the Coxs River and Lake Wallace. There is potential for fuels and chemicals to spread to the surrounding environment, including the soil and the Coxs River, through spills and leaks from equipment if not appropriately managed. The ASS risk maps indicated the potential for ASS to be present is low / nil and exposure to previously buried contamination is also considered to be low. **Operation** The Project Site would minimise sedimentation risks during operation by diverting and distributing stormwater via a management system. The operation of the Project is not anticipated to result in contamination impacts. **Mitigation measures** A detailed Erosion and Sediment Control Plan (ESCP) would be prepared as part of the CEMP, in accordance with *Managing Urban Stormwater – Soils and Construction, Volume 2D* (Landcom, 2004) to manage risks from erosion and sedimentation. An Unexpected Finds Protocol will be included in the CEMP to manage any disturbance of material that is odorous, stained or containing anthropogenic materials, in the event these are encountered during construction. The OEMP prepared for the Project will include measures to manage any spills that occur during operation.
Biodiversity	A Biodiversity Development Assessment Report (BDAR) was prepared by an accredited assessor in accordance with the Biodiversity Assessment Method (BAM) as prescribed under Section 6.7 of the *Biodiversity Conservation (BC) Act 2016*. Assessments of potential impacts to Matters of National Environmental Significance (MNES) identified under the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* have been prepared in accordance *with Matters of National Environmental Significance: Significant Impact Guidelines 1.1*

Environment issue	Potential construction and operational impacts
	(Commonwealth of Australia, 2013). The BDAR is included in Appendix E of the EIS and summarised in Chapter 11. The Project Site has been previously cleared and highly disturbed by human activity. None of the vegetation identified at the Project Site is equivalent to any Threatened Ecological Communities listed under the BC Act and EPBC Act. The Project Site does not contain any existing wetlands. The Coxs River and Lake Wallace are both mapped as a 'Sensitive Waterway' under the Lithgow LEP and Key Fish Habitat and provide habitat for threatened and/or migratory birds. **Construction** Potential impacts from the Project include removal of threatened tree species, plant community types and native vegetation, fauna mortality and indirect impacts. All vegetation within the construction footprint would be removed prior to construction commencing. This includes 1.15 ha of PCT 677 (Black Gum grassy woodland of damp flats and drainage lines of the eastern Southern Tablelands; South Eastern Highlands Bioregion) and 6.48 hectares of exotic vegetation. PCT 677 is known or potential habitat for threatened fauna species. Approximately 16 hollow-bearing trees were identified within the study area, of which six would be cleared as a result of the Project. The Biodiversity Assessment Method identifies 16 potential indirect impacts which have also been considered as a part of a BDAR. The results of the significant impact criteria assessments determined that the Project would not significantly impact on any of the threatened species identified at Project Site. As such, the Project is not considered likely to require referral to the Commonwealth Minister for the Environment for impacts to MNES. **Operation** There is some potential for edge effects during maintenance activities through the operational period of the BESS. Trampling of adjacent native vegetation, rubbish dumping, soil disturbance and weed spread could occur, though this is likely to be minor and localised. **Mitigation measures** A Construction Flora and Fauna Management Plan (CFFMP) will be prepared implemented and would be approved by DPIE prior to any clearing of native vegetation and threatened species habitat within the Project Site. Pre-clearing surveys will be undertaken to identify any breeding or nesting activities by native fauna in hollow-bearing trees and native vegetation. A two-stage approach to clearing will be undertaken. With the appropriate mitigation measures implemented, including a Construction Flora and Fauna Management Plan, the likelihood of these impacts is significantly reduced.
Aboriginal Heritage	An Aboriginal Cultural Heritage Assessment was undertaken by NGH for the Project which included consultation with Aboriginal stakeholders. The Aboriginal Cultural Heritage Assessment (ACHA) Report is included in Appendix F of the EIS and summarised in Section 12. The Project Site is considered to be archaeologically sensitive, however, historic land use practices have resulted in significant but spatially discrete ground and site disturbances. As a result, it is considered that only undisturbed areas within the Project area are likely to retain intact archaeological deposits. Disturbed areas may still contain Aboriginal objects and sites, though they are no longer likely to be *in situ*. A search of the Aboriginal Heritage Information Management System was conducted to investigate any previous records of Aboriginal sites within 50 m of the Project Site which revealed no sites have been recorded. The ACHA site inspection confirmed the presence of Aboriginal objects and areas of potential subsurface deposits within the survey area. This comprised one Isolated Find (Wallerawang

Environment issue	Potential construction and operational impacts
	BESS IF+ PAD 02) within an associated Potential Archaeological Deposit (PAD) area and two artefacts (Wallerawang BESS AFT+ PAD 01) within an associated PAD area, suggesting that there is potential for intact subsurface deposits to remain in parts of the Project Site. Wallerawang BESS AFT+ PAD 01 and Wallerawang BESS IF + PAD 02 have been recorded as AHIMS ID# 45-1-2844 and AHIMS ID# 45-1-2843 respectively. **Construction** Construction of the Project would require earthworks and disturbance to the ground surface, which would have the potential to impact on previously recorded sites of Aboriginal heritage significance. The proposed construction footprint has been refined to avoid identified PAD's and to preserve and conserve landforms with *in-situ* archaeological potential. The potential for impacts to Aboriginal heritage within the refined construction area footprint are considered very low. **Operation** Aboriginal heritage would not be directly impacted during operation of the Project, as ground disturbance / excavation would be restricted to the construction phase of the Project. The introduction of new infrastructure is not expected to impact the setting or value of local Aboriginal items or sites. **Mitigation measures** Given the heavily disturbed nature of the Project Site and general lack of archaeological potential, proposed mitigation would focus on a procedure for the management of unexpected archaeological finds and would be documented within the CEMP and OEMP for the Project.
Non-Aboriginal Heritage	NGH prepared a Statement of Heritage Impact (SoHI) for the Project to determine the presence of any heritage items or historical archaeology of significance. The SoHI for the Project is provided in Appendix G. The SOHI assessment was prepared in accordance with the relevant guidelines and publications. A desktop review identified nine listed non-Aboriginal heritage items and identified no Commonwealth listed non-Aboriginal heritage items within one kilometre of the Project Site. Two additional items not previously listed on any register were identified as holding potential heritage significance: the Original Western Line railway alignment, and a sandstone culvert running beneath the former railway alignment. These potential heritage items were assessed against the seven NSW Heritage Significance criteria, and a statement of significance was prepared to outline their overall heritage value. **Construction** Construction of the Project would not result in impacts to listed Commonwealth, State or local heritage items. A section of the Original Great Western Railway embankment located within the proposed construction footprint will need to be removed to level out the area. This material will be utilised as fill in accordance with the current cut/fill design. The sandstone culvert is located within the section of embankment that will be retained and will be avoided during construction. There is a potential for secondary impacts on the culvert to occur as a result of vibration from construction activities, however impacts are considered unlikely. While the railway embankment and sandstone culvert comprise a section of the original Great Western Railway line alignment, they are not rare and 130 m (33%) of the embankment will be preserved, including the sandstone culvert. The assessment of heritage impacts has found that the overall impact is minor and that any partial adverse impacts to the original Great Western Railway heritage impact can be mitigated by the retention of the sandstone culvert and the completion of an archival recording.

Environment issue	Potential construction and operational impacts
	Operation Operational noise and vibration associated with the inverters and transformers installed on the BESS may have a minor impact to the longevity of the Sandstone Culvert, however, overall, the operational impacts to non-Aboriginal Heritage are anticipated to be low to negligible. **Mitigation measures** Given the already altered state of the Project Site and lack of archaeological potential, proposed mitigation would focus on a procedure for the management of unexpected archaeological finds which would be documented within the OEMP for the Project.
Bushfire Risk	A Bushfire Risk Assessment has been undertaken by Bushfire Consulting Services Pty Ltd for the Project to assess bushfire risk (Section 14 and Appendix H). The assessment included an analysis of the hazard, threat and subsequent risk to the Project and provides recommendations that satisfy the aim and objectives of *Planning for Bushfire Protection* 2019 (NSW RFS, 2019). The Project Site is located within bushfire-prone land as identified by the Lithgow City Council bushfire prone land map and has been assessed as containing high and medium bushfire risk vegetation. **Mitigation measures** At the commencement of the development, and for the life of the development the curtilage surrounding the proposed BESS shall be managed as an Inner Protection Area (IPA) and Asset Protection Zone (APZ) in all directions A 20-meter IPA is proposed for the switchyard, the 330 kV overhead transmission line corridor and any supporting pylons. A static water supply of two 20,000 litre water tanks would be made available for fire suppression activities, with multiple tanks being provided as required. An Emergency Evacuation Plan and bushfire management plan would be prepared as part of the CEMP and the OEMP
Hazards and Risk	A hazard and risk screening analysis has been undertaken Sherpa Consulting to identify potential hazards and risks during construction and operation of the Project. The Preliminary Hazard Analysis (PHA) for the Project is provided in Appendix I. The PHA was prepared in accordance with the relevant guidelines. It was determined the potential risk to people, property and the biophysical environment that may occur as a result of the accidental release of potential hazardous material and energy, in accordance with Hazardous *Industry Planning Advisory Paper (HIPAP) No.6 – Hazard Analysis* (DoPE, 2011), would trigger the requirement for a Preliminary Hazard Analysis (PHA). Key hazards and risks associated with the Project include exposure to voltage, release of energy (i.e. arc flash), fire, release of hazardous materials, generation of explosive gas, battery thermal runaway and exposure to Electric and Magnetic Fields (EMFs) It was determined that the consequences of the identified events are not expected to have significant off-site impacts therefore a Level 1 PHA was undertaken. The risk assessment concluded that all identified risks would be low with the exception of unauthorised access to the Project. A qualitative assessment against the HIPAP No. 4 - Risk Criteria for Land Use Safety Planning risk criteria was undertaken. The Project was found to comply with all of the criteria. An assessment of the potential hazards and risks associated with electromagnetic fields was undertaken using the International Commission on Non-Ionizing Radiation Protection (ICNIRP) *Guidelines for limiting exposure to Time-varying Electric, Magnetic and Electromagnetic Fields* (EMF) (ICNIRP Guidelines). The assessment found that EMF from the

Environment issue	Potential construction and operational impacts
	Project would not exceed the ICNIRP occupational exposure reference levels because the strength of EMFs attenuates rapidly with distance, exposure to the general public would not be exceeded and impact to the general public in surrounding land uses would be negligible. The risk matrix determined the risk of EMF is considered 'Low'. Equipment and systems would be designed and tested to comply with relevant international and/or Australian standards (e.g. AS 5139) and guidelines. The CEMP and OEMP would incorporate the standards of the *Work Health and Safety Act 2011 (WHS* Act).
Water Quality, Flooding and Water use	A Neutral or Beneficial Effect on Water Quality (NorBE) assessment has been undertaken by Arcadis and a Flooding Assessment has been prepared by Hydrology and Risk Consulting Pty Ltd. The NorBE and Flooding assessments have been provided as Appendix J and Appendix K of this EIS respectively. The Project Site is located adjacent to the Coxs River on potentially flood prone land. New amendments to the 'Flood Planning' provisions of the Standard Instrument local environmental plans and Schedule 4 of the EPA Regulation 2000 took effect on 14 July 2021. The new provisions have been introduced in connection with the NSW Government's new 'flood-prone land package' which aims to improve the management of flood risk in light of recent flooding events that have caused significant risk to life and damage to property, including up to and beyond the 1% annual exceedance probability (AEP) flood level. To achieve this, consent authorities need to consider the full range of flood behaviour, such as the upper bound of possible flood impacts (ie the probable maximum flood (PMF)) as well a more frequent event (e.g. 10% AEP). These new amendments have been considered in the flooding assessment. Potential impact associated with the Project as it relates to Water quality, flooding and Water use is summarised below. **Construction** Bulk earthworks and vegetation clearing activities during construction, if not managed properly, could result in increased mobilisation of soil and increased surface water runoff (e.g. sediment laden "dirty" water) into the downstream receiving waters of the Coxs River. This could also include pollutants (such as oil, hydraulic fluids and fuels) from spills or leaks from equipment. Earthworks would involve 'levelling of the site' where isolated elevated sections of the Project Site would be redistributed across depressions on the site. It is not anticipated that the Proposal would intercept groundwater during the main earthworks for the Project Site. The construction of the Project would have a limited water demand. Water may be used during dust suppression and to mix concrete for use on site. This water would be supplied by truck as required. Some water may also be required for construction site office facilities (e.g. for showers and kitchen use). Water and hydrology impacts arising from the construction of the Project are considered minimal due to the limited duration and intensity of construction activities. **Operation** A series of stormwater treatment measures that would be incorporated into the design of the Project to manage water quality during operation of the Project. These would include the use of grassed swales, bioretention basins and Gross Pollutant Traps (GPT). MUSIC modelling results for the proposed development indicate that the proposed measures successfully achieve the NorBE criteria in relation to mean annual pollutant loads. TUFLOW flood modelling was used to compare the existing and proposed flood conditions for 1% and 5% AEP and for PMF events. The modelling showed that for both the 1% and 5% AEP

Environment issue	Potential construction and operational impacts
	events, there is minimal change to the flood extent and in this case all changes to the flood regime would be on land owned by the Proponent. In the case of PMF, there would be additional flooding across the BESS and substation areas of the site with additional sheet flow of approximately 100 mm depth. The sheet flow is a result of the levelling of the BESS area, as the area slowly drains due to the lack of gradient. The Project Site would not be connected to the mains water service and as such, all potable water for use in the Project office would be brought in via tanker as required. A water tank would be provided adjacent to the Project Site offices to collect rainwater from roof areas and provide a valuable on-site water supply. The water use requirements for the Project Site are minor and are not considered to be a significant impact. **Mitigation measures** Any potential impacts were concluded to have been adequately mitigated by existing and proposed design and management measures. A Soil and Water Management Plan and Erosion and Sediment Control Plans would be prepared as part of the CEMP and in accordance with *Managing Urban Stormwater – Soils and Construction, Volume 2D* (Landcom, 2004). The OEMP would include a management, maintenance and cleaning schedule to ensure that stormwater management system devices are regularly inspected and maintained.
Visual Amenity	A desktop assessment was undertaken by Arcadis to identify the quantity and potential visual amenity impact of the Project during construction and operation (Section 17). The Project Site is located within an established industrial/power generation area. The closest residential dwellings are located on Springvale Lane approximately 150 m south-east from the nearest construction activities of the Project Site. Six potential viewpoints were identified and photographs from each of these locations were taken during a site inspection. The visual impact of the Project at the six identified viewpoints was assessed against three criteria: visual sensitivity, magnitude and visual impact. **Construction** There is potential for some construction equipment to be visible from two of the viewpoints, one of which is residential. Due to the temporary nature of the construction works and the surrounding industrial land uses, it is unlikely that visual impacts would be overly intrusive. **Operation** The Project would generally be consistent with the visual built form and visual character of the broader power generation area and is not anticipated to result in substantial visual impacts to the surrounding receivers. The Project was assessed as having a 'negligible impact' at four viewpoints and moderate-low at two viewpoints at which the overhead transmission line towers that may range between 30 m and 80 m high, the Wallerawang substation and BESS units may be viewed. **Mitigation measures** Mitigation measures will be implemented during construction and operation of the Project to minimise any potential visual amenity related impacts. The design of the proposed BESS facility would consider the use of materials that integrate with the surrounding landscape. A Landscape Plan would be prepared during detailed design to help the Project blend into the surrounding landscape and provide screening where appropriate.

Environment issue	Potential construction and operational impacts
Air Quality	A desktop assessment was undertaken by Arcadis to identify the air quality and odour impacts associated with the Project. **Construction** The most likely impacts to air quality during construction of the Project relate to potential fugitive dust emissions from earthworks and ground disturbance and emissions from construction vehicles, plant and equipment. The construction period would be approximately 12 to 24 months. Given the distance to the nearest sensitive receivers (150 m from the Project Site at the closest point of the Castlereagh Highway intersection with the access road to the Project Site) and the short term and temporary nature of construction works, the Project is not anticipated to have a substantial impact on air quality during construction. **Operation** Operation of the BESS would not result in any emission of particulates or other pollutants. Movement of staff vehicles on the access tracks to and through the site during maintenance activities may result in minor particulate and dust emissions. However, during operation, staff movements are estimated to be up to five vehicles per day and would have a negligible impact on local air quality. **Mitigation measures** Reasonable and feasible dust suppression will be implemented during construction activities including the use of water tanks and/or carts, sprinklers, site exit controls (e.g. wheel washing systems and rumble grids) to minimise fugitive dust emissions. An Air Quality Management Plan (AQMP) will be prepared as part of the CEMP. No mitigation measures have been identified for operation as it is unlikely there would be any operational air quality impacts.
Climate Change	A Climate Change Risk Assessment based on the latest available climate science and risk assessment research was undertaken by Arcadis to identify climate change risks and impacts for the Project. Due to the relatively short construction timeframe, potential impacts of climate change are expected to be minimal for construction. Climate change projections for the operational phase of the Project show the potential for an increase in operational risks, associated mostly with flood and storm related events, which would be considered as part of the design development for the Project.
Waste Management	A desktop assessment was undertaken by Arcadis to identify the quantity and potential impact of the waste generated by the Project during construction and operation. The construction and operation of the BESS would generate waste from a variety of sources and activities. Waste will be managed where feasible, on the hierarchy of priorities for the efficient use of resources; which is consistent with the objectives of the *Waste Avoidance and Resource Recovery (WARR) Act 2001*. The waste impacts of the construction and operation of the Project are deemed to be minor and any impacts would be readily managed and reduced through the implementation of mitigation measures. **Construction** Waste generated through construction is likely to include construction waste (like packaging, scrap metal), excavated material, green waste, and recyclables from the construction compounds and site offices.

Environment issue	Potential construction and operational impacts
	Operation Waste would be generated from battery replacement and maintenance, offices, amenities, lunchrooms, stormwater systems, and maintenance of plant and equipment. The Lithium-ion batteries are expected to be returned to the supplier or a suitably licenced processing facility for recycling, re-purposing or appropriate disposal at a licenced facility. **Mitigation measures** Measures to mitigate the effect of the construction waste streams would be incorporated into the Project's CEMP and OEMP and would include best practice waste avoidance and waste management where practicable.
Socio-economic	Due to the limited duration of construction, the socio-economic impacts are anticipated to be minor and would include: • Generation of employment and business opportunities for local residents through the presence of the construction workforce during the construction phase. • Impacts to amenity of nearby residential receivers (i.e. noise, visual). • Temporary traffic disruptions to users of the Castlereagh Highway. Operation of the BESS may also result in the following positive socio-economic outcomes: • Assist with ongoing regional development of the Lithgow community complimentary to the Lithgow Local Strategic Plan (LLSP) • Provide a reliable and secure source of electricity for the local region • Facilitate the introduction of a proven technology that has the potential to support renewable energy. Measures for reducing other environmental aspects (e.g. traffic disturbance, fire risks noise and air quality impacts) and other social impacts will be incorporated into the CEMP and OEMP which will also reduce any associated social impacts.
Property and Land use	A *Land Use Conflict Risk Assessment* has been prepared in accordance with the Department of Industry's *Land Use Conflict Risk Assessment Guide (DPI, 2011)* and is included as Appendix L of this EIS. The Project is located on six lots, five of which are owned by Greenspot and one lot that is owned by TransGrid. The zoning of the Project Site is a combination of IN3 (Heavy Industrial), SP2 (Electricity Generation) and RU1 (Primary Production). The assessment identified that potential land use conflicts would be minor, and the measures included in other sections of this EIS are considered suitable to mitigate these issues. The western portion of the Project Site is a commercial forest which is subject to a Pine Plantation Deed and is managed by Forestry Corporation of NSW. These trees would be harvested prior to construction commencing, However, approval for this process would be undertaken separately to this Project.
Cumulative Impacts	The Project has been assessed in the context of the proposed and future developments in the surrounding area that may result in cumulative environmental impacts, specifically: • Great Western Battery (State Significant Development Application) (SSD-12346552) (DPIE, 2021) • Wallerawang Power Station Decommissioning, Demolition and Rehabilitation (DDR) Program (Greenspot, 2021). Based on the nature of the Project (and these proposals), the key potential cumulative impacts identified are traffic and transport, noise and vibration, air quality and amenity impacts. Only cumulative impacts associated with the demolition phase (Stage 2) of the DDR program have been considered, as the Project would overlap with the DDR for up to six months.

Environment issue	Potential construction and operational impacts
	All impacts are considered to be relatively minor given the relatively small scale of the developments and the short-term nature of construction for the two surrounding proposed developments and the Project. The construction mitigation measures considered in Sections 8 to 22 are considered to be adequate to mitigate the cumulative impacts detailed below.

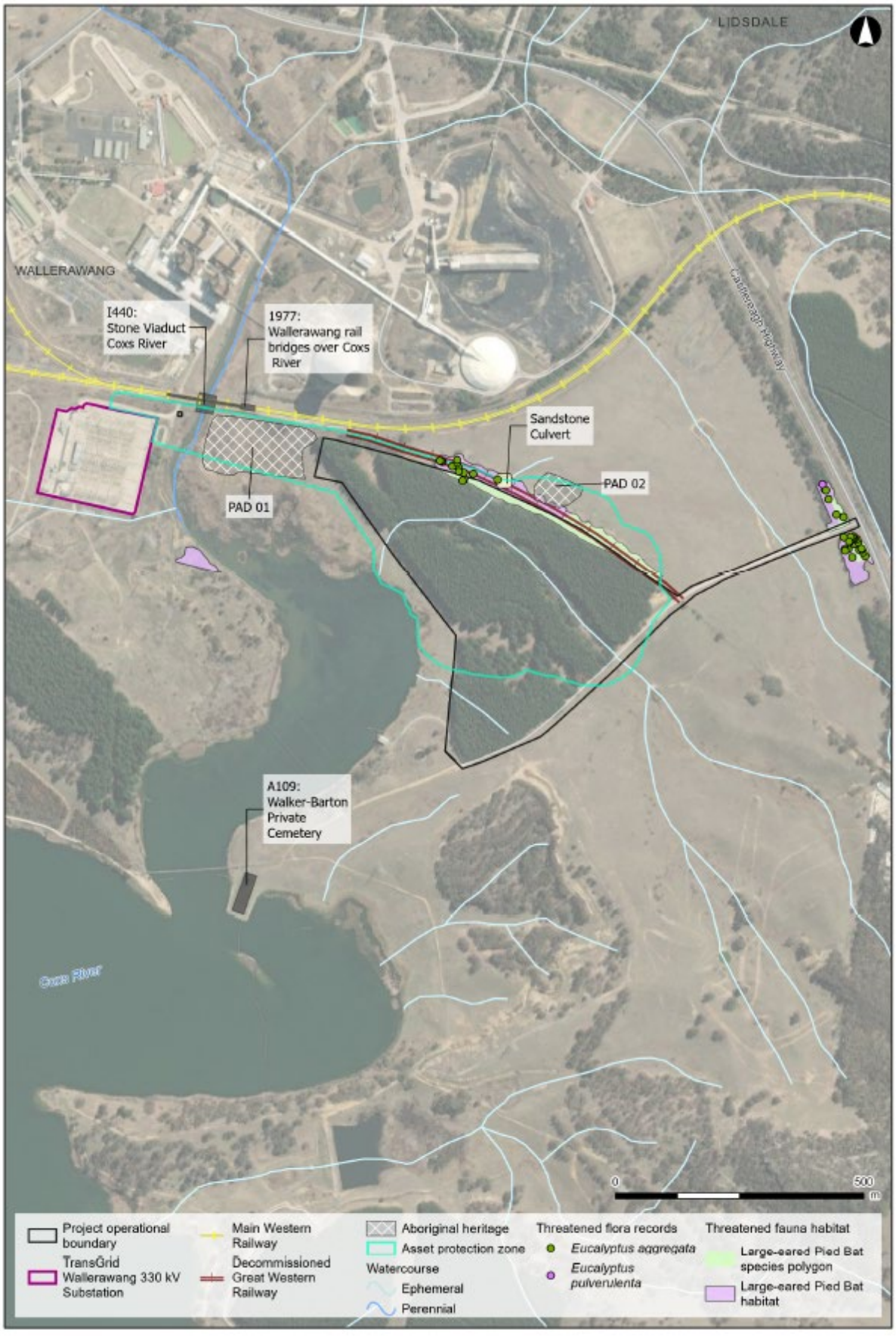


Figure ES-3 Project environmental constraints

Ecologically sustainable development

As required under the SEARs and the EP&A Regulation (Schedule 2, Clause 7), the was assessed against the principles of ecologically sustainable development. Each ecologically sustainable development principle has been considered and incorporated in the development of Project. With appropriate mitigation measures as identified throughout this EIS undertaking the Project in the manner proposed is consistent with the principles of ecologically sustainable development.

Justification and conclusion

Greenspot is seeking to establish a market leading Battery Energy Storage System (BESS), to be known as the 'Wallerawang 9 Battery', located at the site of the old Wallerawang Power Station at Wallerawang, NSW. The BESS will be up to 500 Megawatts (MW) and would provide up to 1,000 Megawatt hours (MWh) of battery storage capacity (two hours of storage at maximum discharge rate). Construction is expected to commence in Quarter 2/Quarter 3 of 2022 and will continue for approximately 12-24 months.

Environmental investigations were undertaken during the preparation of the EIS to assess the potential environmental impacts of the Project. This included assessment of the key environmental issues identified as being Traffic, Transport and access, Noise and vibration, Water quality and hydrology, Soils and contamination, Aboriginal heritage, Biodiversity, Bushfire and Hazards and risk.

The EIS concludes that many of the potential impacts identified would be effectively managed through Project design. To manage other impacts, and in some cases eliminate them completely, a number of mitigation and management measures would be implemented as outlined in Section 24.

The EIS includes an assessment of the permissibility of the Proposal under relevant EPIs and legislation (Section 5). The Project is permissible with consent and is 'state significant development' (SSD) under Part 4, Division 4.7 of the EP&A Act.

In conclusion the Proposal has been assessed in accordance with the EP&A Act and the SEARs. The Project satisfies the requirements of the SEARs (Appendix A) and is consistent with the principles of ecologically sustainable development (Section 25). The potential environmental, social and economic impacts, both direct and cumulative, have been identified and thoroughly assessed as part of this EIS. The assessment concluded that no significant environmental impacts have been identified as a result of the Project. It is considered that any potential impacts can be satisfactorily mitigated through a range of measures that have been identified within the EIS. In addition, the Project has been assessed against, and has been found to be consistent with, the priorities and targets adopted in relevant published and draft State plans, as well as Government policies and strategies.

The Project is considered critical in supporting the NSW Government's electricity strategy for a reliable, affordable and sustainable electricity future that supports a growing economy. Overall, the EIS concludes that the Proposal is in the public interest and approval is recommended.

Next steps

The EIS will be placed on public display for 28 days in accordance with Schedule 1, Division 2 (Part 9, SSD applications) of the EP&A Act. This public display period would provide an opportunity for all stakeholders to comment on the Project. On completion of the public display period, all submissions received would be considered in a response to the DPIE.

Opportunities would also be provided for the community to provide feedback as well as for the dissemination of up-to-date information on the Project via an email feedback system with the Applicant (communityinfo@greenspot.com.au).

1 Introduction

This chapter provides an overview of the Wallerawang Battery Energy Storage System (the Project), Project background, Project location, site history, Project objectives, and describes the Proponent. The chapter also outlines the structure of this Environmental Impact Statement (EIS).

1.1 Project overview

Greenspot Wallerawang Pty Ltd (Greenspot) (the Proponent) is seeking development consent for the construction, operation and maintenance of a Battery Energy Storage System (BESS) within the buffer lands of the decommissioned Wallerawang Power Station site. The BESS will be up to 500 Megawatts (MW) and would provide up to 1,000 Megawatt hours (MWh) of battery storage capacity (two hours of storage at maximum discharge rate). The last operational coal fired units at the old Wallerawang Power Station were units 7 and 8. To reflect the legacy of the Wallerawang Power Station and acknowledge the long-term role the Power Station played in the NSW energy sector, the battery will be known as the **'Wallerawang 9 Battery'** (the Project).

The Project is considered to meet the definition of State Significant Development (SSD) under Clause 8 of the *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP). The Project would be for electricity generating works (above $30 million Capital Investment Value (CIV) on land where this use is permitted with development consent under Clause 34 of the *State Environmental Planning Policy (Infrastructure)* (ISEPP). A Capital Investment Value (CIV) Report was issued to DPIE in October 2021 at EIS lodgement.

The Proponent is seeking SSD approval for the Project under Part 4, Division 4.7 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Chapter 5 provides more information on the planning and assessment process of the Project.

A detailed description of the Project is provided in Chapter 4 of this EIS. The Project would involve construction and operation of the following:

- Large-scale BESS including battery enclosures, inverters and transformers
- 33/330 kV switchyard
- Overhead transmission line connection between the BESS and the nearby TransGrid Wallerawang 330 kV Substation
- Ancillary elements including site access from the Castlereagh Highway, internal access roads and parking, site office and amenities, stormwater and fire management infrastructure, utilities, signage, fencing, security systems and landscaping.

The BESS would operate 24 hours a day, seven days a week. An overview of the project is show in Figure 4-1.

1.2 Key terms

Table 1-1 provides a summary of the key terms used within this EIS.

Table 1-1 Key Terms

Term	Definition
BESS	Battery Energy Storage System facility that includes battery enclosures, inverters and transformers located on the Project Site
Construction area	The area of the Project Site, which is to be utilised for construction works, namely areas to be disturbed during the construction of the Project
Forestry area	The area of the Project Site which is subject to a Pine Plantation Deed (between Greenspot and Forestry Corporation of NSW) and is to be harvested by Forestry Corporation of NSW. The harvesting of this area would be undertaken under a separate approval (to the extent required) and would involve tree removal only. Removal of stumps or any residual vegetation and earthworks for the development of the built form of the Project would be undertaken in this area (refer to Chapters 3 and 4 of this EIS for further details).
Greenspot 2845 Activity Hub	Former Wallerawang Power Station and buffer lands including Lake Wallace, comprising approximately 613 hectares (ha) acquired by Greenspot from EnergyAustralia in September 2020.
Operational area	The area of the Project Site which is to be used for the operation of the Project
The Proponent	The entity seeking approval is Greenspot Wallerawang Pty Ltd
Project	The Wallerawang 9 Battery (subject of this EIS) comprising the BESS, overhead transmission line and ancillary infrastructure.
Project Site	Within the buffer lands of the decommissioned Wallerawang Power Station, located at 1 Main Street, Wallerawang NSW. The area where the Project would be located incorporates the following lots: Lot 3, DP 1018958, Lot 4, DP 1016725, Lot 3, DP 1181412, Lot 3, DP 1226927, Lot 4, DP 1226927.
Project switchyard	33/330 kV switchyard to be constructed for the purposes of the Project on the Project Site, connecting via the proposed overhead transmission line, to the existing TransGrid Wallerawang Substation.
Wallerawang Power Station site	The former Wallerawang Power Station site (not including the buffer lands) on which the main Power Station activities have been historically located.
Wallerawang Substation	Existing TransGrid Wallerawang 330 kV Substation located on Lot 91, DP 1043967.

1.3 Project Site and background

The Project Site is located in the buffer lands of the former Wallerawang Power Station site and is closely linked to this historic land use. The Wallerawang Power Station was a thermal coal power station that commenced operation in the 1950s, supplying electricity to the NSW residential and business market. The Power Station initially consisted of 4 x 30 Megawatt (MW) units but was upgraded in 1961 with an additional two 60 MW units and again in 1976 and 1980, when two 500 MW units were installed.

The Power Station was owned and run by NSW State Government entities and subsequently by Energy Australia up until 2014 when it was closed. In closing the Power Station, EnergyAustralia cited ongoing lower energy demand and Wallerawang's higher operating costs caused by age and inefficiency. The Power Station and buffer lands (including Lake Wallace), comprising approximately 613 ha, were subsequently acquired by Greenspot in September 2020 with the aim of repurposing the site.

Greenspot itself was established with the objective of acquiring and repurposing property assets, primarily from the fossil fuel industry. Greenspot works with communities, government and other key stakeholders to optimise economic and social outcomes in the transition to a circular, sustainable energy economy.

In Australia many people who are potentially most affected by this transition are in regional areas. In these regional areas, key objectives will be attracting and establishing new business across multiple sectors, creating jobs and building resilience. Greenspot believes that, in large part, this will involve focus on core enablers such as:

- Sustainable energy solutions and energy storage infrastructure
- Water security
- Transport networks
- Digital connectivity.

These initiatives have become even more important given the impact of the COVID-19 pandemic.

The repurposing of the Old Wallerawang Power Station and buffer lands is Greenspot's flagship project. To facilitate the repurposing, Greenspot has engaged a leading contractor to undertake a decommissioning, demolition and rehabilitation (DDR) program (under DA 015/19) on the Wallerawang Power Station site. The DDR project commenced in May 2021 and is expected to take approximately 18 months to complete. Under current plans, key infrastructure including the turbine hall and administration building structures, the small chimney stack from the former A and B station, the cooling tower and the coal dome (dry storage area) will be retained by Greenspot to play a role in the future development of the site as a whole.

Greenspot's vision for the site, which has been given the working name of 'Greenspot 2845 Activity Hub', is that it will become a leading example of a master-planned precinct:

- Underpinned by energy generation and storage, and well designed and resilient water infrastructure
- With freight and logistics capabilities
- Which enables a range of businesses in the industrial and agricultural sectors together with commercial, residential, tourism, sport and recreational uses and significant public amenity
- Which, above all, creates long term jobs and is a significant contributor to the successful rejuvenation of the local and regional economy.

As important and catalytic first step in this vision, the Proponent is seeking development consent for the construction, operation and maintenance of a BESS - the Project.

In addition to supporting and enabling the future 'Greenspot 2845 Activity Hub', the Project is considered critical in supporting the NSW Government's Electricity Strategy for a reliable, affordable and sustainable electricity future that supports a growing economy. BESS facilities, such as the Project, would provide enabling infrastructure for expanding the renewable energy industry in NSW, particularly in the Central-West Orana Renewable Energy Zone (REZ), which is considered a critical element of the transformation of the NSW energy sector.

1.4 Project location

The Project Site is about 70 kilometres west of Penrith in the Central Tablelands, about 115 kilometres west of the Sydney Central Business District (CBD) and north-east of the township of Wallerawang in the Lithgow LGA.

The Project is located immediately south of Wallerawang Power Station site and 320 metres (m) east of the TransGrid Wallerawang 330 kV Substation at its closest point. The Project would require up to 22 hectares (for the BESS and overhead transmission line corridor) of land within the Project Site.

1.5 Project objectives

The key objectives of the Project include the following:

- Improve the security, resilience and sustainability of NSW's electricity grid
- Deliver a project that would serve as a significant enabler for the 'Greenspot 2845 Activity Hub'
- Minimise adverse impacts on the environment and community during construction and operation
- Provide an ongoing and consistent power supply (as part of a larger network) for the Lithgow community and Central West and Orana Region
- Providing critical energy storage and related services to facilitate the greater introduction of renewables into the electricity network to meet NSW's household and industry demand for energy.

1.6 The Proponent

Greenspot Wallerawang Pty Ltd was established in 2020 as a joint venture between the owners of Borg and Bettergrow, two leading Australian owned businesses both of which are headquartered in New South Wales.

1.7 Structure of this EIS

This EIS has been prepared by Arcadis Australia Pacific Pty Limited (Arcadis) on behalf of the Applicant to support an application for the approval of the Project. It has been prepared in accordance with the Secretary's Environmental Assessment Requirements (SEARs) issued on 18 March 2021 by the DPIE, the EP&A Act and Schedule 2 of the *Environmental Planning and Assessment Regulations* 2000 (EP&A Regulations).

The structure of this EIS is as follows:

- **Executive Summary**: Provides a brief overview of the Project, key environmental assessment results and an outline of the proposed environmental and social mitigation measures
- **Section 1 – Introduction**: Introduces the Project and the EIS, including Project location, site history, Project objectives, and Proponent details
- **Section 2 – Project Site Description**: Provides a summary of the existing Project Site, its location in a regional and local context and existing operations of the Project Site
- **Section 3 – Project Justification, Need and Alternatives**: Provides a discussion on the need for the Project having regard to strategic justification, relevant legislation, plans and policy and also provides alternatives to the design and location of the Project

- **Section 4 – Project Description**: Provides a description of the Project including built form and operational procedures
- **Section 5 – Statutory Planning Approvals**: Provides a summary and assessment of the Project having regard to relevant statutory legislation and plans at a Commonwealth, State and Local Government level
- **Section 6 – Consultation**: Provides a summary of the consultation (public, stakeholder and government agencies) which has been undertaken to date for the Project
- **Section 7 – Environmental Risk Assessment:** Provides an analysis of the likely environmental risks and assigns a rating before and after the implementation of mitigation measures
- **Sections 8 to 22 – Environmental Assessment**: Provides a discussion on the existing environmental conditions and an assessment of the environmental issues for the Project as identified in the Secretary's Environmental Assessment Requirements (SEARs) (SSD-14540514), namely Traffic and Transport, Noise and Vibration, Soils and Contamination, Biodiversity, Aboriginal Heritage, Non-Aboriginal Heritage, Bushfire Risk, Hazards and Risk, Water Quality, Flooding and Water Use, Visual Amenity, Air Quality, Climate Change, Waste Management, Socio-economic and Property and Land Use.
- **Section 23 – Cumulative Impact Assessment**: Provides an analysis of the likely cumulative impacts resulting from the interaction of the Project with other developments in the region
- **Section 24 – Compilation of Mitigation Measures**: Includes a summary of the mitigation measures identified throughout the EIS
- **Section 25 – Ecological Sustainable Development**: Includes a summary of how the Project aligns with the principles of Ecological sustainable development (ESD)
- **Section 26 – Justification and Conclusion**: Provides a summary of the outcomes of the EIS in support of the overall Project justification.

The following Appendices are included in the EIS.

Appendix	Description	Author
A	Consolidated SEARs Compliance Table	Arcadis
B	EP&A Regulation Checklist	Arcadis
C	Traffic and Transport Impact Assessment	Arcadis
D	Noise and Vibration Impact Assessment	Resonate
E	Biodiversity Development Assessment Report (BDAR)	Arcadis
F	Aboriginal Cultural Heritage Assessment (AHCA) Report	NGH Consulting
G	State of Heritage Impact (SoHI)	NGH Consulting
H	Bushfire Risk Assessment	Bushfire Consulting Services
I	Preliminary Hazard Assessment (PHA)	Sherpa Consulting
J	Water Quality	Arcadis
K	Flooding Assessment	HARC
L	Land Use Conflict Risk Assessment	Arcadis

2 Project site description

This section provides a description of the Project Site within the local and regional context and also summarises the legal ownership.

2.1 Regional context

The Project Site is located within the Lithgow Local Government Area (LGA) in the Central West region of NSW. The Project Site is located about 70 kilometres west of Penrith in the Central Tablelands and about 115 kilometres west of the Sydney Central Business District (CBD). The regional context of the Project and surrounding land uses are shown in Figure 2-1.

The Lithgow region is predominantly rural with some semi-rural, residential and industrial land uses. The nature of regional development has been driven by the long history of industrial land uses including flour milling, coal mining, iron and steel mills, small arms manufacturing and power generation.

A number of industrial land uses and supporting infrastructure are still present in the region including the Main Western Rail Line, Centennial Coal Lidsdale rail siding, Springvale Colliery, Wallerawang Power Station Ash Repository and associated lands and the Mount Piper Power Station which contribute to the ongoing industrial nature of the region.

The Project Site is located around 10 kilometres north-west of Lithgow and around one kilometre east of the main township of Wallerawang, within the buffer lands of the old Wallerawang Power Station site.

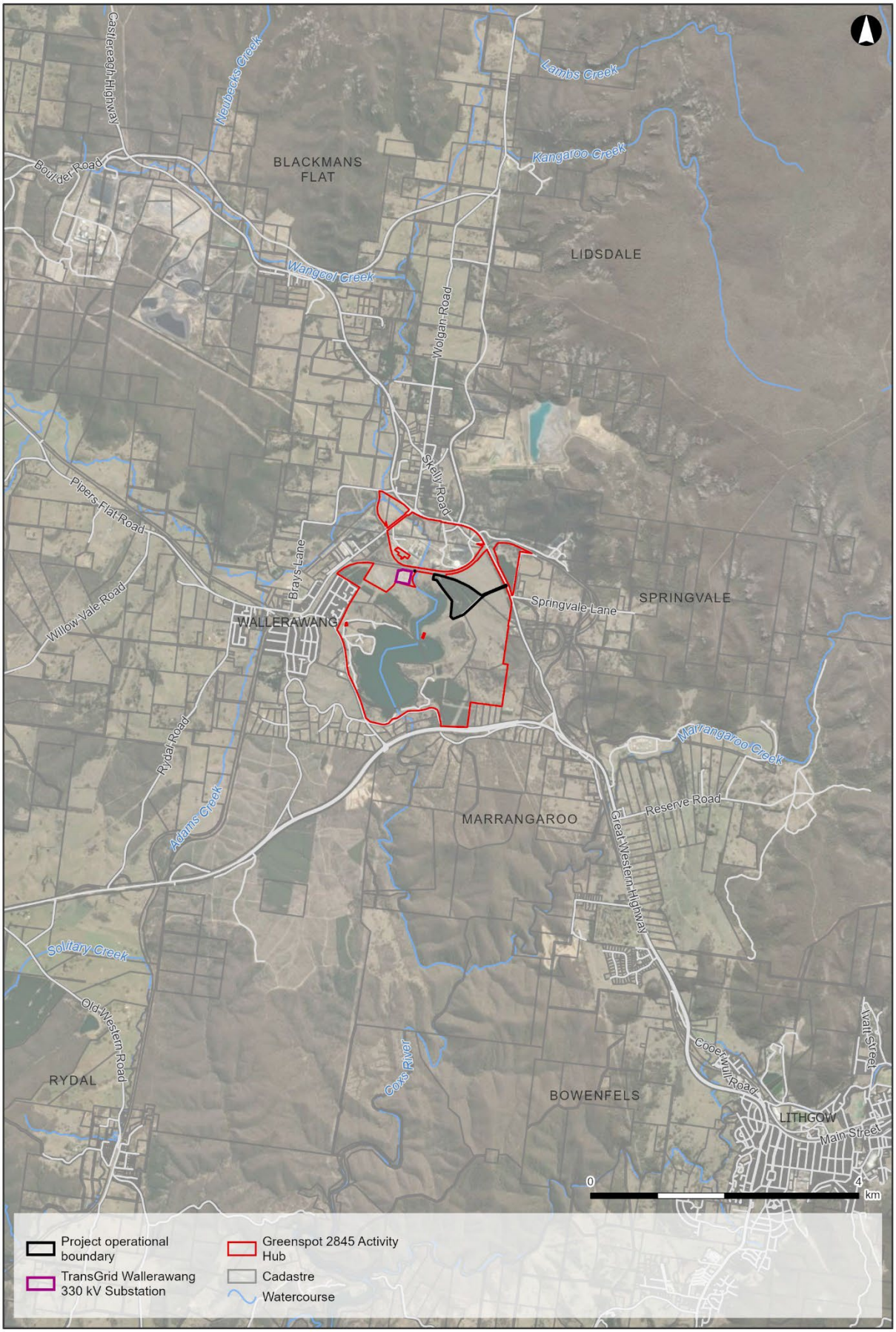


Figure 2-1 Regional context of the Project Site

2.2 Local context

The Project Site is bounded by:

- The Main Western Railway Line and the former Wallerawang Power Station to the north
- Castlereagh Highway to the east
- Coxs River and the TransGrid Wallerawang 330 kV Substation to the west
- Cleared grassland with patches of remnant vegetation to the south.

The buffer lands of the old Wallerawang Power Station are largely rural in nature and have been modified by historic industrial and agricultural land uses. The buffer lands currently comprise cleared paddocks featuring exotic and native grasses and patches of remnant native vegetation. Several forestry areas, subject to Pine Plantation Deeds, are also located in the local area including within the bounds of the Project Site as shown in Figure 2-2. These areas largely comprise plantations of Radiata Pine (*Pinus radiata*) which are managed and to be harvested by the Forestry Corporation of NSW.

The Coxs River is located to the west of the Project Site and would be traversed by the overhead transmission line connection between the Project and the TransGrid Wallerawang 330 kV Substation. The Coxs River originates within Ben Bullen State Forest to the north and flows through the Megalong Valley and parts of the Greater Blue Mountains Area World Heritage site including the Blue Mountains and Kanangra-Boyd national parks, joining a number of other tributaries before flowing into Lake Burragorang (Warragamba Dam). Lake Burragorang forms the major water supply source for greater metropolitan Sydney. The river is impounded at Lake Wallace, where it was formerly used as a cooling source for Wallerawang Power Station, and at Lake Lyell. Areas around the Coxs River and Lake Wallace are used recreationally for camping and fishing.

The 330 kV power lines associated with the Mount Piper Power Station also traverse the western side of the Project Site in a north south direction.

The Project Site is currently accessed from an unsealed access road off the Castlereagh Highway, a two-lane 100 kilometres per hour (km/hr) highway that connects Lithgow to Mudgee and greater western NSW.

The proposed 'Great Western Battery Project' (SSD-12346552), which is a separate and unrelated project currently in the stage of preparing an EIS, is located on private land approximately two kilometres north-west of the Wallerawang Power Station site on the northern side of the Main Western Railway Line and Main Street, Wallerawang.

Potentially sensitive receivers near the Project Site comprise commercial and residential land uses including:

- Goodearth Landscape and Building Supplies, 600 m south
- Black Gold Motel, about 1.1 kilometres north-west
- Commercial businesses along Main Street, Wallerawang, about 1.2 kilometres west
- Approximately six residential receivers located on Springvale Lane, 150 metres south-east of the Project Site at the closest point to construction activities at the intersection of Castlereagh Highway and the access road
- A residential area within the suburb of Wallerawang, approximately 650 metres to the south-west of the Project Site at its closest point.

The local context of the Project and surrounding land uses are shown in Figure 2-2.

Figure 2-2 Local context of the Project Site

Project Site

The Project would be developed on a parcel of land located within the Wallerawang Power Station buffer lands (the Project Site). The western half of the Project Site is zoned as SP2 Infrastructure and the eastern half IN3 Heavy Industrial under the Lithgow *Local Environmental Plan (LEP) 2014*.

The EIS assessment footprint has been defined as the land area where project infrastructure will be constructed and operate for the project life. The EIS assessment footprint is approximately 22 hectares.

The central portion of the Project Site, the forestry area, is a commercial pine forest which is managed by Forestry Corporation of NSW and is subject to a Pine Plantation Deed. The eastern part of the Project Site is undeveloped grasslands. Other features include a row of dense planted vegetation along the Castlereagh Highway and an unsealed access road along the southern boundary of the Project Site. Access to the Project Site will be from Castlereagh Highway. The unsealed access track along the southern boundary will provide entry and exit to the Project Site. The current appearance and condition of the Project Site is shown in Plate 2-1 to Plate 2-4 and the forestry area is scheduled to be harvested in late 2021 or early 2022 by Forestry Corporation of NSW. Harvesting of this plantation will be conducted under a separate approval process (to the extent required). Only stumps of the trees will be left once the trees are harvested (Plate 2-4).

Plate 2-1 General appearance of the Project Site - looking north to the former Wallerawang Power Station

Plate 2-2 General appearance of the Project Site
- looking north towards the Wallerawang Power Station from Lake Wallace

Plate 2-3 View looking north-west from the existing maintenance track towards the existing TransGrid Wallerawang 330kV Substation

Plate 2-4 View looking north-east towards the existing pine plantation (proposed location of the BESS)

2.3 Property description

The Project Site is in its entirety positioned (in part or full) across the properties detailed in Table 2-1 and shown on Figure 2-2.

Table 2-1 Property description (the Project Site)

Lot	Deposited Plan (DP)	Description	Owner
3	1018958	Cleared field in the eastern proportion	Greenspot Wallerawang Pty Ltd
4	1016725	Part of the forestry area	Greenspot Wallerawang Pty Ltd
3	1181412	Partly Coxs River and the western proportion of the forestry area	Greenspot Wallerawang Pty Ltd
3	1226927	South-east of the access road into the site	Greenspot Wallerawang Pty Ltd
4	1226927	South-west of the access road into the site	Greenspot Wallerawang Pty Ltd
91	1043967	TransGrid Wallerawang 330kV Substation	TransGrid Pty Ltd
N/A	N/A	Castlereagh Highway verge	Transport for New South Wales managed by the NSW Government

3 Project justification, need and alternatives

This section outlines the need and justification for the Project. It also provides a description of the alternatives to the Project which have been considered.

The Secretary's Environmental Assessment Requirements (SEARs) relating to the Project need and justification, and a summary of where they are addressed, is presented in Appendix A.

3.1 Project objectives

The objectives of the Project are to:

- Improve the security, resilience and sustainability of NSW's electricity grid
- Deliver a Project that would serve as a significant enabler for the 'Greenspot 2845 Activity Hub'
- Minimise adverse impacts on the environment and community during construction and operation
- Provide an ongoing and consistent power supply (as part of a larger network) for the Lithgow community, Central West and Orana Region
- Provide critical energy storage to facilitate the greater introduction of renewables into the electricity network to meet NSW's household and industry demand for energy.

3.2 Project need and strategic justification

Over the last 10-15 years, there has been a steady increase in the number of renewable projects which are generating electricity for use in the National Electricity Market (NEM), while more of the older traditional coal fired power stations have been retired. This transition from thermal generation to renewable generation will continue into the future. To support this transition, energy storage will be required to support the intermittent nature of generating electricity from renewable energy sources and to provide a reliable and secure source of electricity to consumers and the local population.

The Federal, State and Local Governments have put in place a number of plans, strategies and roadmaps, to progress and optimise consumer benefits through a transition of the energy market. These include:

- *2020 Integrated System Plan for the National Electricity Market* (2020 ISP) (Australian Energy Market Operator (AEMO), 2020)
- *NSW Transmission Infrastructure Strategy* (DPIE, 2018) (the Transmission Infrastructure Strategy)
- *NSW Government's Electricity Strategy* (DPIE,2019 (the Electricity Strategy)
- *NSW Electricity Infrastructure Roadmap* (DPIE, 2020) (Electricity Infrastructure Roadmap)
- *NSW Climate Change Policy Framework* (NSW Office of Environment and Heritage (OEH), 2016)
- *Central West and Orana Regional Plan 2036*
- Draft *Lithgow 2040 Local Strategic Planning Statement (LSPS)*.

3.2.1 2020 Integrated System Plan

The *2020 Integrated System Plan for the National Electricity Market* (2020 ISP) (Australian Energy Market Operator (AEMO), 2020) identifies investment opportunities and recommends actions to optimise consumer benefits as Australia experiences what is widely regarded as the world's fastest energy transition.

The 2020 ISP is an actionable roadmap for eastern Australia's power system to optimise consumer benefits through a transition of the energy market. It identifies the optimal development path for the NEM. It also details planned projects and development opportunities as well as necessary regulatory and market reforms.

Modelling was undertaken as part of the 2020 ISP which confirmed that the least-cost and least-regret transition of the NEM is from a system dominated by centralised coal-fired generation to a highly diverse portfolio of behind-the-meter and grid-scale renewable energy resources. These must however be supported by dispatchable firming resources and enhanced grid and service capabilities to ensure the power system remains reliable.

Development opportunities for an optimal energy system identified in 2020 ISP acknowledge that to firm up the inherently intermittent nature of distributed and large-scale renewable energy generation, new flexible, dispatchable resources, including large-scale battery energy storage systems (as proposed by the Proponent), will be needed. Depending on the scenario, the NEM will need 6-19 Gigawatts (GW) of new flexible dispatchable resources to firm up intermittent resources. It is anticipated that much of the initial investment will be in utility-scale pumped hydro (i.e., Snowy Hydro 2.0) providing longer-term storage and in battery energy storage systems offering shorter-duration, highly responsive and flexible storage.

As the Project would primarily involve the development of a BESS that connects to existing power supply transmission networks, it is considered to align with, and support the intent of, the 2020 ISP.

3.2.2 NSW Transmission Infrastructure Strategy

The *NSW Transmission Infrastructure Strategy* (the Transmission Infrastructure Strategy) (DPIE, 2018) acknowledges that NSW is undergoing an energy sector transformation which will change how energy is generated and used throughout the State.

The Transmission Infrastructure Strategy forms part of the NSW Government's broader plan to make energy more affordable, secure investment in new generation and network infrastructure and ensure new technologies deliver benefits for customers.

One key aim of the Transmission Infrastructure Strategy is to increase NSW's energy capacity by prioritising Renewable Energy Zones (REZs) in the Central West, South West and New England regions of NSW, which will become a driving force to deliver affordable energy into the future. By increasing transmission capacity and low-cost generation, the strategy aims to support an orderly transition of the energy sector over the next two decades. These three zones are considered to be areas of high energy potential where planned transmission infrastructure upgrades are able to connect multiple energy supply projects at lower cost.

Undertaking strategic infrastructure upgrades in these REZs will support and leverage private sector investment opportunities, boosting regional economies and building the State's resilience by ensuring there are enough new energy projects coming online to replace retiring coal-fired power stations. By unlocking the REZs, the State's energy mix can be more easily diversified, and transmission capabilities can be expanded.

The Transmission Infrastructure Strategy will help to facilitate new transmission that could support up to 17,700 MW of new electricity generation in REZs by 2040. These Zones could leverage up to $23 billion in private sector investment, support an average of up to 2,000 construction jobs each year and represents a huge boost for NSW regional communities.

As the Project would primarily involve the development of a large-scale BESS that connects to existing power supply transmission networks, it is considered to complement the Transmission Infrastructure Strategy, particularly by providing dispatchable storage capacity near the Central-West Orana REZ.

3.2.3 NSW Electricity Strategy and Electricity Infrastructure Roadmap

The NSW Government's *Electricity Strategy* (the Electricity Strategy) (DPIE,2019) and *NSW Electricity Infrastructure Roadmap* (Electricity Infrastructure Roadmap) (DPIE, 2020) set out a plan for the delivery of five REZs. It builds on the Transmission Infrastructure Strategy and supports the implementation of the 2020 ISP.

NSW Electricity Strategy

The Electricity Strategy is the NSW Government's Plan for a reliable, affordable and sustainable electricity future. The Electricity Strategy acknowledges the challenges that exist in achieving the Government's objectives for the electricity system. This includes reliability risks from the retirement of some traditional coal-fired power stations combined with congestion within the existing transmission system. Both these risks reduce the attractiveness of investment in the new generation required to reduce electricity prices, improve reliability and protect the environment.

The Electricity Strategy sets out actions to address the specific needs of NSW while long term national reforms are developed and implemented. Wind and solar generation provide intermittent output and need to be complemented with firm and flexible technologies such as hydro, batteries, bioenergy, concentrated solar power, demand management and gas-fired generators. When intermittent generators are unable to satisfy demand, other technologies which can provide electricity on demand, dispatchable firm generation (i.e. gas and battery storage) is able to satisfy electricity demand, provided there is sufficient firm dispatchable capacity.

As noted in the Electricity Strategy, as of October 2019 there were 17,700 MW of large-scale renewable energy projects that have received planning approval or are progressing through the NSW planning system, representing about $24 billion in investment. These projects are summarised in Table 3-1.

Table 3-1 Summary of large-scale renewable energy projects that have recently secured NSW planning approval

Project type	Number of projects	MW capacity	Investment
Solar	81	11,400 MW	$13.4 billion
Wind	15	3,800 MW	$4.7 billion
Biogas	2	325 MW	$1.1 billion
Hydro	Snowy Hydro	2,000 MW	$4.5 billion
	Shoalhaven Scheme expansion	235 MW	$300 million

In addition to these renewable projects, there are 1,410 MW of large-scale non-renewable energy projects with planning approval, worth around $1.5 billion. This includes 1,250 MW of gas projects, worth $1.25 billion, and 160 MW of coal efficiency upgrades, worth $209 million.

The existing network in NSW is running out of capacity, representing a significant barrier to the State's 48 GW of generation connection enquiries in the pipeline. Market research indicates that grid connection is the highest concern for Australian energy sector Chief Executive Officers, and in 2019 it was estimated that there was sufficient capacity to connect only 1 in 20 private sector generation proposals in NSW (p.16, NSW Electricity Strategy, NSW DPIE 2019).

Batteries, as a form of electrical storage, also provide multiple grid services such as frequency regulation. The cost of batteries has fallen in recent years and is expected to continue to trend downwards making batteries a more feasible, commercial firming option for wind and solar farms. The principles guiding the development of the Electricity Strategy comprise four propositions. *Principle 1: New generation, delivered by competitive markets should reduce electricity prices and protect the environment*, notes that renewables, firmed by dispatchable technologies such as gas and storage, are the lowest cost form of new reliable electricity generation. Accordingly, a good investment environment will deliver new generation, reduce electricity prices and ensure reliability while protecting the environment.

The Project is considered to be consistent with the goals of the Electricity Strategy, given the Project's location in close proximity to the Central-West Orana REZ and its ability to provide firm generation infrastructure able to support and complement future development of renewable energy projects including, for example, by:

- Providing synthetic inertia to the Central-West Orana REZ and NSW transmission system more broadly, as the NEM transitions to a lower inertia system (i.e. limited spinning reserve and BESS proving more multi-functional services than synchronous condensers)
- Materially reducing the network augmentation spend that would otherwise be required to support the contemplated introduction of renewables in the Central-West Orana REZ
- Time shifting renewable generation, avoiding network augmentation to overcome potential network constraints (as the Wallerawang 9 Battery is located on the primary transmission route between the proposed 3 GW of renewable generation planned for the Central-West Orana REZ and the major load centre in the Sydney metropolitan area)
- Providing fast frequency response and either or both:
  - Network Support and Control Ancillary Services (NSCAS) maintaining or improving power system reliability and security of supply; and
  - System Restart Ancillary Services in the event of a system blackout.
- Acting as a load during daytime solar generation to smooth out low prices and reduce the duck curve effect
- Assisting nearby Mt Piper Power Station in power station operations, by offering storage capacity to limit thermal cycle fatigue caused by frequent ramping up/down and two-shifting regimes (particularly as the proportion of renewables in NSW grows, and Mt Piper has the longest technical life of the coal fleet).

Electricity Infrastructure Roadmap

There are four coal-fired power stations that are scheduled to close within the next 15 years, which currently provide about 75 per cent of the State's energy supply. It is critical that these power stations be replaced with new sources of energy generation and supporting infrastructure before they close, so as to avoid the potential for substantial price rises and electricity shortages resulting in blackouts.

The Electricity Infrastructure Roadmap recognises that NSW has some of the best renewable energy resources in the world and as the global economy moves to reduce carbon emissions, NSW can attract investment in new, low carbon industries and can benefit from some of the lowest electricity prices in the Organisation for Economic Co-operation and Development. The Electricity Infrastructure Roadmap also acknowledges that to take advantage of these opportunities, substantial investment into modernising the

existing electricity system, including by building transmission, generation and long duration storage and firming infrastructure is required.

The purpose of the NSW Electricity Infrastructure Roadmap is to deliver this infrastructure and secure NSW's future as an energy superpower. The Roadmap is expected to attract $32 billion of timely and coordinated private sector investment in large-scale generation, storage and transmission by 2030 to maintain a reliable, secure and affordable supply.

The Electricity Roadmap also notes that investment in large-scale storage and firming capacity, including battery storage (long and short duration) will be required to balance the supply of intermittent renewable energy.

As part of the roadmap, the NSW Government has announced its priority REZs, which the Electricity Infrastructure Roadmap has been designed to deliver.

The REZs are expected to deliver multiple benefits for NSW, including:

- More reliable energy from new energy supply
- Energy bill savings from reduced wholesale electricity costs
- Emissions reduction from a cleaner energy sector
- Community partnership from strategic planning and best practice engagement and benefit sharing.

Although the Project would be positioned outside of the Central-West Orana REZ, its position on the major transmission lines between the Orana REZ and Sydney (power flows typically towards the Regional Reference Node in Western Sydney) means that it would be able to support and complement the targets of the NSW Electricity Strategy and Roadmap, in particular the objective of supplying Sydney as the major NSW load centre with clean renewable energy from the Central-West Orana REZ.

3.2.4 NSW Climate Change Policy Framework

The aim of the NSW Climate Change Policy Framework (NSW Office of Environment and Heritage (OEH), 2016) is to maximise the economic, social and environmental wellbeing of NSW in the context of a changing climate and current and emerging international and national policy settings and actions to address climate change.

The long-term objectives of the Climate Change Policy Framework are:

- To achieve net-zero emissions by 2050. Stage 1 of the net zero plan[1] looks to implement a 50% reduction in emissions by 2030
- That NSW is more resilient to a changing climate.

As the Project would include the provision of a BESS facility that would facilitate the development of additional renewable energy generation and support the resilience of the NSW electricity network, the Project is considered to be complementary to and aligned with the Climate Change Policy Framework.

3.2.5 Central West and Orana Regional Plan 2036

The Central West and Orana Regional Plan 2036 acknowledges the region as having one of the most diverse economies in regional NSW and is becoming increasingly connected with cities to the east and building the capacity of its freight and logistics infrastructure.

[1] DPIE Net Zero Plan Stage 1: 2020–2030 Implementation Update, September 2021

The Regional Plan identifies the Lithgow LGA as having the potential to grow renewable energy industries. This is supported by Direction 9 of the Regional Plan, which is to increase renewable energy generation. Under this Direction, the region is acknowledged as having significant potential for renewable energy industries with potential for wind power generation, large-scale solar energy and bioenergy generation. Action 9.2 of the Regional Plan is to facilitate small-scale renewable projects using bioenergy, solar, wind, small-scale hydro, geothermal or other innovative storage technologies through local environmental plans.

The Project would be consistent with the direction of the Central West and Orana Regional Plan 2036, as it would provide a large-scale battery storage facility that would support the development of renewable energy projects in the region.

3.2.6 Draft Lithgow 2040 Local Strategic Planning Statement

The Draft Lithgow 2040 Local Strategic Planning Statement (LSPS) sets out a 20-year vision for the future of Lithgow region, as it grows and changes (Lithgow City Council, 2020). The aim of the plan is to provide a 20-year land use vision, contribute to local identity, share and enhance community values, increase growth, include and meet values established in the Central West and Orana Regional Plan. The plan builds on the land use vision for the Lithgow region identified through Council's Community Strategic Plan, *Our Place Our Future 2030* (Lithgow City Council, 2012).

In the land use vision, the Project Site is located in an existing industrial/electricity generation zoned area that flags the potential for a future industrial eco-park redevelopment. The LSPS sets out four Planning priorities that would be implemented to achieve the goals identified in the local and regional plans, including:

- Establish a framework for sustainable growth
- Plan for a diversity of housing
- Plan and appropriately manage rural lifestyle development
- Recognise, Preserve, Promote and Activating our heritage.

The Project would assist in implementing the Planning Priorities. It would provide enabling infrastructure to protect the ongoing reliability of electricity supply for existing and future development in the area. It would provide jobs and supporting broader development in the 'Greenspot 2845 Activity Hub'. Additionally, the Project would support the redevelopment of the Wallerawang Power Station and the activation of its heritage values.

3.3 Project need

As detailed above, NSW is undergoing an energy sector transformation which will change how energy is generated and used throughout the State. The need to increase the generation of renewable energy as the State's coal-fired power stations retire has been identified.

Wind and solar generation provide intermittent generation and need to be complemented with firm and flexible technologies such as hydro, batteries, bioenergy, concentrated solar power, demand management and gas-fired generators. When intermittent generators are unable to satisfy demand, other technologies which can provide electricity on demand (dispatchable firm generation, i.e. gas and battery storage) are able to satisfy electricity demand, provided there is sufficient firm dispatchable capacity.

Without the development and operation of short and long-term dispatchable capacity to support increasing investment in renewable energy into REZs, there is the potential for a future deficit in capacity with the reliability of the NSW power supply system exposed. In a worst-case scenario, this can lead to load shedding or blackout events.

The Project involves the development of a large-scale BESS. BESS facilities, such as that proposed by the Project, would provide enabling infrastructure to protect the ongoing reliability of electricity supply during the expansion of the renewable energy industry in NSW (particularly in the Central-West Orana REZ, which is considered a critical element of the transformation of the NSW energy sector). In addition, the Project has the potential to serve as a significant enabler for the 'Greenspot 2845 Activity Hub'.

3.4 Strategic alternatives

3.4.1 'Do nothing'

The do-nothing approach would not support the NSW Government's broader plans and strategies to make energy more affordable, secure investment in new power sources and network infrastructure and ensure new technologies deliver benefits for customers.

In addition to the broader energy system reliability, community and regional benefits, not building the BESS would also limit the option for providing a lower cost alternative to electricity supply for the future development of the 'Greenspot 2845 Activity Hub'. The greater redevelopment of the site is critical to enhancing the economy by supporting long term sustainable job growth and improving social outcomes and the liveability of the region.

For these reasons, the 'do nothing' scenario is neither the preferred nor a suitable option.

3.4.2 Build the Project

The Project would leverage its strategic location, 320 metres east of the existing TransGrid Wallerawang 330 kV Substation and south of the retired Wallerawang Power Station, to provide for future capacity and resilience of the NSW energy network through the delivery of a large scale dispatchable energy storage system. The Project's location for a new BESS is advantageous given it is positioned in an area appropriately zoned with direct access to the existing power network.

Building a large-scale BESS is expected to contribute to the reduction in the cost of supplying electricity to consumers in NSW. It is envisaged that the Project may also play a part in the energy network expected to power the physical redevelopment of the former Wallerawang Power Station and may form part of a broader sustainable energy supply strategy for the 'Greenspot 2845 Activity Hub'.

This Project also further supports the strategy for more investment in renewable energy technology by providing additional dispatchable energy storage near the Central-West Orana REZ. This supports the goals and objectives of the electricity generation, supply and transmission policy in NSW.

3.5 Project Site selection criteria and refinement

Greenspot completed a site selection exercise for the Project, both within the Wallerawang Power Station site and also surrounding land. A number of site selection criteria were applied, including:

- Proximity to the existing TransGrid Wallerawang 330 kV Substation without the need for third-party easements or access across private property or State-owned rail corridors
- Availability of access to the site via a major road

- Provision of an area that would avoid and/or minimise the need to remove high quality native vegetation
- Minimal interaction with other key infrastructure, such as the Main Western Railway
- Minimising risk of contributing to or being subject to flooding impacts
- Minimising impact on surrounding privately or publicly owned land
- Minimal environmental impacts.

After identifying that land for the Project within the 'Greenspot 2845 Activity Hub' site was preferred over any of the surrounding land, two potential sites within that site were considered for the Project. These options are shown on Figure 3-1.

Figure 3-1 Project Site locations considered

3.5.1 Preferred option

After assessing the two potential site locations, the selected Project Site was considered the preferred location for the BESS facility.

Underpinning factors for this decision included:

- The Project Site's high rating against each of the criteria listed above, particularly its proximity to the existing TransGrid Wallerawang 330 kV Substation in a location where no third-party easements or access across private property would be required (except for connection arrangements with TransGrid at its substation)
- The compatibility of the Project with the preferred site's existing land use zoning and permissibility.

In addition, there is an existing access road along the southern boundary of the Project Site which connects directly to the Castlereagh Highway, whereas the alternative site would require the construction of a larger access road to connect to roads that travel through the Wallerawang township before joining the NSW arterial road network.

The alternative site is subject to a number of easements (e.g. for electricity transmission) and therefore an area of suitable scale is unlikely to be available. Although the alternative site is closer to the TransGrid Wallerawang 330 kV Substation, the site was not considered suitable (even if the easement related constraints mentioned above could be overcome) as it would require more extensive levelling, raising and importation of fill to provide a flat area of land to construct and operate the Project.

3.5.2 Project Site refinements

The Project Site has been refined since the submission of the Scoping Report as a result of design development, consultation with key stakeholders and to reduce the environmental impact. A summary of the key changes and justification is as follows:

- The forestry area will contain the BESS facility and Project Site switchyard
- The proposed overhead transmission line path between Wallerawang substation and the Project Site has been altered to accommodate the 60-metre corridor pathway
- The construction and operational footprints have been reshaped to avoid impacts to areas of potential Aboriginal heritage significance and an item of non-Aboriginal heritage.
- The cleared area to the east of the Project Site will not be used for operation and has been excluded from the operational footprint.
- The entry and exit to the Project Site remains the same, as well as using two internal access tracks to access the Project Site switchyard and BESS facility.

The changes to the Project Site footprint based on the above refinements is show in Figure 3-2.

Figure 3-2 Project Site refinements

4 Project description

This section provides a description of the Project including design, construction, operation and decommissioning. The Project has been designed to ensure potential impacts to the environment are minimised.

4.1 Project overview

The Project would involve construction and operation of a large-scale Battery Energy Storage System (BESS) at Wallerawang, NSW. The BESS will be up to 500 MW and would provide up to 1,000 MWh of battery storage capacity (two hours capacity at maximum discharge rate). The Project also includes the construction and operation of ancillary infrastructure to support the operation of the BESS.

Key features of the Project include:

- Large-scale BESS including battery enclosures, inverters and transformers
- 33/330 kV switchyard
- Overhead transmission line connection between the BESS and the nearby TransGrid Wallerawang 330 kV Substation
- Ancillary elements including site access from the Castlereagh Highway, internal access roads and parking, site office and amenities, stormwater and fire management infrastructure, utilities, signage, fencing, security systems and landscaping.

The operational layout of the BESS including the key features is shown on Figure 4-1.

The new power supply connection from the BESS to the Wallerawang 330 kV Substation would be established on land owned by Greenspot and/or TransGrid and no other third-party easements would be required.

Table 4-1 Project Overview specifications

Project Component	Details	Further reference
Site details		
Application Lots	• Lot 3, DP 1018958 (BESS facility and office) • Lot 4, DP 1016725 (BESS facility) • Lot 3, DP 1181412 (Transmission connection line, Lake Wallace and Coxs River, west of the Project Site) • Lot 3, DP 1226927 (Includes the access road) • Lot 4, DP 1226927 (Includes the access road) • Lot 91, DP1043967 (TransGrid 330 kV Substation) • Castlereagh Highway (east of the Project Site).	Section 2
Zoning	The Project is located on land zoned as a combination of IN3 Heavy Industrial and SP2 (Infrastructure) Electricity generating works.	Section 5

Project Component	Details	Further reference
Project footprint	• Total footprint – approximately 22 ha • BESS, switchyard, ancillary development - approximately 18 ha • Overhead transmission line - approximately 3.6 ha • Access road to the BESS facility, office and amenities – approximately 0.5 ha	Section 2
Access	Access to the Project Site would be via the access road off the Castlereagh Highway	Section 4.3.7 Section 4.4
Project design and built form		
BESS facility and components	Depending on the final detailed design, the BESS facility could comprise: • Up to 2013 battery enclosures housing lithium-ion type battery cells, associated control systems and HVAC (heating, ventilation and air conditioning) units (numbers indicative only and subject to change in final design) • Up to 372 power inverters (numbers indicative only and subject to change in final design) • 86 MV transformers (numbers indicative only and subject to change in final design) • Medium voltage (MV) switch rooms containing MV switchgear.	Section 4.2.1
33/330 kV Switchyard	• Switchyard (33/330 kV) including up to four high voltage (HV) transformers and HV switchgear and associated control building.	Section 4.2.2
Overhead transmission line connection	• Approximately 600 m transmission line including cabling infrastructure from the TransGrid Wallerawang 330 kV Substation to the BESS switchyard • Alteration to Wallerawang 330 kV substation (bay changes for connection) • Construction of foundations to support new overhead transmission line towers • Installation of towers which would be craned (in sections) onto the footings and secured with holding down bolts.	Section 4.2.3
Ancillary elements	• access road off the Castlereagh Highway • Permanent site office, staff amenities and car park • Signage at site entrances and within the Project Site for the purposes of way finding, safety and building identification. • Perimeter and internal lighting of the Project site • Stormwater drainage and management measures • Two 20,000 litre water tanks for fire suppression • On-site security system including but not limited to, closed circuit television (CCTV) and an integrated telecommunication system • Connections to telecommunications infrastructure	Section 4.2.4

Project Component	Details	Further reference
	• 330 kV back fed for supply to the Project • Rainwater capture in rainwater tanks • Contained on-site sewage system	
Construction		
Activities	Construction of the Project is expected to comprise: • Site establishment • Trenching • Installation of footings for the BESS • Delivery, installation and fit out of the BESS • Delivery installation and fit out of the switchyard • Construction of ancillary elements • Installation of permanent fencing and security systems • Testing and commissioning • Removal of construction equipment and materials and rehabilitation of construction areas (where applicable).	Section 4.3
Program	Expected commencement of construction in Quarter 2/Quarter 3 of 2022 and would continue for approximately 12-24 months.	Section 4.3.2 Section 4.3.3
Hours	• 7am to 6pm Monday to Friday • 8am to 1pm Saturdays • No works on Sundays or public holidays Some work outside of these hours (e.g. oversize deliveries, emergencies) as required.	Section 4.3.4
Workforce	Up to approximately 100 full-time equivalents will be required for construction during the project peak	Section 4.3.8
Operation		
Capacity	The BESS would have a capacity of up to 500 MW and up to 1000 MWh of battery storage capacity (two hours duration at maximum discharge)	Section 4.4
Life of BESS	The estimated life of the initial BESS equipment is 15-20 years. It is expected that replacement of the batteries would be undertaken extending the life of the BESS to 30-40 years	Section 4.4
Workforce	Up to five operational personnel, some of which may be located off-site and work remotely. In addition to this, maintenance staff would be on-site periodically.	Section 4.4
Operational hours	24 hours, 7 days a week.	Section 4.4

Figure 4-1 Operational overview of the Project

4.2 Project design and built form

4.2.1 BESS facility

The location of the BESS facility within the Project Site is shown on Figure 4-1. The BESS would include the following key elements:

- Individual battery units or 'enclosures', generally consisting of a large fridge sized box or shipping container
- Inverters, which convert direct current (DC) electricity from energy generating sources (such as solar panels) to alternating current (AC) mains power and vice versa
- Inverters can become very warm when operating at large power outputs and need suitable ventilation and cooling airflow (HVAC units)
- A transformer, allowing energy transfer to or from the grid.

A summary of the specifications of the BESS is provided in Table 4-2 below and an overview of the concept design for the BESS is shown on Figure 4-1. Note that the battery components needed to achieve the desired storage capacity have been identified by the potential technology partners. These numbers are indicative only and subject to change during detailed design.

Table 4-2 BESS facility Specifications

Element	Description
Discharge capacity	Up to 500 MW
Storage capacity	Up to 1,000 MWh battery storage capacity (two hours duration at maximum discharge)
Components	Note that the battery components needed to achieve the desired storage capacity have been identified by the potential technology partners. **These numbers are indicative only and subject to change during detailed design**: • Up to 2013 prefabricated BESS enclosures containing up to 6,324 lithium-ion batteries and associated heating, HVAC units and control systems. • 372 inverters • 86 MV transformers • MV switchgear • MV cabling.
Dimensions	• Each battery enclosure would be around 2.5 m high, 2 m wide and up to 7 m long. • Inverters would generally be around 2-3 m in height. • Based on the indicative design shown in Figure 4-1, the total Project Site area would cover up to 18 ha (including BESS, switchyard, ancillary development and buffer) and 3.6 ha for the overhead transmission line corridor, a total of approximately 21.6 ha.

As shown in Figure 4-2, the BESS would comprise prefabricated enclosures arranged into groups and fixed into place on concrete footings. The layout is indicative only and would be subject to change during detailed design and construction as required. Generally, the BESS groups would be arranged on the site to minimise transmission lengths whilst maintaining appropriate separation distances to manage fire risks and provide access for ongoing maintenance.

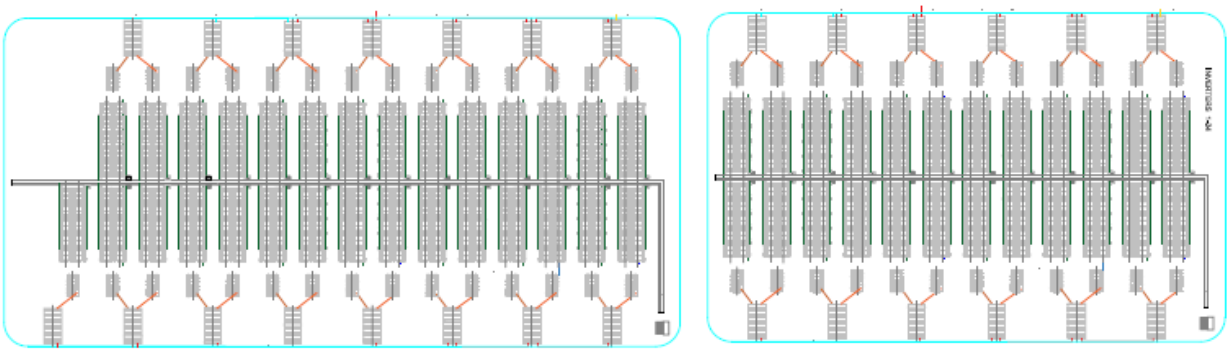


Figure 4-2 Indicative layouts for prefabricated enclosures

The battery modules would be supported by inverters and MV switchgear contained within up to four switch rooms, enabling provision of energy to the grid.

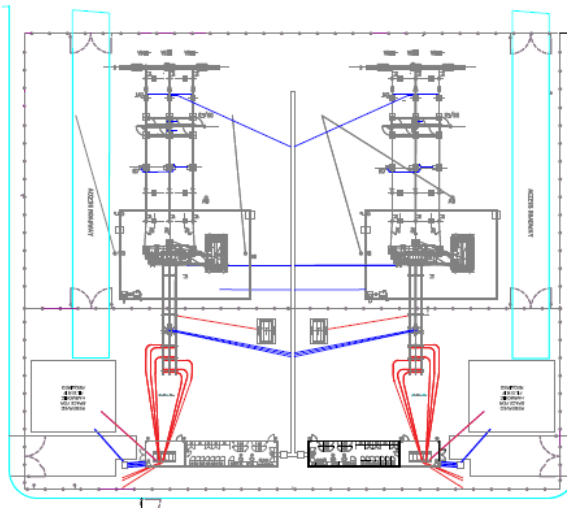


Figure 4-3 Indicative layout for MV switchgear

The BESS facility would be connected to the grid via the adjacent 33/330 kV switchyard (described in Section 4.2.2) and the 330 kV overhead transmission line (described in Section 4.2.3) which would link the Project to the existing TransGrid Wallerawang 330 kV Substation on the western side of the Coxs River.

Operation of the BESS would be supported by ancillary infrastructure as described in Section 4.2.4.

It is anticipated that the majority of the BESS infrastructure (e.g. BESS modules, inverters etc), transformers and switchgear would be procured offshore, and Port Botany would be the preferred Port of Entry. However, the Proponent would look to source these components locally where feasible. Other materials for site infrastructure (e.g. prefabricated buildings, concrete, water tanks etc) would be sourced locally where feasible.

4.2.2 33/330 kV switchyard

A 33/330 kV switchyard would be constructed as part of the Project directly adjacent to the BESS facility as shown in Figure 4-1. The purpose of the switchyard is to convert the MV power produced by the BESS facility to HV power to enable connection to the grid. The 33/330 kV switchyard would be connected to the overhead transmission line and the BESS facility and would contain HV switchgear and up to four HV transformers.

An operational area of around 3.6 hectares (180 metres x 180 metres) has been allowed for the switchyard, however the actual switchyard infrastructure is anticipated to be smaller than this with the exact dimensions subject to detailed design.

4.2.3 Overhead transmission line connection

An overhead transmission line connection between the Project 33/330 kV switchyard and the nearby TransGrid Wallerawang 330 kV Substation would be provided as part of the Project. The connection would be around 600 metres long and would be across Greenspot owned land only, to the TransGrid Wallerawang 330 kV Substation. The connection would include a transmission corridor of 60 metres in accordance with TransGrid requirements for 330 kV lines. The indicative location of the overhead transmission line connection is shown on Figure 4-1.

The conductors would be above ground. The line would be strung from lattice steel transmission towers, with gantry structures at each end. The line would be either a single circuit configuration (i.e. strung on one side of the towers only) or a double-circuit configuration (i.e. strung on both sides of the towers).

Construction of foundations for the new towers would generally involve boring or excavating a hole for each of the four footings of the tower. It is expected that each borehole would be approximately one metre wide and up to 10 metres deep and stabilised with concrete. Alternatively, steel reinforcements would be placed into the hole and backfilled with concrete.

Each tower would be craned (in sections) into position onto the footing and secured with holding down bolts. Some structures may require additional strengthening through the use of guy wires. The guy wire would be connected to metal rods which would be embedded in a concrete foundation block (approximately 1 m^3) installed below ground.

There is an existing overhead transmission line that connects to the Mount Piper Power Station which crosses the overhead transmission line route between the proposed BESS facility and the TransGrid substation. The overhead transmission line would be designed to avoid conflicts with this existing line and in accordance with Australian Standards and TransGrid's Design Guidelines.

The overhead transmission line would connect to the north-eastern corner of the TransGrid Wallerawang 330 kV Substation.

4.2.4 Ancillary design elements

To support operation of the Project several ancillary elements are proposed. These are described in Table 4-3 and shown on Figure 4-1.

Table 4-3 Project ancillary design elements

Design element	Description
Site office and amenities	A staff office and amenities building would be provided adjacent to the BESS.
Site access and parking	Entry and egress access to the Project Site would be via the existing intersection of Castlereagh Highway and the existing access road. Access roads for the BESS and TransGrid switchyard would be included for operational maintenance purposes as shown in Figure 4-1. Minor upgrades to the intersection would be undertaken to accommodate construction traffic and this would remain in place for operation.

Design element	Description
	A car parking area for staff would be provided adjacent to the office and amenities building and would accommodate a total of ten spaces for operational and maintenance staff and visitors. Operational traffic movements are expected to be minor (around five staff are expected to be on-site each day during operations). This is further discussed in Section 8.
Fencing	Security fencing (e.g. chain link or palisade) would be installed along the perimeter of the Project Site. Fencing would also be utilised to separate operational areas within the Project Site (i.e. the BESS facility, office and amenities building and the Project substation) to maintain operational safety. The existing fencing along the Castlereagh Highway frontage would be maintained. A locked gate would be located at the Castlereagh Highway access road intersection to control access to the Project Site.
Signage	Signs would be situated at a number of locations across the Project Site. These signs would be for the purposes of way finding, safety and building identification.
Lighting	Standard lighting would be located around the perimeter and throughout the Project Site, including the BESS facility, Project 33/330 kV switchyard, office and amenity building and internal roads and car park. Lighting would be used to maintain safety and security and to allow for out of daylight hours maintenance, as required. External lighting design would be consistent with *AS/NZS 1680.5:2012 Australian and New Zealand Interior and workplace, Part 5: Outdoor workplace lighting* and *AS 4282-1997 Control of the obtrusive effects of outdoor lighting*.
Drainage Infrastructure	The Project would include the installation of stormwater management infrastructure, incorporated into the design of the Project to manage water quality during operation of the Project. Stormwater treatment measures are detailed in Section 16 and Appendix J and would include the provision of grassed swales, a bioretention basin and installation of Gross Pollutant Traps (GPT) to collect runoff from the BESS facility, switching yard, office/carpark. The majority of the access road would also be treated before entering the bioretention basin.
Services and utilities	Proposed service and utility connections to the Project Site include: • On-site security system including but not limited to, CCTV and an integrated telecommunication system • Connections to telecommunications infrastructure via fibre optic cable for high-speed internet • 330 kV back fed supply for supervisory control and data acquisition (SCADA) system • Rainwater capture in rainwater tanks for offices and amenities. Potable water would also be brought in via tanker as required. • Sewage would be managed via on-site septic tank or transported for management off-site via tanker.
Fire management	Two 20,000 litre water tanks would be located on the Project Site for fire suppression These would be filled via water tankers and refilled as required.

4.3 Construction

This section details construction activities required to facilitate the Project.

4.3.1 Site preparation

Harvesting of the trees (not stumps) within the forestry area would be undertaken prior to commencement of the construction works for the Project and would be under a separate approval (to the extent required).

Site establishment works and preparation for construction would include:

- Clearing of vegetation and grubbing to remove tree stumps within the forestry area.
- Civil works for site levelling within the BESS area, 33/330 kV switchyard and ancillary areas, including the installation of a proposed pipe to manage flows within the ephemeral creek (see Section 16.1.2). There will be excess cut material as a result of these activities (as shown on Figure 4-4). This material will be stockpiled on the site for beneficial re-use including potentially as part of the development of the 'Greenspot 2845 Activity Hub'.
- Installation of temporary environmental controls such as water management infrastructure.
- Establishment of a temporary construction compound within the construction footprint including demountable offices and amenities, storage sheds (shipping containers) and fabrication area.
- Establishment of a laydown area for materials such as cable drums, fill, gravel, road base, etc.
- Construction of access tracks and fencing.
- Surveying and investigation of on-site conditions to implement the final design on-site.

Temporary upgrades to the site entrance off Castlereagh Highway would also be undertaken during the site preparation phase. This would comprise widening of the mouth of the intersection and upgrading / paving the entry of the access road for around 40 metres to prevent tracking of gravel onto the highway. The proposed construction upgrades are discussed in more detail in Section 8 and also shown in Figure 8-5.

Figure 4-4 Proposed cut and fill

4.3.2 Construction stages

Following completion of the site establishment and preparation works, construction of the Project would commence and is anticipated to include:

- Trenching and installation of cable from the battery to the 33/330 kV switchyard
- Installation of footings for battery enclosures, inverters, switch rooms and transformers, including pilings and concrete
- Delivery, installation and fit out of the BESS including battery modules, inverters and MV transformers. BESS components are largely prefabricated and will be lifted directly into place from the delivery vehicle
- Delivery, installation and fit out of transformers and switchgear for the 33/330 kV switchyard
- Installation of overhead transmission line towers, including pilings and concrete, and stringing of the line
- Construction of ancillary elements including, offices and amenities, installation of services, water and sewage management, fire systems and signage
- Installation of permanent fencing and security systems
- Testing and commissioning
- Removal of construction equipment and materials and rehabilitation of construction areas (where applicable).

4.3.3 Construction program

Construction would begin as soon as practicable after all regulatory approvals are obtained and would take approximately 12 to 24 months to complete. The peak construction period would last between nine and 15 months.

The Project assumes that the entire 500 MW BESS would be constructed within a single continuous construction period. However, the Project may be staged as necessary to meet market conditions. Potential staging could be:

- Stage 1 – Consisting of 250 MW / 500 MWh with construction commencing as soon as practicable after all regulatory approvals are obtained
- Stage 2 – Consisting of 100 MW / 200 MWh with construction commencing in 2024
- Stage 3 – Consisting of 150 MW / 300 MWh with construction commencing in 2026.

Note that the above stages are indicative only. Staging activities would be limited to the BESS facility. The final built form of the 33/330 kV switchyard, the transmission line and the ancillary facilities would be constructed as part of Stage 1 in all staging scenarios.

The construction of each stage of the battery would take between 10-12 months and comprise construction of BESS footings, delivery, installation and fit out of BESS and, testing and commissioning. A worst-case scenario of the full capacity BESS being constructed in one stage has been assumed.

Figure 4-5 Project construction footprint

4.3.4 Construction hours

Construction works would generally be undertaken during standard daytime construction working hours, being:

- 7am to 6pm Monday to Friday
- 8am to 1pm Saturdays
- No works on Sundays or public holidays.

Notwithstanding this, deliveries using oversize vehicles may need to be undertaken outside of these hours. Key stakeholders would be informed prior to out of hours activities.

In addition to the above, outside of hours works may also include:

- Emergency work to avoid damage to persons or property and/or to prevent environmental harm
- Maintenance and repair of public infrastructure where disruption to essential services and/or consideration of worker safety does not allow work within standard construction hours
- Public infrastructure works that shorten the length of the Project
- Construction works where it can be demonstrated and justified that these works are required to be undertaken outside of standard construction hours.

4.3.5 Construction compounds

A temporary compound would be required to support construction of the Project. The compound is anticipated to be established east of the BESS pad as detailed in Figure 4-5.

It is anticipated that the compound area would contain the following:

- Site office and amenities
- Staff parking areas
- Fabrication area
- Equipment and vehicle storage areas
- Laydown areas for construction materials (e.g. cable drums, fittings, gravel roadbase)
- Stockpiling of excavated materials and soil
- Bunded fuel storage areas.

The construction compound would be temporary in nature and removed / decommissioned at the completion of construction. Where the construction compound is not situated within the footprint of the operational area it would be rehabilitated to the pre-construction standard upon completion of the works.

In the event that other compounds are required, the following site selection criteria would be applied to their location:

- Within the construction support works area (Figure 4-5)
- Access to the local road network
- Relatively level land

- Greater than 50 metres from a watercourse
- Greater than 50 metres from threatened species and endangered ecological communities
- Greater than 100 metres from a residential dwelling
- No requirement to remove any native vegetation beyond that otherwise being undertaken for the Project
- No requirement to undertake any significant ground disturbing works
- No impact on any heritage items (Indigenous or non-Indigenous)
- Not unreasonably affect the land use of adjacent properties.

Consideration to all of the above factors would be undertaken prior to the establishment of any additional construction compound or stockpiles for the purpose of the Project.

4.3.6 Construction plant and equipment

The plant and equipment that are likely to be used during the construction of the Project are summarised in Table 4-4.

Table 4-4 Construction plant and equipment

Activity	Equipment	
Earthworks	• Front end loaders • Dump trucks • Road trucks • Excavators	• Graders • Compactors • Water trucks
Trenching / construction of BESS / fit out / drainage and utilities	• Concrete trucks • Elevated work platforms • Cranes • Concrete saws and grinders • Compactors and rollers • Scrapers • Backhoe	• Bobcats • Telehandlers • Forklifts • Twin-cab utes • Cable laying machine and/or cable winch • Generators • Welders.

4.3.7 Construction traffic, access and parking

Construction traffic movements

Vehicles associated with construction works would include light vehicles (workers travelling to and from the Project Site at the start and finish of shifts) and heavy vehicles delivering / removing construction materials and battery components.

The construction contractor may provide communal transport for transport construction workers to the Project construction site each day for safety and convenience. This procedure would be detailed in the Construction Environmental Management Plan (CEMP).

Heavy vehicles would deliver equipment and battery components and would also be used for the removal of waste material resulting from construction activities. Over Size Over Mass (OSOM) vehicles would also be required for the delivery of transformers during construction (up to 36 metres).

The majority of construction and delivery traffic would be coming from the south, predominantly from Lithgow and Sydney. Construction traffic movements are anticipated to comprise:

- Up to 100 two-way light vehicle movements per day associated with workers coming to site
- Approximately 20 two-way heavy vehicle movements per day, associated with transport of equipment, and materials including batteries
- Approximately 36 OSOM movements across the construction period.

OSOM movements would be scheduled outside of peak periods where feasible and may occur outside of standard construction hours. OSOM movements would be required for:

- 12 MV transformer deliveries over the construction period during standard construction hours
- 20 MV switchgear deliveries over the construction period during standard construction hours
- Up to four HV transformer deliveries.

These movements would be undertaken in accordance with applicable licences and permits.

Access

Access to and egress from the Wallerawang BESS site during construction would use the unnamed access road from Castlereagh Highway (see Figure 4-5). This access point would also be used as the main operational entry point for vehicles (refer to Section 8 of this EIS).

Temporary upgrades to the site entrance off Castlereagh Highway would be undertaken during the site preparation phase. This would comprise widening of the mouth of the intersection and upgrading / paving the entry to the access road and up to around 40 metres into the site to prevent tracking of gravel onto the highway. The proposed construction upgrades are shown in Figure 8-5.

Parking

A construction parking area suitable to accommodate the anticipated construction staff would be provided adjacent to the main construction compound. The parking area would be a cleared, demarcated area but would not be a formalised carpark.

A designated area for delivery trucks would be located within the laydown area (Figure 4-5) and will be regulated by the construction contractor.

4.3.8 Construction workforce

It is anticipated that up to 100 personnel a day would be required during the peak construction periods of the Project. The construction workforce would include (but not be limited to) the following:

- Tradespeople and construction personnel
- Sub-contractor construction personnel
- Engineers
- Functional and administrative staff.

4.3.9 Construction environmental management plan

A Construction Environmental Management Plan (CEMP) would be developed that details environmental management systems and processes for construction of the Project. The CEMP would provide the framework for the management of all potential environmental impacts resulting from the construction activities.

The CEMP would be prepared based on the mitigation and management measures identified in the EIS (refer to Section 24) and the Conditions of Approval. The specified documentation would be required to be prepared and approved prior to the commencement of works and adhered to for the duration of construction.

4.4 Operation

The Project would be operational 24 hours, seven days a week. The Project would generally be managed and monitored remotely with the exception of site maintenance. Ongoing operational would require up to five operational personnel.

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 Site including fencing, roads, water infrastructure and environmental controls. Management of vegetation and pests would also be undertaken.
- Repair and maintenance of Project infrastructure such as battery enclosures, inverters, transformers, cables and substations
- Ongoing security monitoring.

4.4.1 Stormwater runoff controls

The stormwater treatment measures would include:

- All roads would be provided with grassed swales
- A bioretention basin with an average surface area of 2,821 m^2 would be provided
- Collected runoff from the BESS facility, switching yard, office/carpark and the majority of the access road would be treated by a Gross Pollutant Trap (GPT) before entering the bioretention basin.

4.4.2 BESS replacement and decommissioning

The BESS units have a design life of 15-20 years. It is expected that replacement of the batteries would be undertaken extending the life of the BESS to 30-40 years. Remaining operational infrastructure has a design life of 30-50 years.

It is expected that with improved technology, the battery units will be upgraded and be maintained to extend the life of the BESS. Any wholescale repowering would seek to make use of the existing foundations, connections and switchyard and would generally comprise swapping out and recommissioning BESS containers.

If a battery unit faults and is beyond repair, the unit will be removed and recycled for materials, where practicable.

In the case of a full decommissioning of the BESS, the Project Site will be repurposed for other industrial uses as determined by the Proponent (and subject to separate approvals being obtained for those uses).

4.4.3 Operational environmental management plan

An Operational Environmental Management Plan (OEMP) would be prepared to provide the overarching framework for the management of all potential environmental impacts resulting from the operation of the Project.

5 Statutory planning approvals

This chapter describes the environmental impact assessment and approval process for the Project, as well as other relevant environmental planning and statutory approval requirements as required by the SEARs. A complete SEARs compliance table is presented in Appendix A.

5.1 Commonwealth legislation

5.1.1 Environmental Protection and Biodiversity Conservation Act 1999

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) establishes the Commonwealth's role in environmental assessment, biodiversity conservation and the management of protected areas.

Under the EPBC Act, a referral to the Commonwealth Department of Agriculture, Water and Environment (DAWE) is required for proposed 'actions' that have the potential to significantly impact on any Matter of National Environmental Significance (MNES) or the environment of Commonwealth land (including leased land).

Current matters of national environmental significance are:

- World heritage properties
- National heritage places
- Wetlands of international importance (often called 'Ramsar' wetlands after the international treaty under which such wetlands are listed)
- Nationally listed threatened species and ecological communities
- Listed migratory species
- Commonwealth marine areas
- The Great Barrier Reef Marine Park
- Nuclear actions (including uranium mining)
- A water resource, in relation to coal seam gas development and large coal mining development.

A desktop review of the DAWE *Protected Matters Search Tool* was undertaken on 1 June 2021. Table 5-1 displays MNES within 10 kilometres of the Project Site.

Table 5-1 Protected Matters within 10 kilometres of the Project Site

Protected Matters within 10 kilometres of the Project Site (EPBC Act)	Count
World Heritage Properties	None
National Heritage Places	None
Wetlands of International Importance (Ramsar wetlands)	4
Listed Threatened Species	49
Listed Threatened Ecological Communities	4
Listed Migratory Species	13
Commonwealth Marine Areas	None

Protected Matters within 10 kilometres of the Project Site (EPBC Act)	Count
The Great Barrier Reef Marine Park	None
Nuclear actions (including uranium mining)	None
Other Protected Matters under the EPBC Act within 10 kilometres of the Project Site	
Commonwealth Land	4
Listed Marine Species	19
Whales and Other Cetaceans	None
Critical Habitats	None
Commonwealth Reserves Terrestrial	None
Australian Marine Parks	None
Invasive Species	39
Nationally Important Wetlands	None
Key Ecological Features (Marine)	None

Threatened species, threatened ecological communities and migratory species impacts associated with the Project are discussed further in Section 11 and in the BDAR (Appendix E). As identified within the BDAR, the Project is not anticipated to have a significant impact on listed threatened species or ecological communities or migratory species. No other significant impacts are anticipated upon MNES and therefore a referral to DAWE is not required.

5.1.2 Native Title Act 1993

The main objective of the Commonwealth *Native Title Act 1993* is to recognise and protect native title. A successful native title claim results in the recognition of the particular rights, interests or uses claimed by the registered party. A search of the register maintained by the National Native Title Tribunal was undertaken on 1 June 2021. There is one native title claim lodged in August 2018 within the Project Site (NC2018/002 – Warrabinga-Wiradjuri #7).

Native title cannot be claimed on freehold land, as it is extinguished over the area. However, protection is required on freehold land under State and federal legislation for the protection of sacred sites.

This has been discussed in the Aboriginal Cultural Heritage Assessment (ACHA) Report in Section 12 and Appendix F of this EIS.

5.2 New South Wales legislation

The *Environmental Planning and Assessment Act 1979* (EP&A Act) and the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) are the primary pieces of legislation that regulate land use planning and development assessment in NSW. This legislation is supported by a range of environmental planning instruments, including State environmental planning policies and local environmental plans.

5.2.1 Environmental planning approvals pathway

Permissibility

Under the *Lithgow Local Environmental Plan 2014*, (Lithgow LEP, 2014) the Project meets the definition of 'electricity generating works', which is defined as:

'*a building or place used for the purpose of –*

(a) Making or generating electricity; or

(b) Electricity storage'

Division 4 of the *State Environmental Planning Policy (Infrastructure)* (ISEPP) applies to development for the purposes of electricity generating works (as defined above) or solar energy systems. Clause 34(1) notes that:

'development for the purpose of electricity generating works may be carried out by any person with consent on the following land –

(c) in the case of electricity generating works comprising a building or place used for the purpose of making or generating electricity using waves, tides or aquatic thermal as the relevant fuel source—on any land

(d) in any other case—any land in a prescribed rural, industrial or special use zone.'

The Project is located on land within the Lithgow Local Government Area (LGA) on land zoned under the Lithgow LEP 2014. A summary of the land use zoning is provided in Table 5-2.

Table 5-2 Land use zoning of the Project Site

Lot/DP	Land Use Zone
Lot 3 DP 1018958 Lot 4 DP 1016725 Lot 3, DP 1226927 Lot 4, DP 1226927	IN3 Heavy Industrial
Lot 3 DP 1181412 Castlereagh Highway	SP2 (Infrastructure) – Electricity generating works Road infrastructure
Lot 91 DP 1043967	RU1 Primary Production

Under the *Lithgow LEP 2014*, 'electricity generating works' are permissible with development consent under land zoned SP2, however prohibited under land zoned as IN3 and RU1. Notwithstanding this, land zoned as IN3, RU1 (and SP2) are defined as prescribed zones under Division 4 of the ISEPP and electricity generating works are therefore permissible with consent on this land under Clause 34 of the ISEPP.

The Project is therefore considered to be permissible with development consent under the provisions of the ISEPP.

State Significant Development

Section 4.36 of the EP&A Act provides for the declaration of a project as State Significant Development (SSD). The declaration of a project as SSD under Section 4.36 of the Act can be by meeting the requirements of a State Environmental Planning Policy or by the Minister for Planning and Public Spaces.

Clause 8(1) of the *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP) notes that development is declared to be SSD for the purposes of the EP&A Act if:

(a) The development on the land concerned is, by the operation of an environmental planning instrument, not permissible without development consent under Part 4 of the Act, and

(b) The development is specified in Schedule 1 or 2.

As described in Section 3.1, the Project is permissible with development consent.

Clause 20 of Schedule 1 of the SRD SEPP declares 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) to be SSD for development that either –

(a) Has a capital investment value of more than $30 million, or

(b) Has a capital investment value of more than $10 million and is located in an environmentally sensitive area of State significance.

The Project is expected to have a capital investment value of about $404 million.

The Project is considered to meet the definition of SSD under Clause 8 of the SRD SEPP, as the Project would be for electricity generating works on land that is permitted with development consent under Clause 34 of the ISEPP, and would have a capital investment value greater than $30 million.

Development consent for the Project is therefore being sought in accordance with Part 4, Division 4.7 of the EP&A Act.

Planning approval process under Division 4.7 of the EP&A Act

The assessment and approval process for an SSD project is established under Part 4, Division 4.7 of the EP&A Act. The Project requires an SSD application is to be accompanied by an Environmental Impact Statement (EIS) prepared by or on behalf of the Applicant in the form prescribed by the regulations, in accordance with Section 4.12(8) of the EP&A Act.

The EIS for the Project will be informed by the Secretary's Environmental Assessment Requirements (SEARs). The Proponent submitted its Scoping Report to the Department of Planning, Industry and Environment (DPIE) in in February 2021 to seek the SEARs, as required by Section 4.12(8) of the EP&A Act. The SEARs were issued on 18 March 2021. This EIS has been prepared in accordance with the SEARs and the requirements of Schedule 2 of the EP&A Regulation. Appendix A provides a summary of all the SEARs and Appendix B summarises the requirements of Schedule 2 of the EP&A Regulation. Where each of these requirements has been addressed in the EIS is also provided.

The DPIE will place the EIS on public exhibition for a minimum of 28 days (as per Schedule 1, Division 2, Clause 12 of the EP&A Act). During the exhibition period, the community, stakeholders and government agencies will have an opportunity to review the EIS and provide a written submission to DPIE for consideration in its assessment of the Project.

At the completion of the public exhibition period, DPIE will provide the Proponent with a copy of all submissions received during the exhibition period. After reviewing the submissions, the Proponent will prepare a Submissions Report that responds to the relevant issues raised. If changes are required to the Project as a result of the issues raised or to minimise environmental impacts, the Proponent would prepare a report to address these changes and submit this for review to DPIE, after which it would be made available to the public.

Pursuant to section 4.5 of the EP&A Act, the consent authority for State Significant Development is the Independent Planning Commission (if the development is of a kind for which the Commission is declared the consent authority by an environmental planning instrument) or the Minister for Planning and Public Spaces (if the development is not of that kind). Under clause 8A of the SRD SEPP the Independent Planning Commission (IPC) is declared to be the consent authority for State Significant Development in instances where more than 50 public objections are received on the application, the applicant has made a reportable political donations disclosure and/or the local council (Lithgow City Council) has objected to the Project.

All SSD projects will be assessed by DPIE prior to determination by the consent authority.

5.2.2 NSW Environmental Planning Instruments

Considerations and discussion of State Environmental Planning Policies which are considered relevant to the Project are summarised in Table 5-3.

Table 5-3 Statutory context – NSW Environmental Planning Instruments

Environmental Planning Instrument	Considerations and Discussion	Relevance to the Project	Relevant section(s) in EIS
State Environmental Planning Policy (State and Regional Development) 2011	Identifies development that is SSD.	As the Project is electricity generating works and has a capital investment value of over $30 million, it is considered SSD.	Section 5.2.1
State Environmental Planning Policy No.33 – Hazardous and Offensive Development	Applies to any projects that fall under the policy's definition of 'potentially hazardous industry' or 'potentially offensive industry'.	A Preliminary Hazard Analysis (PHA) has been undertaken (refer to Section 15) to assess the potential hazards and risk associated with the Project. The assessment concluded the Project would not involve any potentially hazardous activities that would pose a significant risk to human health, life or property, or to the biophysical environment. In addition, the environmental assessment undertaken as part of this EIS indicates that with the implementation of proposed mitigation measures, the Project would not pose a potentially offensive development to existing or likely future land use.	Section 15 Appendix I
State Environmental Planning Policy No.55 – Remediation of land	Provides a State-wide approach to the remediation of contaminated land for the purpose of minimising the risk of harm to the health of humans and the environment.	A preliminary desktop assessment for potential contamination within the Project Site has been undertaken (refer to Section 10). The assessment found there was a low likelihood of contamination being present within the Project Site.	Section 10
State Environmental Planning Policy (Infrastructure) 2007	ISEPP aims to facilitate the effective delivery of infrastructure across NSW.	Division 4 of the ISEPP applies to the Project, as it is considered to be development for the purposes of electricity generating works or solar energy systems. The Project is permissible with development consent under the ISEPP.	Section 5.2.1

Environmental Planning Instrument	Considerations and Discussion	Relevance to the Project	Relevant section(s) in EIS
State Environmental Planning Policy (Koala Habitat Protection) 2020 *State Environmental Planning Policy (Koala Habitat Protection) 2021*	Encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline.	The provisions of this SEPP apply to local government areas listed under Schedule 1, which includes the Lithgow LGA where the Project is located. The Project Site is located in a koala habitat area. In summary, no 'core Koala habitat' was identified within the Project Site. Therefore, in accordance with Clause 8 of SEPP 44, development consent may be granted for impacts to potential Koala habitat that is not considered 'core Koala habitat'. For further detail refer to the Section 11 and Appendix E of this EIS.	Section 11 Appendix E
State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011	The State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011 (SDWC SEPP) aims to provide for healthy water catchments that will deliver high quality water while permitting development that is compatible with that goal. Clause 10(1) of the SDWC SEPP notes that a consent authority must not grant consent to the carrying out of development under Part 4 of the Act on land in the Sydney drinking water catchment unless it is satisfied that the carrying out of the proposed development would have a neutral or beneficial effect on water quality.	The Project is located within the SEPP *Sydney Drinking Water Catchment (2011)*. In accordance, with the SEPP a Neutral or Beneficial Effects Assessment (NorBE) has been undertaken to assess the potential water quality effects of the Project. MUSIC modelling was used to assess the effectiveness of the proposed stormwater treatment measures described above. The MUSIC modelling results for the proposed development indicate that the adopted best practice measures in stormwater treatment (i.e. grassed swales, gross pollutant traps and bioretention basin) successfully achieve the NorBE criteria in relation to mean annual pollutant loads.	Section 16 Appendix J

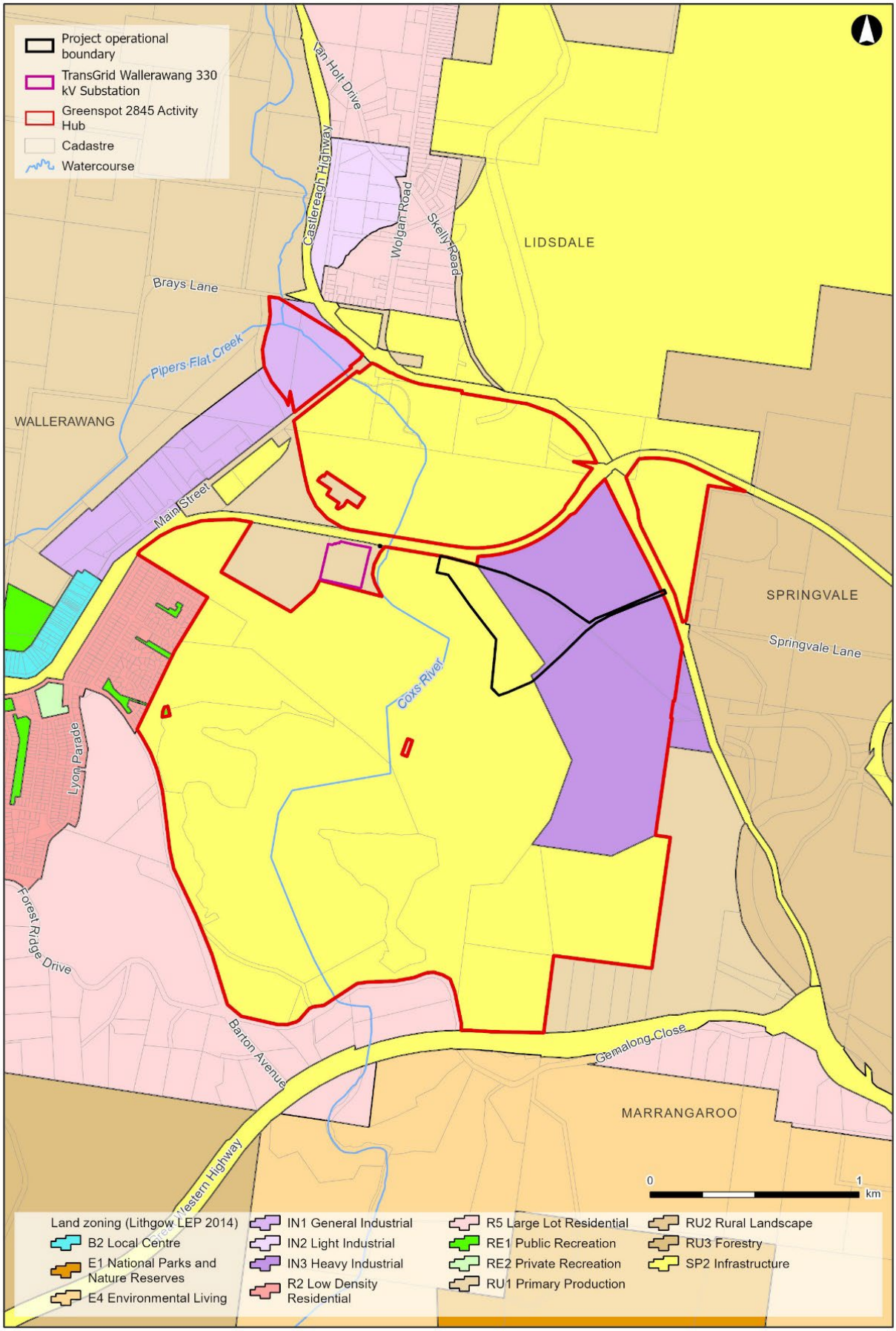


Figure 5-1 Land use zoning of the Project Site

5.3 Other NSW legislation

In accordance with Sections 4.41 and 4.42 of the EP&A Act, some environmental planning legislation does not apply to SSD projects or must be applied consistently with an approval for SSD.

5.3.1 Consideration of other NSW legislation

Other statutory planning related legislation and regulations applicable to SSD projects, and their consideration in the context of the Project have been summarised in Table 5-4 below.

Table 5-4 Statutory context – other NSW legislation

Legislation	Considerations	Relevance to the Project	Relevant section(s) in EIS
Protection of the Environment Operation Act 1997 (POEO Act)	• Pollution of waters • Air pollution • Pollution of land and waste • Environment Protection Licence The activities listed in Schedule 1 of the POEO Act (broadly, activities with potentially significant environmental impacts) require an Environment Protection Licence (EPL). The Project (including construction) does not constitute any of the scheduled activities and therefore does not require a licence.	The Project is located within the land subject to an existing EPL (EPL 766) for the Wallerawang Power Station and surrounding area. The scheduled activities under the conditions of EPL 766 are for crushing, grinding or separating (processing capacity of up to 30,000 tonnes per annum). However, the Project would not be classified as a scheduled activity under the *Protection of the Environment Operations Act 1997* (POEO Act) and therefore an EPL for the construction and/or operation of the Project is not anticipated to be required. If the Project is approved, it is expected that EPL 766 may be varied to exclude the Project Site given no scheduled activities will be undertaken on the Premises.	Section 16 Section 18 Section 20
Biosecurity Act 2020	• Natural resource protection • Impacts of pests, disease, weeds and contaminants.	A BDAR has been prepared (refer to Section 11 and Appendix E). This includes the assessment of the impact to threatened species and the management of invasive species located within the Project Site.	Section 11 Appendix E (BDAR)
Biodiversity Conservation Act 2016	• Conservation of biological diversity • Maintain the diversity and quality of ecosystems and enhance their capacity to adapt to change and provide for the needs of future generations • Assess the extinction risk of species and ecological communities • Identify key threatening processes through an independent and rigorous scientific process • Establish a framework to avoid, minimise and offset the impacts of proposed development and land use change on biodiversity	The Project occurs on land identified on the Biodiversity Values Map and involves removal of listed vegetation. Accordingly, a BDAR (Appendix E) has been prepared by Arcadis, an accredited assessor under the BAM. The BDAR identifies how the Proponent proposes to avoid and minimise impacts, any potential impact that could be characterised as serious and irreversible, and any obligation required to offset the likely biodiversity impacts of the Project. Further information is provided in Section 11.	Section 11 Appendix E (BDAR)

Legislation	Considerations	Relevance to the Project	Relevant section(s) in EIS
	• Establish a framework for assessment and offsetting of development impacts as well as investment in biodiversity conservation.		
Contaminated Land Management Act 1997	• Outlines the circumstances in which the notification of the NSW Environment Protection Authority is required in relation to contamination of land.	A desktop study of contamination has been undertaken for the Project and is provided at Section 10. The study considered the potential for contamination to occur at the Project Site to be low and could be appropriately managed through mitigation measures in the event any unexpected contamination is encountered during construction. The operation of the Project is not anticipated to result in contamination impacts	Section 10
Heritage Act 1977 (Section 146)	• Requires that the Heritage Council be notified if a relic is uncovered during construction and if it is reasonable to believe that the Heritage Council is unaware of the location of the relic.	An assessment of the heritage impact of the Project has been undertaken (refer to Sections 12 and 13). The Statement of Heritage Impacts (SoHI) prepared by NGH is included in Appendix G. This assessment identified nine significant listed non-Aboriginal heritage items within 1 km of the Project Site. Two additional items not previously listed on any register were identified as holding potential heritage significance: the Original Western Line railway alignment, and a sandstone culvert running beneath the former railway alignment. Construction of the Project would not result in impacts to any listed Commonwealth, State or local heritage items, while operational impacts are anticipated to be low to negligible.	Section 13 Appendix G (SoHI)

Legislation	Considerations	Relevance to the Project	Relevant section(s) in EIS
Fisheries Management Act 1994	• Requires the identification, conservation and recovery of threatened fish, aquatic invertebrates and marine vegetation. It covers the identification and management of key threatening processes which affect threatened species or could cause other species to become threatened.	Coxs River and Lake Wallace are mapped as Key Fish Habitat by NSW DPI (2007) as shown in the BDAR (Appendix E). Key Fish Habitat is not defined in the FM Act, however one of the objectives of the FM Act is to conserve Key Fish Habitats. The Project Site will not impact upon any Key Fish Habitats and appropriate measures have been outlined in Section 11 of this EIS.	Section 11 Appendix E (BDAR)
National Park and Wildlife Act 1974	Requires the conservation of nature, objects, places or features of cultural value within the landscape including but not limited to: • Places, objects and features of significance to Aboriginal people • Places of social value to the people of New South Wales • Places of historic, architectural or scientific significance.	An assessment of the heritage impact of the Project has been undertaken (refer to Sections 12). An Aboriginal Cultural Heritage Assessment (ACHA) Report was prepared by NGH and is included in Appendix F. Two newly recorded Aboriginal sites were located during a surface survey and have been registered with the Aboriginal Heritage Information Management System (AHIMS). Greenspot has modified the Project construction footprint and both these sites will be avoided. Measures (e.g. signage and no-go zones) will be put in place for the duration of construction.	Section 12 Appendix F (ACHA Report)
Rural Fires Act 1997	Require public authorities and owners/occupiers of land to take all practicable steps to prevent the occurrence of bushfires on, and to minimise the danger of the spread of bushfires on or from, that land.	Parts of the Project Site are mapped within a designated bush fire prone area. An assessment of potential bushfire risk associated with construction and operation of the Project has been prepared by Bushfire Consulting (Appendix H). The curtilage surrounding the proposed Wallerawang Switchyard, the 330 kV overhead transmission line corridor and associated structures, and the office and carpark would be managed as an Inner Protection Area (IPA) Asset Protection Zone (APZ) from the proposed buildings in all directions for a distance of at least 20 m.	Section 14 Appendix H

Legislation	Considerations	Relevance to the Project	Relevant section(s) in EIS
Roads Act 1993	Under Section 138 of the Roads Act, approval is required before any works can be undertaken within a public road reserve.	Access to the Project is via Castlereagh Highway located within and an internal access road. Some minor temporary works may be undertaken on the Castlereagh Highway to facilitate access to the Project Site. Therefore, approval under Section 138 of the Roads Act may be required. Further consultation would be undertaken with TfNSW, as required.	Section 8 Appendix C

5.4 Local environmental planning legislation

5.4.1 Lithgow Local Environmental Plan 2014

The Project is located within the Lithgow LEP and subject to the provisions of the *Lithgow Local Environmental Plan 2014* (Lithgow LEP, 2014). The Project would be located on land zoned as IN3 (Heavy Industrial), SP2 (Infrastructure) Electricity generating works / road infrastructure and RU1 (Primary Production). As the Project is SSD under the SRD SEPP, the Lithgow LEP 2014 does not apply to the extent of any inconsistency with the SRD SEPP.

An overview of the land use zone objectives of the Lithgow LEP 2014 is provided in Table 5-5 below. The Project is considered to be consistent with the objectives of the land use zones within which it is located.

Table 5-5 Land use objectives

Land use zone	Land use objectives	Consistency
IN3 – Heavy Industrial	• To provide suitable areas for those industries that need to be separated from other land uses • To encourage employment opportunities • To minimise any adverse effect of heavy industry on other land uses • To support and protect industrial land for industrial uses • To maintain or improve the water quality of receiving water catchments.	The Project is located within a well-established industrial area. The Project will employ up to approximately 100 construction workers. Mitigation will be implemented to minimise any detrimental environmental effects. The Project will not impact upon the Coxs River and Sydney Drinking Water Catchment.
SP2 (Infrastructure) – electricity generating works	• To provide for infrastructure and related uses • To prevent development that is not compatible with or that may detract from the provision of infrastructure • To maintain or improve the water quality of receiving water catchments.	The Project is located within a well-established industrial area. The Project will not impact upon the Coxs River and Sydney Drinking Water Catchment.
RU1 - Primary Production	• 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 minimise the environmental and visual impact of development on the rural landscape.	The Project would not impact on land currently used for primary production. The Project would minimise environmental impacts (including visual and environmental). The Project would not adversely impact on water quality or receiving water catchments.

Land use zone	Land use objectives	Consistency
	• To provide for recreational and tourist development and activities of an appropriate type and scale that do not detract from the economic resource, environmental or conservation value of the land. • To maintain or improve the water quality of receiving water catchments.	

A number of additional local provisions contained in Part 7 of the Lithgow LEP 2014 will be considered where relevant, as part of the EIS, including earthworks, flood planning, stormwater management, biodiversity, riparian land, groundwater, heritage conservation, bushfire hazard reduction and infrastructure.

Table 5-6 Lithgow LEP local provisions

Provision	Description	Compliance
5.10 Heritage conservation	As noted in Section 13, the Project Site is located within 1 km of eight heritage-listed items under the Lithgow LEP 2014. None of these sites will be impacted by construction or operation of the BESS. Also, two newly recorded Aboriginal sites were located during a surface survey and have been registered with the AHIMS (Section 12. These sites will be avoided during the construction of the Project. This EIS is supported by the corresponding heritage assessments (ACHA Report and SoHI) (Appendix F and Appendix G respectively). As outlined in Sections 12 and 13, of this EIS, the Project Site is considered suitable for the proposed development subject to the implementation of measures identified in both heritage assessments.	Yes
5.11 Bush fire hazard reduction	Part of the Project Site is considered bushfire prone land. A Bushfire Assessment Report (Appendix H) has been prepared for the Project. As noted in Section 14, the Project has been designed to consider any relevant bushfire risks.	Yes
7.1 Earthworks	As described in Section 4.3.1, the Project would involve earthworks. The detailed design for these earthworks would ensure that there are no detrimental effects on drainage patterns, soil stability or any surrounding properties. Further, a desktop assessment has been undertaken to understand the impacts associated with earthworks. This is further discussed in Section 10.	**Y**es
7.2 Flood planning	The Project Site is not land identified as within the “flood planning area” under the Lithgow LEP 2014. The Project Site includes land (particularly in proximity to the Cox River) that is subject to flooding. A Flooding Impact Assessment was undertaken for the EIS (Appendix K). The assessment shows that for both the 1% and 5% Annual Exceedance Probability (AEP) events, there is minimal change to the flood extent. Impacts are largely contained to the area immediately downstream of where the proposed pipe (refer to Section 16.1.2) discharges back onto the floodplain. All changes to the flood regime would be on land owned by the Proponent.	Yes

Provision	Description	Compliance
	Flooding can be adequately managed in the Project Site subject to the measures identified in the Flooding Impact Assessment (Appendix K) and Water Quality Impact Assessment (Appendix J).	
7.3 Stormwater management	The Project Site is partially located within IN1 zoning and therefore consideration (under this clause) is to be given to maximising water permeable surfaces, use of on-site stormwater retention for alternative water supply and avoid significant adverse impacts on neighbouring properties and environmental values from run-off. A Water Quality Impact Assessment (Appendix J) has been prepared to consider potential water quality impacts (and stormwater management) as part of the Project. Further consideration of these stormwater management elements would be undertaken as part of detailed design of the Project.	Yes
7.4 Terrestrial Biodiversity 7.7 Sensitive lands	An environmentally sensitive area (adjoining the eastern side of the forestry area) is located within the Project Site. The Project would remove vegetation within this environmentally sensitive area and as a result a BDAR (Appendix E) has been prepared which includes measures to minimise and mitigate this impact. Further a Water Quality Impact Assessment (Appendix J) has been prepared to consider potential water quality impacts (and erosion and sediment control) as part of the Project. Further consideration of erosion and sediment control would be considered as part of detailed design of the Project.	Yes
7.5 Groundwater vulnerability 7.6 Riparian land and watercourses	The Project is located within a groundwater vulnerable area (i.e. Environmentally Sensitive Areas – Water Overlay Map). Riparian vegetation, along the Cox River would not be impacted by the Project. A BDAR (Appendix E) has been prepared to consider and mitigate potential groundwater dependant ecosystems. No impacts to groundwater dependant ecosystem are anticipated. Further, a desktop assessment has been undertaken to understand the potential contamination impacts of the Project. Subject to the implementation of mitigation measures the potential for contamination (soil and groundwater) can be adequately managed. This is further discussed in Section 10.	Yes

5.4.2 Lithgow Development Control Plan

The Lithgow Development Control Plan (DCP) was originally adopted by Lithgow City Council on the 26 July 2021 and came into operation on 1 September 2021. The DCP supports the Lithgow LEP 2014 by providing more detailed controls that apply to the Lithgow LGA.

The overarching aims of this DCP are:

- To implement and support the objectives of Lithgow LEP 2014
- To provide clear and concise development guidelines for various forms of development
- To promote appropriate growth and development in the Lithgow LGA and ensure it occurs in an orderly, environmentally friendly and sustainable manner
- To ensure positive planning outcomes are maximised for the benefit of the broader community.

As the Project is SSD, the provisions of the Lithgow DCP do not apply. However, consideration has been given to the objectives of the Lithgow DCP throughout the EIS, in order to demonstrate consistency of

the Project with the overarching aims of LCC for the Project. General provisions of the Lithgow DCP include:

- Site requirements
- Natural environment and hazards
- Heritage and cultural conservation
- Sub-division and roads
- Commercial, community and industrial development
- Rural and other land uses.

The Project is considered compliant with provisions regarding all site requirements, natural environment and hazards including bushfire prone land, vegetation clearing and flood prone land, heritage and cultural conservation, commercial, community and industrial development including industrial precincts, building design, facades, materials and colours.

6 Consultation

This section provides a summary of consultation activities undertaken for the Project including details of how issues raised during consultation have been addressed.

A full SEARs compliance table is presented in Appendix A.

6.1 Introduction

Consultation activities undertaken for the Project provided information to relevant State government agencies, service and infrastructure providers, the community and nearby landowners and allowed the opportunity for interested stakeholders and community members to provide feedback on the Project.

A summary of consultation with agencies and relevant stakeholders is included in Table 6-11 and detailed in the sections below.

6.2 Government agency consultation

6.2.1 Stakeholder identification

Several government agencies were identified as having a likely interest in the Project. These agencies were identified through the SEARs issued by DPIE as well as an understanding of the agencies that may have an interest in specific aspects of the Project or particular environmental considerations. The agencies identified for consultation were:

- DPIE, including:
  - Biodiversity, Conservation and Science (DPIE BCS)
  - the Natural Resources Access Regulator (DPIE NRAR) (Water Knowledge Office)
- Water NSW
- Lithgow City Council
- Transport for New South Wales (TfNSW)
- Forestry Corporation of NSW
- Heritage NSW (as Delegate of Heritage Council of NSW).

6.2.2 Consultation mediums

The consultation mediums adopted differed depending on the agency engaged with and the nature and level of their interest in the Project. Consultation mediums included:

- Face-to-face and virtual meetings
- Telephone conversations
- Email correspondence
- Letter correspondence.

The consultation outcomes for each agency is described in Section 6.2.3.

6.2.3 Consultation outcomes

A summary of the consultation activities carried out, the key aspects discussed, and how they have been considered within this EIS and the development of the Project, is provided for each agency below.

Department of Planning, Industry and Environment

DPIE has been consulted on various elements of the Project throughout the preparation of this EIS. Consultation with DPIE has comprised the following activities:

- An initial scoping meeting was held between Greenspot and DPIE on 2 February 2021. An overview and key elements of the Project were presented during the meeting and a copy of the presentation provided to each of the DPIE representatives.
- Multiple telephone conversations and email correspondences with representatives from DPIE have occurred throughout the development of the EIS.

The key aspects raised by DPIE throughout the above consultation, and how these items have been addressed is presented in Table 6-1.

Table 6-1 DPIE consultation outcomes

Aspect for Consideration	Response	Reference
Assessment requirements for the EIS (SEARs) issued on 18 March 2021	A summary of where the SEARs have been addressed within this EIS is provided in Appendix A.	All sections of EIS
Determine final location of the BESS facility	The location of the BESS facility and associated infrastructure has been detailed in Section 4 and depicted in the operational footprint (Figure 4-1).	Section 4 Figure 4-1
Determine if the forestry area will be removed	The forestry area, as detailed in Section 3 and Section 4, is subject to a Pine Plantation Deed and is to be harvested by the Forestry Corporation of NSW. The harvesting of this area would be undertaken under separate approval (if required) and would involve tree removal only. Removal of stumps or any residual vegetation and earthworks for the development of the built form of the Project would be undertaken in this area and under this approval.	Section 3 Section 4
Determine the transmission line easement and tower locations and the potential impact to the vegetation located on the eastern side of Coxs River	An overhead transmission line connection between the Project's 33 kV/330 kV switchyard and the nearby TransGrid Wallerawang 330 kV Substation would be provided as part of the Project. The connection will be around 600 m long from the BESS site to the TransGrid substation perimeter fence, and would be across Greenspot owned land only. The connection would include a corridor of 60 m in accordance with TransGrid requirements for 330 kV lines. No third-party easements across private property will be required. The location of the overhead transmission line corridor is shown in the operational footprint (Figure 4-1) in Section 4.	Section 4.2.2 Section 4.2.3 Figure 4-1

Aspect for Consideration	Response	Reference
	A Biodiversity Development Assessment Report (BDAR) (Appendix E) was undertaken and the potential impacts are summarised in Section 11. There is considered to be no impact to the riparian corridor of the Coxs River and construction would only be undertaken for the transmission towers.	Section 5.4.1 Section 11 Appendix E
Consultation should be undertaken with DPIE Biodiversity Conservation and Science (BSC) and Heritage NSW	Consultation with DPIE BCS and Heritage NSW is discussed below.	Section 11 Section 12 Section 13
Consultation with Forestry Corporation of NSW and TransGrid should be undertaken and included in the EIS	Consultation with Forestry Corporation of NSW is discussed below.	Section 0
Community consultation should be undertaken and included in the EIS	Consultation with the community and local stakeholders has been undertaken for the Project and is discussed further in Section 6.2.	Section 6.2
The DPIE Environment Risk Assessment (ERA) should be undertaken in the EIS	An ERA was prepared for the Project to identify initial and residual risk ratings for associated environmental issues. This assessment is summarised in Section 7.	Section 7
A Preliminary Hazards Assessment (PHA) should be undertaken in the EIS	A detailed PHA has been prepared by Sherpa Consulting for the project and is summarised in Section 15 and included as Appendix I.	Section 15 Appendix I
Consider future land use in the EIS with reference to the greater Wallerawang 2845 Activity Hub	A Land Use Conflict Risk Assessment has been prepared in accordance with the *Department of Industry's Land Use Conflict Risk Assessment Guide* (DPI, 2011) and is included as Appendix L of this EIS. Findings are also summarised in Section 22.	Section 22 Appendix L
Consider the Neoen's Great Western Battery Proposal that may coincide with the construction and operation of the Project	A Cumulative Impact Assessment has been prepared for the Project and is detailed in Section 23. The Cumulative Impact Assessment includes the discussion of all cumulative impacts of Neoen's Great Western Battery based on the currently available information.	Section 23

DPIE (Biodiversity, Conservation and Science)

The DPIE BCS (Biodiversity, Conservation and Science) identified a number of assessment requirements. A summary of these requirements and how they have been considered in the preparation of the EIS is provided in Table 6-2.

A letter was also provided to BCS in June 2021 to provide an update on the Project. The letter described the specialist investigations being carried out, and how the areas for consideration raised by BCS during earlier stages of consultation were being addressed. No response from BCS was received.

Table 6-2 DPIE BCS consultation outcomes

Aspect for Consideration	Response	Reference
Biodiversity and offsetting The BDAR must document the application of the avoid, minimise and offset framework including assessing all direct, indirect and prescribed impacts in accordance with the Biodiversity Assessment Method (BAM).	A BDAR (Appendix E) was prepared by Arcadis, in accordance with the BAM. The assessment and potential impacts are summarised in Section 11. Potential impacts from the Project include removal of threatened tree species, PCTs and native vegetation, fauna mortality and indirect impacts. A number of credits are required as part of the biodiversity offsets for the Project. A Biodiversity Offset Strategy for the Project will be prepared prior to construction.	Section 11.1 Appendix E
Water and soils The EIS must map features relevant to water and soils.	A Neutral or Beneficial Effects (NorBE) assessment was undertaken by Arcadis to address water quality and hydrology impacts (Section 16 and Appendix J). Water and soil features, relevant to the Project are depicted in Appendix J, Figure 1. Section 10 includes a desktop review assessment for soils and contamination.	Section 16 Section 10 Appendix J Figure 1 – Post development layout
The EIS must describe background conditions for any water resource likely to be affected by the project.	The existing conditions for water resources potentially affected by the Project are discussed in Section 16.	Section 16 Appendix J
The EIS must assess the impacts of the project on water quality and hydrology.	Water quality and hydrology impacts as predicted through MUSIC and DRAIN modelling are discussed in Section 16 and Appendix J.	Section 16 Appendix J
Flooding The EIS must describe flood assessment and modelling undertaken in determining the design flood levels for events, including a minimum of the 5% Annual Exceedance Probability (AEP), 1% AEP, flood levels and the probable maximum flood, or an equivalent extreme event.	A Flooding Impact Assessment (Appendix K) was undertaken by HARC and is summarised in Section 16. TUFLOW flood modelling was undertaken for the Project to compare the existing and proposed flood conditions. The change in flood levels (afflux) resulting from the Project are provided in Section 16. The assessment shows that for both the 1% and 5% AEP events, there is minimal change to the flood extent.	Section 16.3.2 Appendix K

DPIE NRAR (Water Knowledge Office)

The Water Knowledge Office were consulted during the scoping report and request for SEARs stage. The Water Knowledge Office provided feedback on the Project including a number of assessment requirements. A summary of these requirements and how they have been considered in the preparation of the EIS is provided in Table 6-3.

Table 6-3 DPIE NRAR consultation outcomes

Aspect for Consideration	Response	Reference
Water supply and site water balance The identification of an adequate and secure water supply for the life of the project. This includes confirmation that water can be sourced from an appropriately authorised and reliable supply. This is also to include an assessment of the current market depth where water entitlement is required to be purchased. A detailed and consolidated site water balance.	The Project would use water during both the construction and operation phases, primarily for dust suppression, concrete, washdown and cleaning, fire management (using on-site firewater tanks) and site office amenities. Given the minimal water requirements during operation, the Project would not be connected to the potable water mains and would utilise captured or imported water. As such, a qualitative assessment of water use for the Project was deemed adequate and has been undertaken	Section 16.1.3 Appendix J (NorBE)
Impacts on surface and groundwater sources Assessment of impacts on surface and ground water sources (both quality and quantity), related infrastructure, adjacent licensed water users, basic landholder rights, watercourses, riparian land, and groundwater dependent ecosystems, and measures proposed to reduce and mitigate these impacts.	The NorBE assessment concluded that the proposed stormwater mitigation measures for the proposed development would meet the required NorBE criteria in relation to stormwater management as set by Water NSW. This is summarised in the water quality and hydrology chapter in Section 16.3.	Section 16.3 Appendix J
Monitoring and methodologies of proposed surface and groundwater activities Proposed surface and groundwater monitoring activities and methodologies.	Details on water quality monitoring and maintenance would be included in the Project's Operational Environmental Management Plan.	Section 16.4 Appendix J
Consideration of legislation and policies Consideration of relevant legislation, policies and guidelines, including the *NSW Aquifer Interference Policy (2012)*, the Guidelines for *Controlled Activities on Waterfront Land (2018)* and the relevant Water Sharing Plans	Legislation, policies and guidelines relating to water quality and flooding are included in Section 5 of the EIS and the NorBE (Appendix J). Generally the Project earthworks would involve 'levelling of the site' where isolated elevated sections of the Project Site would be redistributed across depressions on the site. It is not anticipated that the Proposal would intercept groundwater during the main earthworks for the Project Site.	Section 5 Section 16.2.3 Appendix J

Water NSW

Water NSW identified that a number of assessments were required. A summary of these requirements and how they have been considered in the preparation of the EIS is provided in Table 6-4.

Table 6-4: Water NSW consultation outcomes

Aspect for Consideration	Response	Reference
Water Quality The full description of the development and existing environment should also include those aspects which have the potential to impact on the quality and quantity of surface water on, or downstream of, the Project Site. This should include:	The NorBE (Appendix J), Flooding Impact Assessment (Appendix K), and Section 16 provide a description of the existing water quality and hydrological conditions and assess the impacts of the Project on water quality, flooding and water use.	Section 16 Appendix J Appendix K
• The full Project Site layout and concept design including battery storage buildings, access roads and carparks, transmission line routes, and staff amenity building	An indicative layout of the Project Site has been provided in Figure 4-1 of the EIS (Section 4) and has been used in the NorBE MUSIC modelling.	Section 4 Figure 4-1
• A Water Cycle Management Study (WCMS) detailing Mitigation or minimisation measures for potential water quality impacts throughout project design and route, site selection and construction stage	Section 3 of the NorBE assessment details these requirements including mitigation measures to manage water quality. This is summarised in Section 16.	Section 16.3 Section 3 of Appendix J
• Stormwater quality modelling using MUSIC software showing a comparison of pre- and post-development scenarios on water quality parameters (including an electronic copy of the MUSIC file in .sqz file) in accordance with Water NSW's current recommended practices	Section 3 of the NorBE details the stormwater modelling inputs and Section 4 of the NorBE describes the MUSIC modelling results. Appendix A of the NorBE shows the site pre-development layout, while Appendix B shows the post-development layout.	Section 16 Appendix J Section 3 Section 4 NorBE Appendix A and Appendix B
• Concept Stormwater Drainage Plans that are consistent with MUSIC Stormwater	The operational water quality assessment identifies a series of stormwater treatment measures that would be incorporated into the design of the Project to manage water quality during operation of the Project. Stormwater treatment measures are included in Section 16.3 and Appendix J.	Section 16 Appendix J Sections 3 and 4 NorBE Appendix A and Appendix B
• Quality Modelling	Water quality modelling and results are provided in Section 4 of the NorBE and summarised in Section 16.3.2 of the EIS.	Section 16.3.2 Appendix J Sections 4
• A Site and Soil investigation for On-Site Wastewater System if any on-site wastewater management system is proposed (including in the Construction Phase) or hydraulic capacity of existing	Not applicable No on-site wastewater management system is proposed.	N/A

Aspect for Consideration	Response	Reference
sewerage infrastructure if connecting to reticulated sewerage system		
• A Conceptual Soil and Water Management Plan(s) for the Construction Phase of the project.	A conceptual soil and water management plan for the construction phase of the project will be prepared as part of the refined concept design and updated during the detailed design stages of the development. To manage the potential water quality impacts during construction an erosion and sedimentation control plan would be prepared in accordance with the guidelines in *Managing Urban Stormwater: Soils and Construction* (Landcom, 2004). T	Section 16.3 Appendix J Sections 3 and 4 NorBE Appendix A and Appendix B

Transport for NSW

TfNSW were consulted during the scoping report and request for SEARs stage. TfNSW provided feedback on the Project including a number of assessment requirements. A summary of these requirements and how they have been considered in the preparation of the EIS is provided in Table 6-5.

Table 6-5 TfNSW consultation outcomes

Aspect for Consideration	Response	Reference
Traffic and transport TfNSW requests the Environmental Impact Statement be supported by a Traffic Impact Assessment prepared by a suitably qualified person in accordance with the Austroads Guide to *Traffic Management Part 12, Roads and Maritime's Supplements to Austroads* and the RTA *Guide to Traffic Generating Developments*.	A Traffic Impact Assessment (TIA) has been prepared by Arcadis. The TIA is provided in Appendix D and summarised in Section 8 of this EIS. The TIA has been prepared by a suitably qualified person in accordance with the Austroads Guide	Section 8 Appendix C
Assessment of the impact (both construction and operation) to the operational rail corridors of Bowenfels to Wallerawang and the Wallerawang Colliery lines in accordance with the heads of consideration under the relevant railway provisions of the *State Environmental Planning Policy (Infrastructure) 2007 (ISEPP)* and *Development near Rail Corridors and Busy Roads – Interim Guideline 2008.*	The Project will not impact upon the rail corridor. The construction and operational footprints are provided in Section 4 of the EIS.	Section 4 Figure 4-1 Figure 4-2
Consultation Consultation with TfNSW and its managing agent of the Country Regional Network to obtain an access agreement for transmission lines that require access/crossing the rail corridor lands or over the air space of the rail corridor. Third Party Access application shall be submitted to John Holland Rail for approval in the event that a transmission line	Consultation with TfNSW and John Holland, the managing agent of the Country Regional Network, was undertaken and has been summarised in Table 6-11. The Project will not impact upon the operational rail corridor.	Section 4 Figure 4-1 Figure 4-2

Aspect for Consideration	Response	Reference
connection requires access to the air space of the rail corridor.		
Stormwater management Details of the stormwater management infrastructure which may have impacts on the rail corridor land and rail infrastructure including culverts.	As stated above, the Project will not impact upon the rail corridor. Stormwater management infrastructure has been discussed in Section 6 and Appendix J of this EIS.	Section 4 Figure 4-1 Figure 4-2 Section 16 Appendix J

Preliminary consultation on the Traffic Impact Assessment

Based on advice from DPIE, preliminary consultation on the draft TIA was undertaken with TfNSW, with particular advice being sought on the proposed upgrades to the intersection at Castlereagh Highway and the access road access to the Project. The draft version of the TIA was issued to TfNSW on 16 June 2021. TfNSW provided preliminary comments on 24 August 2021, which have been addressed in the TIA.

Lithgow City Council

Lithgow City Council (LCC) has been consulted on various elements of the Project throughout the preparation of this EIS. Consultation with LCC has comprised the following activities:

- A face-to-face meeting was held between Greenspot and LCC General Manager, Development Manager and Economic Development and Environment Manager on 11 February 2021 the LCC office. An overview of the Project, battery technology, key environmental issues and consultation proposed to be undertaken was discussed. A summary of the key outcomes from the meeting and where each of these have been addressed within this report is provided in Table 6-6.
- Multiple telephone conversations and email correspondences between Greenspot and representatives from LCC have occurred throughout the development of the EIS
- LCC indicated the *Lithgow Local Environmental Plan 2014*,and Draft *Lithgow 2040 Local Strategic Planning Statement* is not scheduled to be updated for another five years. Items relevant to the development would be considered in these reviews if required.

Table 6-6: Lithgow City Council consultation outcomes

Aspect for Consideration	Response	Reference
Consultation Community consultation should be undertaken as part of the EIS	Consultation undertaken with the community is discussed further in Section 6.2	Section 6.2
Treasury NSW and Department of Regional NSW should be made aware of the Project	Consultation with Treasury NSW and Department of Regional NSW was undertaken via a telephone call and email correspondence. This is detailed in Table 6-11.	Table 6-11
Transmission line connection Confirm whether the transmission connection will be underground or overhead lines	The connection of the BESS facility to the existing Wallerawang 330 kV Substation has been determined through ongoing consultation with TransGrid. Through this consultation, it was agreed that the conductors would be above ground. Section 4 details the overhead transmission line connection.	Section 4.2.2 Section 4.2.3 Figure 4-1

Aspect for Consideration	Response	Reference
Operational timeframe Confirm when the Project would be operational	It is expected that construction will take 12-24 months to complete and is planned to be operational in late 2023/ early 2024.	Section 4 Section 4.4
Water quality The water quality of Lake Wallace and Coxs River should be taken into consideration and included in the assessment	The NorBE addressed water quality of impacts of the local water sources (including Lake Wallace and Coxs River). Given the temporary nature of the proposed construction works and implementation of erosion and sediment control features, the impacts to surface water are considered minor. Any potential minor impact would be adequately controlled and further minimised through the implementation of mitigation measures described in Section 16.4.	Section 16 Appendix J

Heritage NSW (as Delegate of Heritage Council of NSW)

A summary of Heritage NSW requirements and how they have been considered in the preparation of the EIS is provided in Table 6-7.

Table 6-7 Heritage NSW consultation outcomes

Aspect for Consideration	Response	Reference
Statement of Heritage Impact A Statement of Heritage Impact (SoHI) prepared by a suitably qualified heritage consultant in accordance with the guidelines in the NSW Heritage Manual. The SoHI is to address the impacts of the proposal on the heritage significance of the site and adjacent areas	A SoHI was prepared by NGH Environmental (Appendix G) and summarised in Section 13. The heritage assessment describes the potential non-Aboriginal heritage impacts associated with the Project.	Appendix G Section 13
Impacts of historical archaeology If the SoHI identifies impact on potential historical and/or maritime archaeology, an historical and/or maritime archaeological assessment should be prepared by a suitably qualified archaeologist in accordance with the guidelines Archaeological Assessment (1996) and Assessing Significance for Historical Archaeological Sites and Relics (2009).	Not applicable. The Project construction footprint was modified to avoid the culvert and to minimise the potential impact on the Original Western Line embankment. The assessment of heritage impacts has found the overall impact of the Project to be minor and that any partial adverse impacts to the original Great Western Railway heritage impact can be mitigated by the retention of the sandstone culvert and the completion of an archival recording.	N/A
This assessment should identify what relics, if any, are likely to be present, assess their significance and consider the impacts from the proposal on this potential archaeological resource. Where harm is likely to occur, it is recommended that the significance of the relics be considered in determining an appropriate mitigation strategy.	Not applicable. The assessment undertook searches of national, state and local heritage databases to identify items of heritage significance in the Project Site as well as conducting a site inspection and determined there would be no impact to any items of state or local heritage significance.	Section 13

Aspect for Consideration	Response	Reference
	Items identified as having heritage significance were discovered during the site inspection including a railway embankment and sandstone culvert comprising a section of the original Great Western Railway line alignment. The Project construction footprint was modified to avoid the culvert and to minimise the potential impact on the Original Western Line embankment. The assessment found that any partial adverse impacts to the original Great Western Railway heritage can be mitigated by the retention of the sandstone culvert and the completion of an archival recording.	
If harm cannot be avoided in whole or part, an appropriate Research Design and Excavation Methodology should also be prepared to guide any proposed excavations or salvage programme.	Not applicable. The Project construction footprint was modified to avoid the culvert and to minimise the potential impact on the Original Western Line embankment therefore a Research Design and Excavation Methodology would not be required.	N/A

TransGrid

Consultation with TransGrid has been ongoing in relation to the connection process for the BESS facility to the existing Wallerawang 330 kV Substation. This consultation has included a number of online meetings, emails and telephone calls. This connection process will remain a private matter for the Applicant and TransGrid, however, through this consultation, it was agreed that the conductors would be above ground.

This was requested by Greenspot to minimise potential impacts to identified Aboriginal Potential Archaeological Deposit (PAD) and to preserve and conserve landforms with *in-situ* archaeological potential. The line would be strung from lattice steel transmission towers, with gantry structures at each end. The line would be either a single circuit configuration (i.e. strung on one side of the towers only) or a double-circuit configuration (i.e. strung on both sides of the towers).

Forestry Corporation of NSW

Consultation with the Forestry Corporation of NSW has been ongoing throughout the development of the EIS. Discussions included the harvesting of the trees only (not stumps) within the Forestry area. This would be undertaken prior to commencement of the construction works for the Project and would be under a separate approval (if required). Telephone conversations and email correspondence are ongoing.

6.1 Aboriginal Consultation

Consultation with Aboriginal stakeholders for this Project was undertaken in accordance with clause 60 of the *National Parks and Wildlife Regulation 2019* and following the process outlined in the *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (ACHCRP). The ACHA Report is provided in Appendix F of the EIS.

6.1.1 Stakeholder identification

A summary of the Aboriginal consultation process includes:

- Stage 1 – Notification of project proposal and registration of interest
- Stage 2 – Presentation of information about the proposed project
- Stage 3 – Gathering information about cultural significance
- Stage 4 – Review of draft cultural heritage assessment report.

Stage 1 consultation mediums included:

- Letters outlining the development proposal and the need to carry out an ACHA were sent to the Bathurst Local Aboriginal Land Council (LALC) and various statutory authorities including Heritage NSW, as identified under the ACHCRP.
- An advertisement was placed in the local Lithgow Mercury on 28 April 2021 seeking registrations of interest from Aboriginal people and organisations.
- Further letters were sent to other organisations as identified by Heritage NSW.

A total of six Aboriginal groups registered their interest in the Project following Stage 1 of the consultation steps.

6.1.2 Registered Aboriginal Parties consultation

The following Registered Aboriginal Parties (RAPs) expressed interest including:

- Mingaan Wiradjuri Aboriginal Corporation
- Didge Ngunawal Clan
- Yurrandaali Cultural
- Bathurst LALC
- Two RAPs chose to remain anonymous for the ACHA process.

For Stage 2, the proposed Assessment Methodology for the Project was issued to five of the RAPs on 18 May 2021 and to Bathurst LALC on 15 June 2021 due to a late registration.

Stage 3 included a survey of the proposed Project Site which was undertaken with two of the six RAP groups selected for fieldwork participation by the Proponent. The fieldwork was carried out on the 22 June 2021.

Finally for Stage 4, a draft version of the ACHA Report was issued to the RAPs on 6 September 2021 for the mandated 28 days consultation period. Comments on the results, significance, assessment and recommendations within the ACHA Report were encouraged.

6.1.3 Review of ACHA report

Following the mandated 28 day consultation period, no comments on the results, significance, assessment and recommendations within the ACHA were received from the RAPs.

Ongoing consultation with Aboriginal RAPs will remains a priority for the Proponent throughout the development of the Project.

6.1.4 Summary of Aboriginal Heritage consultation

Table 6-8 Summary of Aboriginal RAP and stakeholder consultation

Organisation	Consultation activities	Response
Interested Registered Parties		
Mingaan Wiradjuri Aboriginal Corporation	• 10 December 2020: Discussed initial plans for the Project with Aunty Helen Riley in a meeting at the Wallerawang Power Station • 11 February 2020: Met with Aunty Helen Riley and Aunty Sharon Riley at the Wallerawang Power Station site to provide an update on the project including an overview and its current status. • 22 June 2021: Attended site visit as part of the ACHA process	• Acknowledged Project and expressed interest in the ACHA surveying process • Ongoing consultation including emails and telephone calls • Involved in ACHA process
Didge Ngunawal Clan	• 05 May 2021: Issued notification to register interest in Project	• Involved in ACHA process • Ongoing consultation including emails and telephone calls
Yurrandaali Cultural	• 05 May 2021: Issued notification to register interest in Project	• Involved in ACHA process • Ongoing consultation including emails and telephone calls
Withheld	• 05 May 2021: Issued notification to register interest in Project • 22 June 2021: Attended site visit as part of the ACHA process	• Acknowledged Project and expressed interest in the ACHA surveying process • Ongoing consultation including emails and telephone calls
Withheld	• 05 May 2021: Issued notification to register interest in Project	• Involved in ACHA process • Ongoing consultation including emails and telephone calls
Bathurst Local Aboriginal Land Council	• 05 May 2021: Issued notification to register interest in Project	• Acknowledged Project, no feedback received.
Other stakeholders		
Native Title Service Corporation (NTSCorp)	• 05 May 2021: Issued notification to register interest in Project	• Acknowledged Project, no feedback received.
Lithgow City Council (representation for Aboriginal consultation)	• 05 May 2021: Issued notification to register interest in Project	• Acknowledged Project, no feedback received.
National Native Title Tribunal (NNTT)	• 05 May 2021: Issued notification to register interest in Project	• Acknowledged Project, no feedback received.

Organisation	Consultation activities	Response
Heritage NSW	• 05 May 2021: Issued notification to register interest in Project • 30 June 2021: Letter to Heritage NSW to provide a high-level overview of the Project	• Acknowledged Project, no feedback received.
Local Land Service Central Tablelands	• 05 May 2021: Issued notification to register interest in Project	• Acknowledged Project, no feedback received.

6.2 Community consultation

Community and stakeholder engagement activities regarding the Project commenced in late 2020 and throughout the development of the EIS.

During the preparation of the EIS, consultation was primarily undertaken to facilitate engagement between the Project team and key community stakeholders. This engagement served a dual purpose:

- To inform and create broad awareness of the future plans for the Wallerawang Power Station site and Project Site
- To identify any key community issues for consideration in the EIS and associated technical studies.

6.2.1 Stakeholder identification

Commercial and residential stakeholders have been identified as being near the Project Site. These include:

- Goodearth Landscape and Building Supplies, 600 metres south
- Black Gold Motel, about 1.1 kilometres north-west
- Residences and commercial business within the suburb of Wallerawang.
- Residential receivers located on Springvale Lane located south-east of the Project Site
- Wider Lithgow City Council area.

6.2.2 Consultation mediums

The following consultation mediums have been used to date to inform the local community and local stakeholders:

Table 6-9 Community consultation mediums

Medium	Comment
Electronic	A website (www.greenspot.com.au) was used to provide a central point of contact for community enquiries. This website contains information on the Wallerawang Power Station site and plans for the BESS. The community are free to contact Greenspot on 1300 405 500. Media enquiries can be made via media@greenspot.com.au.
Social media	A Facebook page and LinkedIn profile were set up for the community to access information and updates on the Wallerawang Power Station site as well as the Project.

Medium	Comment
Printed	A community newsletter in February 2021 was uploaded onto the Greenspot website and associated social media pages and distributed throughout the Wallerawang area to local businesses and property owners. The newsletter contained information on the Project, Project timeline as well as methods for submitting enquiries. These newsletters were also mailed out and/or provided the Wallerawang community seeking feedback on the Project. A copy of the newsletter is provided in Figure 6-1.
Newspapers	Several newspaper articles were published in the Village Voice (Lithgow local newspaper), the Lithgow Mercury, ABC and The Sydney Morning Herald regarding the plans for the Project and Wallerawang Power Station site. • https://www.lithgowmercury.com.au/story/7276664/the-old-wallerawang-power-station-is-set-to-look-a-little-different/ • https://www.smh.com.au/environment/sustainability/all-about-evolution-here-s-what-to-do-with-a-dead-power-station-20210512-p57r2w.html • https://www.abc.net.au/news/rural/2021-05-08/wallerawang-power-station-finds-new-lease-on-life/100119980 • https://www.abc.net.au/news/2021-11-24/wallerawang-coal-demolition/100643694.
Site visits	Several site visits to the Wallerawang Power Station site were provided on a private basis by the Proponent. Information regarding the Project was provided to these community members.
Door-knocking	Direct feedback was received from a number of neighbouring businesses and local property owners during door knocking activities. Door-knocking was used to provide neighbouring businesses and local property owners information on plans for the Wallerawang Power Station site and an overview of the Project. Discussions revealed a generally positive reception to the Project and to the larger 'Greenspot 2845 Activity Hub'.
Community information day	It was initially envisaged to undertake face-to-face community information sessions however this was not able to be undertaken as a result of the restrictions and risks associated with COVID-19. With the easing of restrictions, Greenspot plans to hold a community day during the exhibition period. The aim of the community day will be to provide information and an update on the Project and to provide the community with an opportunity to ask questions and to provide feedback and comments.

Community Newsletter #1

'The Wallerawang 9 Battery'

February 2021

Greenspot and our plans for the Old Wallerawang Power Station

Greenspot was established in 2020 as a joint venture between the owners of Borg and Bettergrow, two leading Australian owned businesses headquartered in New South Wales.

We completed the acquisition of the Old Wallerawang Power Station (WPS) and buffer lands, comprising approximately 450 hectares, from EnergyAustralia in September 2020. Our vision is to repurpose the WPS site and in doing so attract a range of businesses, serving to generate economic activity and employment growth in the local community and more broadly in the NSW Central-West region.

As a first step towards repurposing, we must undertake a **Decommissioning, Demolition and Rehabilitation (DDR) program** on the WPS. After a selection process in late 2020, we have chosen Liberty Industrial as the principal contractor to assist us with the DDR program. Liberty is an experienced contractor having demolished a number of power stations, most recently the Munmorah Power Station on the NSW Central Coast. We are currently liaising with key stakeholders, including Lithgow City Council and TransGrid, to ensure that **all preconditions are satisfied to allow for the DDR works to** commence in the second quarter of this year. From commencement, the DDR program is anticipated to take Liberty about 18 months to complete.

Greenspot is also currently developing a medium to long-term **Master Plan** for the repurposing of the old WPS and buffer lands. As part of the redeveloped site, we will retain the heritage chimney stack, turbine hall, administration building, cooling tower and the coal dome.

We will work with the community and all stakeholders to ensure that the transformation of the site serves as an example of what can be done to reshape and build long term resilience in regional economies. In acknowledgement of the community and where the repurposing project is to take shape (Wallerawang, postcode 2845), the working name for repurposing project is the '**Greenspot 2845 Activity Hub**'.

A Grid-Scale Battery on site

As an important component of our vision for the Greenspot 2845 Activity Hub, we have commenced the planning approvals process, seeking development consent for the construction, operation and maintenance of a Battery Energy Storage System (BESS) of 500 MW capacity that would provide 1,000 MWh of energy storage.

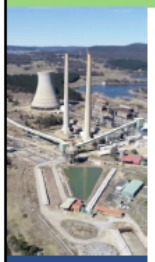
An overview of the BESS project (Project), including an image of its key features and indicative location, is provided overleaf.

The Project, if approved, will be strategically important for two overarching reasons:

- First, it will help to support the NSW Government's electricity strategy for a reliable, affordable and sustainable electricity future that supports a growing economy.
- Second, it will also be a significant enabler for the generation of economic activity at the '**Greenspot 2845 Activity Hub**', providing a stable, reliable and cost-effective energy source for our future redevelopment.

The name of the Battery

The Wallerawang Power Station was operational for almost 60 years and the last two generator units to be decommissioned in 2014 were units 7 and 8. In continuation of this legacy and reflecting the long-term role the Power Station played in the NSW energy sector, the battery will be known as the '**Wallerawang 9 Battery**'.



What are the next steps?

A Scoping Report has been lodged with the Department of Planning, Industry and Environment (DPIE). That is a publicly available document and is available on our website.

In the near future we will prepare an Environmental Impact Statement (EIS) for the Project. The EIS will include more detailed information about the Project, including:

- Its design and how it will be constructed.
- An assessment of key environmental issues associated with construction and operation of the Project.
- A description of any measures and strategies to be implemented to avoid, minimise, and manage the potential impacts of the Project.
- Identification and response to issues raised by DPIE, other stakeholders and the community.

The EIS will be placed on public exhibition, during which time there will be an opportunity to discuss the project, and provide a formal submission on any aspect of the project.

Greenspot will continue to engage with the community and key stakeholders in the lead up to the public exhibition of the EIS, throughout exhibition and after it is completed.

Overview of the Project

The Project will involve construction and operation of a large-scale BESS.

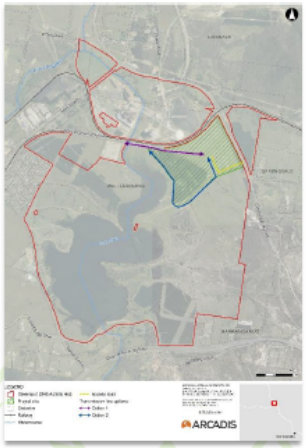
The BESS would require a built area of about 10 hectares of land at a location to be determined within the Project Site of about 40 hectares as shown on the overview figure.

The location and configuration of the final built form of the Project would be confirmed as part of further design developments, and detailed within the EIS for the Project.

Construction is expected to begin in early 2022 and take about 12-18 months.

The Project is anticipated to be operational in 2023 with a design life of at least 20 years and would include the following key built form features:

- An operational large-scale BESS including battery enclosures, inverters and transformers.
- A transmission line connection (either above ground and/or underground) between the BESS and the adjacent TransGrid Wallerawang 330kV substation. Two options are currently being considered as shown on the overview figure. There is no requirement for any third party easements.
- Ancillary upgrades to the Wallerawang 330kV substation.
- Site access from the Castlereagh Highway via an upgrade of the existing service road.
- Internal site access road and car park.
- A permanent office and staff amenities.
- Installation of utilities (e.g. telecommunications).
- Stormwater management infrastructure, lighting, fencing and security.
- Subdivision of the proposed site.



Contact Details

For more information, or if you wish to discuss anything in this newsletter, please contact us via our website at www.greenspot.com.au

Figure 6-1 Community newsletter

6.2.3 Other organisations and stakeholders

Table 6-10 summarises the other organisations and stakeholders who have been contacted about the Project.

Table 6-10 Community stakeholders and businesses

Stakeholder	Consultation activities
Goodearth 879 Castlereagh Highway, Springvale NSW 2790	• 4 February 2021: Meeting with owner of business to provide a high-level overview of the Project.
Generator Property Management Pty Ltd (Owner of Wallerawang Power Station Ash Dams on northern side of Castlereagh Highway)	• 4 February 2021: Greenspot met with the Managing Director (Steve Saladine) to give a high-level overview of the Project. • Since late 2020, fortnightly meetings have been held between senior executives of Greenspot and Generator Property Management in relation to the DDR Program. From February 2021 verbal BESS project updates have been provided at each of these meetings.
Centennial Coal (Owner of Springvale Colliery)	• 5 February 2021: Greenspot contacted Centennial Coal to identify the most appropriate contact to discuss the Project • 11 February 2021: Telephone call and follow up email to Centennial Coal to provide a high-level overview of the Project. • Multiple subsequent calls between Centennial Coal and Greenspot executives have been held since, most calls include an update on BESS progress.
John Holland	• 4 February 2021: Telephone call to provide a high-level overview of the Project.
Black Gold Hotel	• 4 February 2021: Greenspot met with hotel owner to provide high level overview of the Project. • Multiple subsequent discussions have been held between the owner of the Black Gold and Greenspot executives.
EnergyAustralia (Owner of Mt Piper Power Station and other land near the Project)	• 21 January 2021: Met with EnergyAustralia at Mt Piper Power Station and advised of high-level plans for the Project • 4 February 2021: Telephone call with compliance, risks and property specialist to provide overview of the Project • 11 February 2021: Email to EnergyAustralia advising of Greenspot's intent to lodge the Scoping Report for the Project. • Multiple subsequent discussions have been held between members of EnergyAustralia senior management and Greenspot executives.
St John the Evangelist Church	• 5 February 2021: Telephone call to provide a high-level overview of the Project.
Lithgow Rangers Soccer Club	• 5 February 2021: Telephone call to provide a high-level overview of the Project.

Stakeholder	Consultation activities
Neoen Australian (developer of the Great Western Battery Project at 173 Brays Lane, Wallerawang NSW 2845)	• 3 February 2021: Greenspot met with representatives of Neoen at a community information session for the Great Western Battery Project • 4 February 2021: Email sent to Neoen, advising of their intent to develop the Project and indicative timing for this Scoping Report to be lodged, along with an overview of the Project Site. • May 2021: telephone discussion between Neoen and Greenspot executives discussing project status.

6.3 Consultation during and after the EIS Exhibition

This EIS will be placed on public exhibition for a minimum of 28 days in accordance with Schedule 1, Division 2 (Part 9, SSD applications) of the EP&A Act. During the exhibition period, DPIE invites written submissions on the Project from the community, agencies, stakeholders and other interested parties.

After the exhibition of the EIS, the Secretary will provide copies of any submissions received to the Applicant. The Secretary may then require the Applicant to prepare a submissions report to respond to the issues raised in submissions. The Secretary will prepare an environmental assessment report and provide it to the Minister for Planning and Public Spaces (or his delegate) or the Independent Planning Commission (IPC). The Minister (or his delegate) or the IPC will then decide whether or not to approve the Project and the conditions attached.

6.4 Ongoing consultation

Greenspot will continue to carry out consultation after the completion of the planning phase of the Project and into its construction and operational phases. Ongoing consultation will include:

- Ongoing responses to any media requests
- Regular updates of the dedicated webpage outlining key milestones and achievements
- Ongoing monitoring of the website, analysis and encouragement of feedback
- Periodic mailing of those who have registered interest
- Maintenance of a complaints register.

6.5 Summary of consultation activities

Table 6-11 Agency and stakeholder consultation summary

Agency	Consultation activities	Response
DPIE	• 2 February 2021: A Scoping Meeting with DPIE was held (via teleconference) to provide an overview of the Project • 18 February 2021: Lodged Scoping report / request for SEARs.	• Feedback provided during kick-off meeting • 18 March 2021: Issued SEARs • Telephone call to provide Project update

Agency	Consultation activities	Response
Chloe Hicks, Director Energy Infrastructure & Zones, Strategy Implementation (Department Representative)	• 26 May 2021: Telephone call.	• Telephone call to provide project status update.
DPIE Case Managers: Jack Hunter, Manager Charlie Wilson, Project Officer	• 11 June 2021, 22 July 2021, 28 August 2021 & 29 September 2021: Case Management meetings to discuss project status and receive guidance and assistance with DPIE approvals process.	• Ongoing status updates and feedback.
Members of Parliament and Ministerial and Departmental Staff	• 21 January 2021: Meeting held at the Wallerawang Power Station site with the State Member for Bathurst to provide a high-level overview of the Project • 17 May 2021: Provided a briefing on the overall masterplan for the Greenspot 2845 Activity Hub and Project features including battery technology, environmental issues and design.	• Feedback provided during meeting
Lithgow City Council	• 11 February 2021: Greenspot and Arcadis met with Councillors at Lithgow City Council Chambers to provide a briefing on the Project and the contents of the Scoping Report, including project features, key environmental issues and consultation proposed to be undertaken.	• Feedback provided during meeting • Input into SEARs and received no feedback.
DPIE BCS Renee Shepherd	• 18 February 2021: Scoping report / request for SEARs • 30 June 2021: Letter to DPIE BCS to provide a high-level overview of the Project	• Input into SEARs and provided feedback.
DPIE NRAR (Water Knowledge Office) Alistair Drew	• 18 February 2021: Scoping report / request for SEARs • 30 June 2021: Letter to DPIE Water Knowledge Group to provide a high-level overview of the Project.	• Input to SEARs and provided feedback.
Heritage NSW Katrina Stankowski	• 18 February 2021: Scoping report / request for SEARs. • 30 June 2021: Letter to NSW Heritage to provide a high-level overview of the Project	• Input into SEARs and received no feedback.

Agency	Consultation activities	Response
Water NSW Juri Jung	• 18 February 2021: Scoping report / request for SEARs • 30 June 2021: Letter to Water NSW to provide a high-level overview of the Project	• Input into SEARs and received feedback.
TfNSW Alexandra Power	• 18 February 2021: Scoping report / request for SEARs • 30 June 2021: Letter to TfNSW to provide a high-level overview of the Project • Ongoing telephone and email conferences regarding access road and Castlereagh Highway intersection works	• Input into SEARs and provided feedback • Response to consultation letter.
TransGrid	• 17 November 2020: Connection enquiry was lodged • 21 December 2020: Formal connection response was received • Updates provided at least monthly throughout 2021	• Ongoing meetings held between TransGrid and Greenspot to progress the connection process.
Forestry Corporation of NSW	• 10 February 2021: Telephone call and follow up email regarding the Project. As part of the telephone call, plans for tree harvesting was discussed. Following the telephone call, Greenspot provided the Forestry Corporation of NSW with an overview of the Project	• Forestry Corporation of NSW indicated forestry trees would be harvested in early 2022.
Paul Toole MP, State Member for Bathurst	• Updates provided approximately monthly from site acquisition in September 2020	• Ongoing updates.
Andrew Gee MP, Federal Member for Calare	• 11 February 2021: Telephone call with Federal Member's office and email sent to Federal Member.	• Acknowledged Project, no feedback received.
John Holland (as the operator of the Country Regional Rail Network)	• 10 February 2021: Telephone call and email with representative from John Holland and provided a high-level overview of the Project.	• Acknowledged Project, no feedback received.
NSW Rural Fire Service	• 5 February 2021: Telephone call with Wallerawang Rural Fire Service to provide high level overview of the Project.	• Acknowledged Project, no feedback received.

Agency	Consultation activities	Response
NSW Treasury	• 11 February 2021: Telephone call with, and email to, NSW Treasury to provide a high-level overview of the Project. •	• Acknowledged Project, no feedback received.
Department of Regional NSW	• 11 February 2021: Telephone call with, and email to the Department of Regional NSW to provide a high-level overview of the Project.	• Acknowledged Project, no feedback received.

7 Environmental risk assessment

The SEARs identified the key environmental issues, or risks, which have been discussed in this EIS (see Appendix A). These key issues were reviewed as part of an Environmental Risk Assessment (ERA).

The purpose of the ERA was to identify the level of risk associated with the Project before and after the application of the mitigation measures outlined in Section 24, and to determine the level of the residual risks. Risks were therefore provided an 'initial' risk ranking and a 'residual' risk ranking, assuming effective implementation of the proposed mitigation measures.

7.1 Environmental risk screening methodology

The ERA was undertaken in accordance with the principles of the *Australian and New Zealand standard AS/NZS ISO 31000:2018 Risk Management – Principles and Guidelines*. This involved ranking the risks by identifying the consequence of the impact and the likelihood of each impact occurring.

The following rules guided the risk analysis process:

- Risk ratings were considered at the broader issue level only (for example construction noise and vibration, rather than noise from each specific construction activity separate to vibration)
- Industry standard environmental management practice was considered in determining risk ratings, however project-specific mitigation (which would depend on the outcome of future environmental assessments) was not applied.

The first step in the risk analysis involved the identification of the consequence, should an impact occur, followed by identification of the likelihood of the impact occurring. The definitions of the consequences used are provided in Table 7-1 and the definitions of likelihood are provided in Table 7-2. The risk rating was then determined by combining the consequence and likelihood to identify the level of risk as shown in the matrix in Table 7-3.

Table 7-1 Consequence definitions

Consequence level	Environmental	Community	Time frame
Catastrophic	Irreversible large-scale environmental, social or economic impacts.	Extended substantial disruptions and impacts to stakeholder(s).	Long-term Greater than 12 months
Severe	Potentially irreversible impacts, extensive remediation required	Severe disruptions or long-term impacts to stakeholder(s).	Long-term 6 to 12 months
Major	Potentially irreversible impacts, considerable remediation required	Major impacts or disruptions to stakeholder(s)	Medium-term Between 3 and 6 months
Moderate	Reversible and/or well-contained impacts, minor remedial actions required	Moderate impacts or disruptions to stakeholder(s)	Medium-term Between 1 and 3 months

Consequence level	Environmental	Community	Time frame
Minor	Reversible or minor impacts that are within environmental regulatory limits and within site boundaries	Minor or short-term impacts on stakeholder(s)	Short-term Less than 1 month
Insignificant	No appreciable or noticeable changes to the environment	Negligible impact on environment or stakeholder(s).	Short term Hours

Table 7-2 Likelihood definitions

Likelihood	Definition	Probability
Almost certain	Expected to occur frequently during time of activity or project (10 or more times per year)	>90%
Likely	Expected to occur occasionally during time of activity or project 75% to 90% (1 to 10 times per year)	75% to 90%
Possible	More likely to occur than not occur during time of activity or project 50% to 75% (once per year)	50% to 75%
Unlikely	More likely to not occur than occur during time of activity or project 25% to 50% (once every 1 to 10 years)	25% to 50%
Rare	Not expected to occur during the time of the activity or project 10% to 25% (once every 10 to 100 years)	10% to 25%
Almost unprecedented	Not expected to ever occur during time of activity or project (less than once every 100 years)	<10%

Table 7-3 Risk analysis categories and criteria for risk rating

Likelihood	Consequence					
	Insignificant	Minor	Moderate	Major	Severe	Catastrophic
Almost certain	Moderate	High	High	Very high	Very high	Very high
Likely	Moderate	Moderate	High	High	Very high	Very high
Possible	Low	Moderate	Moderate	High	High	Very high
Unlikely	Low	Low	Moderate	Moderate	High	High
Rare	Very low	Low	Low	Moderate	Moderate	High
Almost unprecedented	Very low	Very low	Low	Low	Moderate	Moderate

7.2 Risk analysis

The ERA was carried out using the framework described and is presented in Table 7-4. The risk analysis identifies an initial risk rating for each of the environmental issues and provides a description of how the risk ratings were derived.

Further details regarding the existing environment and potential impacts associated with each environmental issue are provided in Chapters 8 through to 23.

7.3 Environmental risk assessment

The outcomes of the ERA process for the Project are presented in Table 7-4.

Table 7-4 Outcomes of environmental risk

Environmental aspect	Initial risk identified	Initial Risk Rating (pre-mitigation)	Mitigation	Residual risk (post-mitigation)	EIS Reference
Traffic, Transport and Access (construction)	Construction traffic and transport impacts on the local road network	Moderate	Implementation of traffic control measures will help mitigate traffic and transport impacts. Traffic and transport mitigation measures are outlined in Section 8 A Construction Traffic Management Plan (CTMP) will be developed prior to construction as part of the Construction Environmental Management Plan (CEMP) for the Project.	Low	Section 8 Appendix C Traffic and Transport Assessment
Traffic, Transport and Access (operation)	Operational traffic and transport impact on surrounding network	Very Low	Traffic and transport mitigation measures are outlined in Section 8. Given the negligible impact of traffic from the Project, no Project specific operational traffic measures are considered to be required.	Very Low	Section 8 Appendix C Traffic and Transport Assessment
Noise and Vibration (construction)	Construction noise and vibration impacts on sensitive receivers	Moderate	A Construction Noise Management Plan (CNMP) will be developed prior to construction as part of the CEMP for the Project and implemented during construction.	Low	Section 9 Appendix D Noise and Vibration Impact Assessment
Noise and Vibration (operation)	Operational noise and vibration impacts on sensitive receivers	High	The Operational Environmental Management Plan (OEMP) prepared for the Project will include measures for managing noise related issues during operation. Sound power levels for the final design would be updated and the potential noise impacts re-assessed as required. The final layout including the location of battery units and noise walls will also be refined further during detailed design and will aim to achieve the project specific noise criteria. For any residual exceedances, further mitigation would be considered such as at property treatment in accordance with the *Noise Policy for Industry 2017*.	Moderate	Section 9 Appendix D Noise and Vibration Impact Assessment

Environmental aspect	Initial risk identified	Initial Risk Rating (pre-mitigation)	Mitigation	Residual risk (post-mitigation)	EIS Reference
Soils and Contamination (construction)	Potential to encounter contaminated soils during construction Contamination of soils caused by spills and leaks during construction	Moderate	A detailed Erosion and Sediment Control Plan (ESCP) as part of the CEMP, in accordance with *Managing Urban Stormwater – Soils and Construction, Volume 2D* (Landcom, 2004). An Unexpected Finds Protocol will be included in the CEMP to manage any disturbance of material that is odorous, stained or containing anthropogenic materials, in the event these are encountered during construction	Low	Section 10
Soils and Contamination (operation)	Contamination of soils caused by spills and leaks during operation	Low	The OEMP will include an Incident Response Plan and will specify the procedure to be followed in the event of a spill, including the notification requirements and the use of absorbent material to contain spills.	Low	Section 10
Biodiversity	Construction or operational impact to flora and fauna	Moderate	A Construction Flora and Fauna Management Plan (CFFMP) will be prepared. Clearing of native vegetation and threatened species habitat within the Project Site would not occur until the CFFMP is approved. This CFFMP would include the following: • Plans showing areas to be cleared and areas to be protected, including exclusion zones, protected habitat features and revegetation areas • Pre-clearing survey requirements • Procedures for unexpected threatened species finds and fauna handling • Protocols to manage weeds and pathogens.	Low	Section 11.3 Appendix E Biodiversity Development Assessment Report (BDAR)
Biodiversity	Impacts to threatened flora species	High	The CFFMP will include Pre-clearing survey requirements Clearance of native vegetation would be minimised as far as is practicable. The limits of vegetation clearing would be marked on plans and on-site with signed fencing so that clearing activities are constrained to approved areas only.	Low	Section 11.3 Appendix E Biodiversity Development Assessment Report (BDAR)

Environmental aspect	Initial risk identified	Initial Risk Rating (pre-mitigation)	Mitigation	Residual risk (post-mitigation)	EIS Reference
Biodiversity	Impacts to threatened fauna species	Moderate	The CFFMP will include pre-clearing survey requirements and procedures for unexpected threatened species finds and fauna handling. Pre-clearing surveys would be undertaken to identify any breeding or nesting activities by native fauna in hollow-bearing trees and native vegetation. No breeding attempts or active nests should be disrupted, as far as practical. Where fauna species are identified in vegetation to be cleared, animals would be removed and relocated to adjacent bushland prior to felling. If this is not possible, the tree would be sectionally dismantled or soft felled under the supervision of an ecologist or wildlife carer, before relocating the animal. A two-stage approach for felling trees will be undertaken A pre-start-up check for sheltering native fauna of all infrastructure, plant and equipment and/or during relocation of stored construction materials would be undertaken.	Low	Section 11.3 Appendix E Biodiversity Development Assessment Report (BDAR)
Biodiversity	Impacts on native vegetation	Low	It is estimated that of the 13.3 ha to be removed, only 14% (1.9 ha) is native vegetation. The limits of vegetation clearing would be marked on plans and on-site with signed fencing so that clearing activities are constrained to approved areas only.	Low	Section 11.3 Appendix E Biodiversity Development Assessment Report (BDAR)
Biodiversity	Indirect impacts on biodiversity (such as sedimentation and the spread of weeds)	Moderate	The CFFMP will include protocols to manage weeds and pathogens. A detailed ESCP as part of the CEMP, in accordance with *Managing Urban Stormwater – Soils and Construction, Volume 2D* (Landcom, 2004). Where possible, earthworks would be undertaken during dry weather conditions. Clearing of vegetation should be avoided during overland flow events.	Low	Section 11.3.2 Appendix E Biodiversity Development Assessment Report (BDAR)

Environmental aspect	Initial risk identified	Initial Risk Rating (pre-mitigation)	Mitigation	Residual risk (post-mitigation)	EIS Reference
Biodiversity	Impacts to groundwater dependent ecosystems (GDE)	Low	A review of the Bureau of Meteorology's (BoM) GDE identified that there are no potential terrestrial or subterranean GDE's within the Project Site. There is one moderate potential aquatic GDE within the Project Site along Coxs River. No other potential GDEs are located within close proximity to the Project Site.	Low	Section 11.2.5 Appendix E Biodiversity Development Assessment Report (BDAR)
Aboriginal Heritage	Impacts to previously unrecorded Aboriginal heritage sites during construction	Moderate	The Project Site has been amended to avoid items of potential heritage significance, and due to the lack of archaeological potential, proposed mitigation would focus on a procedure for the management of unexpected archaeological finds which would be documented within the CEMP and OEMP for the Project. Any unexpected heritage items identified during construction, operation and maintenance works would be managed in accordance with the Unexpected Finds Protocol and in line with the legislation as stated in the *NSW National Parks and Wildlife Act 1974* (NPW Act) and the *NSW Heritage Act 1977* (Heritage Act).	Low	Section 12 Appendix F Aboriginal Cultural Heritage Assessment (ACHA) Report
Non-Aboriginal Heritage (construction)	Impacts to previously unrecorded non-Aboriginal heritage sites during construction	Low	The Project Site has been amended to avoid items of potential heritage significance, and due to the lack of archaeological potential, proposed mitigation would focus on a procedure for the management of unexpected archaeological finds which would be documented within the CEMP for the Project. In the event of an unexpected archaeological / heritage item find during construction, works within the area should cease and a suitably qualified heritage professional be engaged to assess the significance and management of the finds.	Very Low	Section 13.3.1 Appendix G Statement of Heritage Impact (SoHI)
Non-Aboriginal Heritage (operation)	Impacts to the culvert structures due to vibration during operation	Low	Vibration produced by the transformers and inverters may have an adverse impact on the longevity of the sandstone culvert structures. This would be considered in the OEMP.	Very Low	Section 13.3.2 Appendix G Statement of Heritage Impact (SoHI)

Environmental aspect	Initial risk identified	Initial Risk Rating (pre-mitigation)	Mitigation	Residual risk (post-mitigation)	EIS Reference
Non-Aboriginal Heritage (operation)	Impacts to previously unrecorded non-Aboriginal heritage sites during operation	Low	It is possible, however unlikely, that unexpected heritage items may be identified during operation and maintenance works. In this case, the Unexpected Finds Protocol (included in the OEMP) would be followed.	Very Low	Section 13.3.2 Appendix G Statement of Heritage Impact (SoHI)
Bushfire	Bushfire impacting on construction or operational infrastructure within the Project Site	High	An Inner Protection Area (IPA) and Asset Protection Zone (APZ) would be established in all directions for a distance of at least 100 m. An APZ of 20 m will be established for the overhead transmission line. A static water supply of 40,000 litres (two 20,000 tanks) would be made available for fire suppression activities. Property access road would be two-wheel drive, all weather roads, with a minimum 4 m carriageway width, and suitable access for a Category 1 fire appliances would be available Vegetation within the overhead transmission line corridor would be managed in accordance with the *ISSC3 Guideline for Management Vegetation near Power Lines (November 2016)* A Bushfire Management Plan and Emergency Evacuation Plan would be prepared and implemented as part of the CEMP and the OEMP	Moderate	Section 14 Appendix H Bushfire Risk Assessment
Hazards and Risk (operation)	Thermal runaway, release of energy (arc flash) and generation of explosive gas from lithium-ion batteries during operation causing fire	High	Equipment and systems would be designed and tested to comply with relevant international and/or Australian standards (e.g., AS 5139) and guidelines. Appropriate fault detection and safety shut-off protocols will be developed for operation. All staff working on-site will undertake a site induction/substation training (i.e., high voltage areas) appropriate to the work activities.	Moderate	Section 15.3 Appendix I Preliminary Hazard Assessment
Hazards and Risk (operation)	Runaway fire from infrastructure and overhead lines	High	A Fire Management Plan (e.g., establishing defendable fire-fighting boundary) would be prepared and implemented as part of the OEMP.	Low	Section 15.3 Appendix I Preliminary Hazard Assessment

Environmental aspect	Initial risk identified	Initial Risk Rating (pre-mitigation)	Mitigation	Residual risk (post-mitigation)	EIS Reference
Hazards and Risk (operation)	Exposure to Electric and Magnetic Fields (EMF)	Moderate	Exposure to EMF (specifically magnetic fields) from electrical equipment would be localised and the strength of the field attenuates rapidly with distance. Exposure to EMF personnel on-site will be minimised due to the transient nature of occupation of the site during operation. Incidental shielding (i.e., the BESS enclosure, substation) and warning signs would be placed within the site and surrounds. Additionally, fencing around the project boundary would limit the exposure to EMF for the general public.	Low	Section 15.5 Appendix I Preliminary Hazard Assessment
Hazards and Risk (operation)	Accidental release of chemicals, fuels and materials during construction	Moderate	The OEMP prepared for the Project would include procedures and measures for managing accidental spills during operation.	Low	Section 15.3 Appendix I Preliminary Hazard Assessment
Hazards and Risk (operation)	Unauthorised access/trespasser, bushfire, lightning storm, water ingress (rain and flood, loss of containment from firewater tank)	High	The site would be fenced off with appropriate security measures (e.g., locked gates, CCTV) and would also include hazard/danger signage.	Moderate	Section 15.3 Appendix I Preliminary Hazard Assessment
Water Quality and Flooding (construction)	Potential to encounter groundwater during construction	Low	Project earthworks would involve 'levelling of the site' where isolated elevated sections of the Project site would be redistributed across depressions on the site. It is not anticipated that the Proposal would intercept groundwater during the main earthworks for the Project Site. Footings for the transmission towers would extend up to 10 m deep and would have the potential to encounter groundwater, however excavations would be short term and minimised where possible.	Very Low	Section 16 Appendix J Water Quality Assessment

Environmental aspect	Initial risk identified	Initial Risk Rating (pre-mitigation)	Mitigation	Residual risk (post-mitigation)	EIS Reference
Water Quality and Flooding (construction)	Impacts to groundwater quality from turbid, saline or contaminated water impacting groundwater users	Low	It is not anticipated that the Proposal would intercept groundwater during the main earthworks for the Project Site. Any groundwater which is evident in transmission tower excavations will be either recharged into the groundwater aquifer at the same location or collected and taken off-site for disposal/treatment.	Very low	Section 16 Appendix J Water Quality Assessment
Water Quality and Flooding (construction)	Soil erosion during construction, resulting in off-site sedimentation of waterways and impacts to water quality	Moderate	A detailed Erosion and Sediment Control Plan (ESCP) as part of the CEMP would be prepared and implemented, in accordance with *Managing Urban Stormwater – Soils and Construction, Volume 2D* (Landcom, 2004). Given the temporary nature of the proposed construction works and implementation of erosion and sediment control features, the impacts to surface water are considered minor. Any potential minor impact can be adequately controlled and further minimised through the implementation of mitigation measures described in Section 16.4.	Low	Section 16 Appendix J Water Quality Assessment
Water Quality and Flooding (operation)	Impacts to downstream waterways from increased surface water runoff from additional areas of hardstand	Moderate	A series of stormwater treatment measures would be incorporated into the design of the Project to manage water quality during operation of the Project. This would include swales, bioretention basins and gross pollutant traps. Stormwater treatment measures are detailed in Appendix J.	Low	Section 16.3.2 Appendix J Water Quality Assessment
Water Quality and Flooding (operation)	Monitoring and maintenance of surface water quality measures	Moderate	The OEMP would include a management, maintenance and cleaning schedule to ensure that stormwater management system devices are regularly inspected and cleaned.	Low	Section 16 Appendix J Water Quality Assessment
Water Quality and Flooding (operation)	Impacts to downstream waterways from increased surface water runoff from additional areas of hardstand due to flooding	Low	For both the 1% and 5% annual exceedance probability (AEP) events, there is minimal change to the flood extent. Impacts would be largely contained to the area immediately downstream of the proposed pipe (see Section 16.1.2) discharges back onto the floodplain. All changes to the flood regime would be on land owned by the Proponent.	Low	Section 16.3.2 Appendix K Flooding Impact Assessment

Environmental aspect	Initial risk identified	Initial Risk Rating (pre-mitigation)	Mitigation	Residual risk (post-mitigation)	EIS Reference
Visual Amenity (construction)	Construction (temporary) impact on visual landscape on sensitive receivers	Low	Construction works may be visible from some viewpoints however, given the low-rise nature of construction works and surrounding industrial land uses, it is unlikely that these works would be overly intrusive and visual impacts would be localised and temporary in nature	Low	Section 17
Visual Amenity (operation)	Long-term impact on visual landscape on sensitive receivers	Low	The design of the BESS would consider a materials colour palette that integrates with the surrounding industrial nature and landscape. Implementation of a Landscape Plan would help to integrate the Project into the surrounding landscape	Very Low	Section 17
Air quality (construction)	Impacts on local air quality from construction activities, including dust generation from exposed surfaces, use of construction plant and emissions from machinery and vehicles	Moderate	An Air Quality Management Plan (AQMP) will be prepared as part of the CEMP to minimise the potential air quality issues associated with the construction activities. Reasonable and feasible dust suppression measures during will be implemented during construction (e.g., water tanks or sprinklers) to minimise fugitive dust emissions. Additionally, all plant and equipment will be maintained in accordance with manufacturers specifications and would comply with relevant vehicle emission standards, where applicable.	Low	Section 18.3.1
Air quality (operation)	Impacts on local air quality from operation of the Project	Very Low	Operation of the BESS would not result in any emission of particulates or other pollutants. Movement of staff vehicles will be minimal. No mitigation measures have been identified as it is unlikely there would be any operational air quality impacts	Very Low	Section 18.3.2

Environmental aspect	Initial risk identified	Initial Risk Rating (pre-mitigation)	Mitigation	Residual risk (post-mitigation)	EIS Reference
Climate change and greenhouse gas (design and construction)	Emission of greenhouse gases from construction activities	Moderate	Detailed design of the Project would consider potential impacts from climate change. Management and mitigation measures identified in other EIS chapters and relevant technical papers that are relevant to the management of climate change impacts include measures to manage impacts associated with stormwater runoff and drainage design of the Project, measures to manage hazards and risk, management of bushfire risks and management of flooding impacts to the Project during operation	Low	Section 19 Section 10 Section 14 and Appendix H Bushfire Risk Assessment Section 15.3 and Appendix I Preliminary Hazard Assessment Section 16, Appendix J Water Quality Assessment and Appendix K Flooding Impact Assessment
Climate change and greenhouse gas (operation)	Impact of climate change on operational infrastructure	Low	Management and mitigation measures identified in the EIS would be relevant for the duration of operation.	Low	Section 19 As above
Waste Management (construction)	Inappropriate management of waste during construction	Moderate	A Waste Management Plan would be prepared and implemented as part of the CEMP which will detailing appropriate procedures for waste management in accordance with the waste management hierarchy. Wastes would be appropriately transported, stored and handled in accordance with NSW EPA waste classification and in a manner that prevents pollution of the surrounding environment.	Low	Section 20
Waste Management (operation)	Inappropriate management of waste during operation	Low	The BESS units have a life span of 15-20 years. During this time various components of the BESS may require maintenance, and / or replacement. Battery replacement and maintenance parts / materials would be managed in accordance with an operational Waste Management Plan which would be prepared as part of the OEMP.	Low	Section 20

Environmental aspect	Initial risk identified	Initial Risk Rating (pre-mitigation)	Mitigation	Residual risk (post-mitigation)	EIS Reference
Socio-economic (construction)	Amenity impacts resulting from noise, traffic, visual and air quality during construction	Moderate	A CEMP would be prepared and implemented to address the management of environmental issues outlined in this EIS including traffic and access, noise and vibration, visual amenity and air quality. A complaints contact number and email will be established for the duration of construction and a community complaints register will be maintained. Any complaints received from the community or other stakeholders will be appropriately investigated.	Low	Section 21 Section 8 and Appendix C Traffic and Transport Assessment Section 9 and Appendix D Noise and Vibration Impact Assessment Section 17 (visual) Section 18 (air quality)
Socio-economic (operation)	Amenity impacts (including noise and traffic) during construction	Moderate	The OEMP would include measures to engage with stakeholders and to manage and respond to feedback received during the operation.	Low	Section 21 Section 9 and Appendix D Noise and Vibration Impact Assessment
Land use and property	Changes in land use	Low	Forestry Corporation of NSW plan to harvest the forestry areas within the Project Site prior to construction. There are no property and land use mitigation measures required for the Project.	Low	Section 22 Appendix L Land Use Conflict Risk Assessment

Environmental aspect	Initial risk identified	Initial Risk Rating (pre-mitigation)	Mitigation	Residual risk (post-mitigation)	EIS Reference
Cumulative impacts	Cumulative construction impacts at sensitive receivers	Moderate	Existing background levels incorporating impacts from existing operations at nearby facilities have been taken into consideration for each of the key assessment areas within the EIS including traffic and transport, noise and vibration, air quality and visual amenity. As such, the operational assessments presented in the EIS can be considered to represent a 'cumulative' assessment of the Project with existing surrounding operations. Given the separation of the Project from the GWB project and the limited likelihood of overlapping construction, significant cumulative impact from traffic, noise and vibration, air quality and visual amenity from the construction periods of these projects are not anticipated. Similarly, given the small overlap and the short-term nature of construction works for the DDR Program, there is not anticipated to be more than a minor cumulative noise impact for simultaneous construction of these projects.	Low	Section 23

8 Traffic and transport

This section provides a summary of the potential traffic and transport impacts of the Project. Arcadis has undertaken an assessment of the potential traffic, transport and access impacts associated with the Project to address the SEARs issued by DPIE. The Traffic Impact Assessment (TIA) for the Project is provided in Appendix C of this EIS.

Appendix A provides a summary of the relevant SEARs which relate to traffic and where these have been addressed in this EIS.

8.1 Methodology

The methodology for the TIA comprised:

- Identification of the existing transport network conditions including, traffic volumes, roadway capacity, access and key intersections
- Assessment of the potential traffic and transport impacts during construction and operation of the Project
- Identification of mitigation and management measures as required.

8.2 Existing environment

8.2.1 Existing road network

The Castlereagh Highway runs adjacent to the Project Site on the eastern side. The Great Western Highway, located approximately two kilometres south of the Project Site, is a major road which connects Sydney to Lithgow and Western NSW. An unnamed access road is located adjacent to the south of the Project Site and currently acts as a service road for Greenspot. The dirt road intersects with Castlereagh Highway about 180 metres north of Springvale Lane and would be the access point to the Project Site.

A description of the key roads surrounding the Project is provided below:

- Castlereagh Highway: A two-way state road providing access from Lithgow to Mudgee in a south-north direction. A broken centreline marking separates the traffic lanes with a 1.5 metres shoulder on either side. The marked speed limit is 100 km/h.
- Unnamed Access Road: A graded road adjacent to Castlereagh Highway about 180 metres north of Springvale Lane
- Great Western Highway: A two-way state road providing access from Sydney, The Blue Mountains and Lithgow to Bathurst and greater regional NSW.

Public transport

The key bus routes in the vicinity of the Project are shown in Figure 8-1 and include:

- Route 600 – Portland to Lithgow via Wallerawang
- Route 636 – Lithgow to Bathurst via Wallerawang.

The bus services make use of the following roads:

- Barton Avenue
- Lyon Parade
- Hume Avenue
- Lidsdale Street
- Commens Street
- Pipers Flat Road
- Main Street
- Great Western Highway

No bus services use the Castlereagh Highway in the vicinity of the Project. The majority of the roads listed above would not coincide with the routes to be used for construction of the Project with the exception of Main Street and the Great Western Highway.

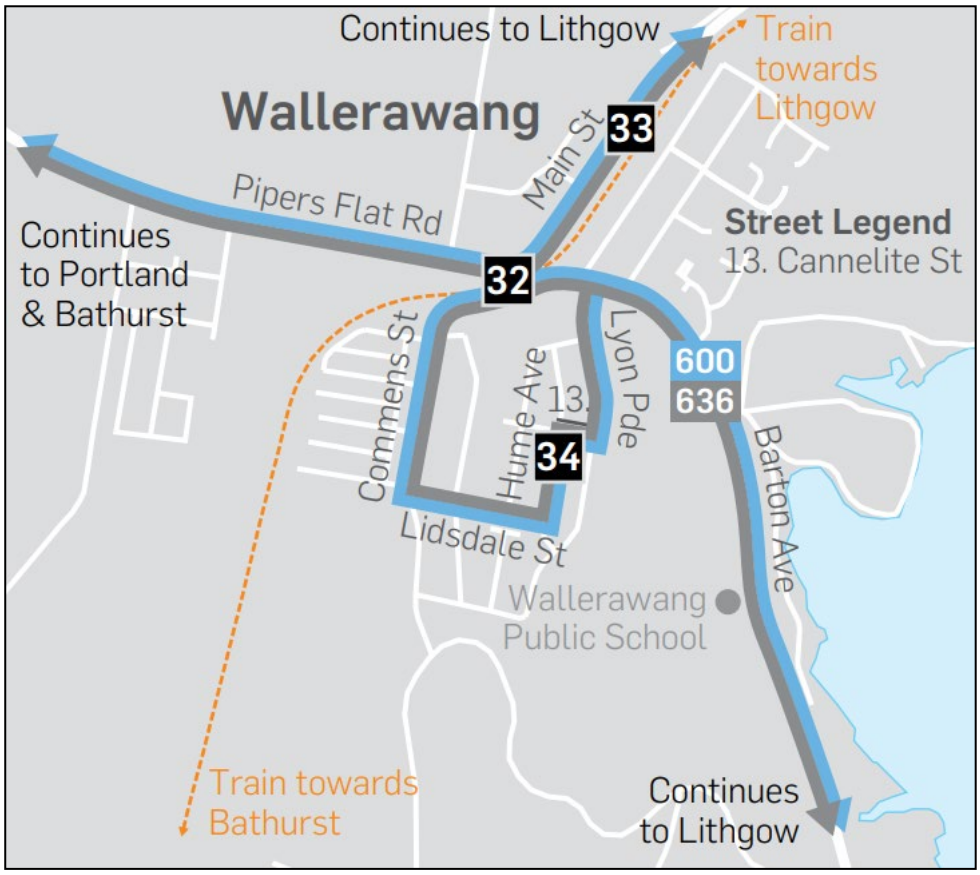


Figure 8-1 Bus routes in the vicinity of the Project

There are no cycle paths or formal pedestrian paths along Castlereagh Highway or Great Western Highway (the key roads utilised by the Project). The Project is not anticipated to impact on the local pedestrian and cycling network.

Heavy vehicle routes

The Great Western Highway and Castlereagh Highway are designated heavy vehicle routes for B-double up to 26 metre long under General Mass Limit (GML) and Higher Mass Limit (HML) conditions. See Figure 8-2.

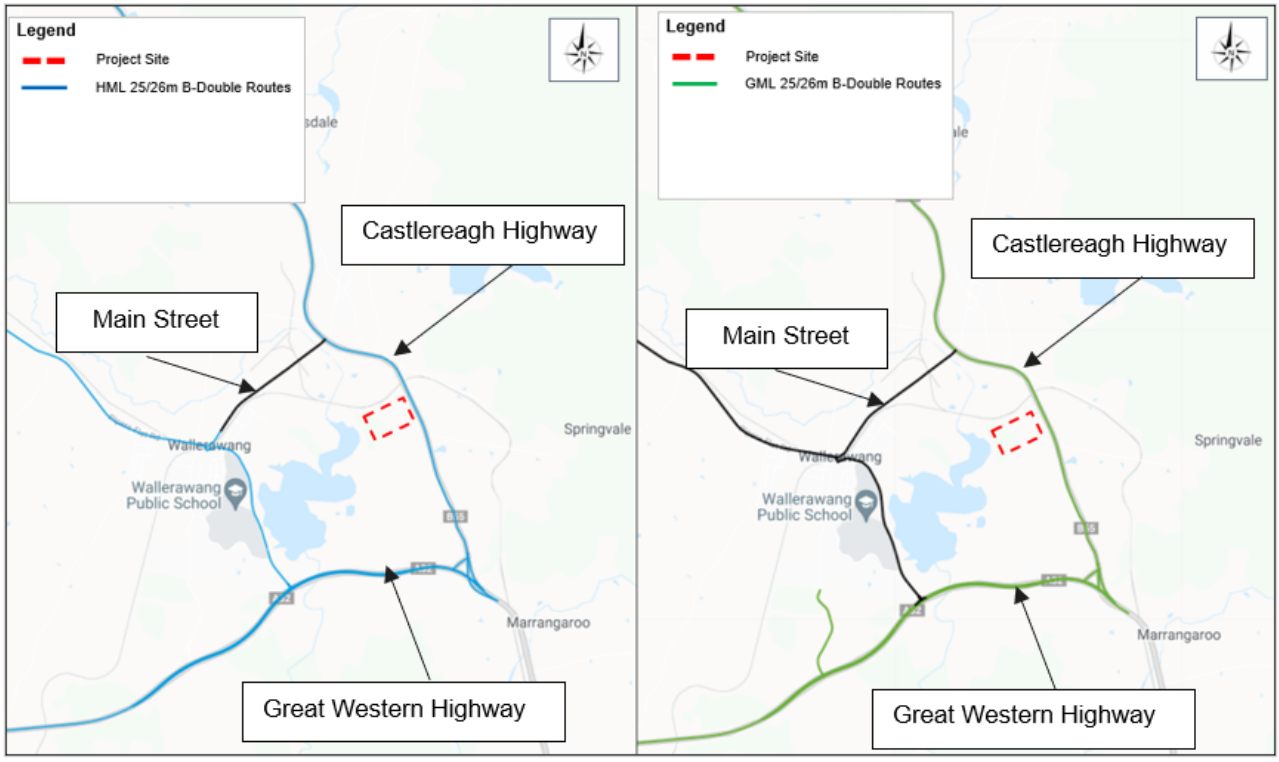


Figure 8-2 Approved heavy vehicle routes within Wallerawang and the surrounding area

Existing traffic conditions

To establish existing traffic conditions, a traffic survey was conducted on Tuesday 30 March 2021. The survey recorded turn movement volumes at key intersections as shown on Figure 8-2, including:

- I-1: Castlereagh Highway / Great Western Highway
- I-2: Castlereagh Highway / Wolgan Road
- I-3: Castlereagh Highway / Main Street.

Figure 8-3 Traffic survey locations

Based on the traffic survey, background peak hours on the road network surrounding the Project site occurred at 7:45 – 8:45 for the AM peak hour and 15:15 – 16:15 for the PM peak hour.

Results of the traffic surveys at the key intersections for the AM and PM road network peaks are shown in Figure 8-4 and Figure 8-5. Survey results have been provided in full in Appendix C.

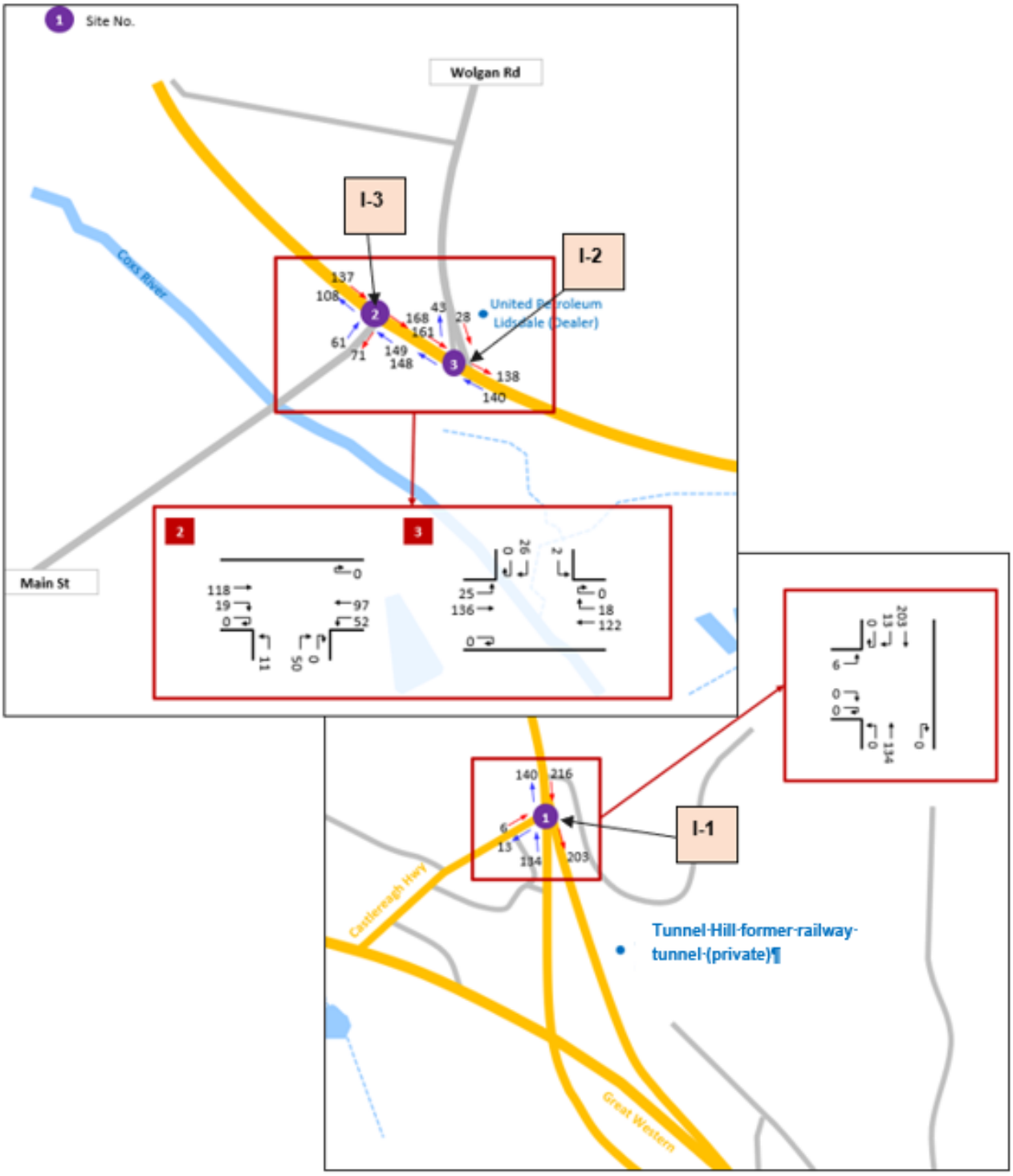


Figure 8-4 Traffic movements at key intersections during the AM peak

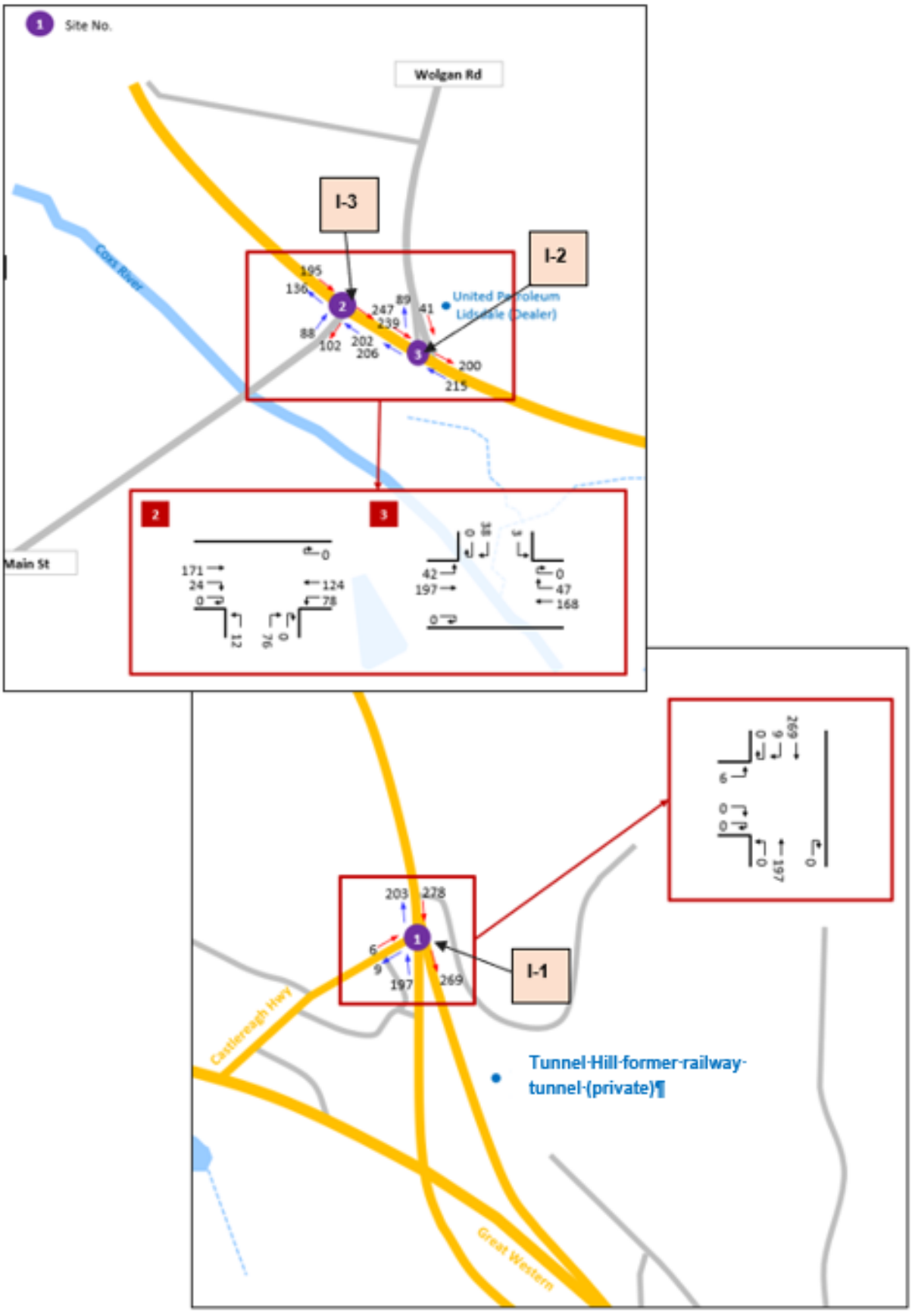


Figure 8-5 Traffic movements at key intersection during the PM peak

8.3 Background traffic growth

To assess imapcts of the Project in future years, the future background traffic volumes have been established using a compounded 3.7% annual traffic growth rate. The traffic growth rate is based on information obtained from Traffic Volume Viewer for Station 99084. Following consultation with TfNSW, additional data from 2021 was obtained to validate the established growth rate. The data identified a historical growth rate of 1.2% since 2008. As such the assumed traffic growth rate of 3.7% adopted for the traffic impact assessment is considered to be conservative and reasonable.

8.4 Potential impacts

8.4.1 Construction

Turn warrants assessments of the proposed access to the Project Site during construction and operation indicate that based on the expected peak hour traffic volumes basic left turn (BAL) and basic right turn (BAR) treatments would be sufficient for the access to accommodate the construction stage turn movement volumes. However, the Project Site access would have to be formalised in order to accommodate for the B-Double, which is the largest design vehicle expected to use the access during construction (for regular use). The intersection would be modified in accordance with *Austroads Guide to Road Design Part 4 Intersections and Crossings* (Austroads, 2021), turn treatments for rural roads.

The Project would formalise the access to a suitable standard to accommodate B-double construction vehicle turn paths as well as provide for a paved road surface for up to 40 metres into the site to eliminate any gravel spill over onto the Castlereagh Highway. Formalising the access would also require minor pavement widening to allow for lateral movements of vehicles when decelerating into the access.

Additionally, it is proposed that the posted speed of Castlereagh Highway be reduced from 100 km/h to 80 km/h for the duration of construction activities on the Project Site and only along the road section fronting the Project Site. The proposed access arrangement is shown in Figure 8-6. An assessment of the suitability of this upgrade to manage potential construction traffic has been included in this section. The assessment of construction impacts on the road network assumes the upgrade as described is in place.

Figure 8-6 Proposed temporary access arrangement

The proposed access arrangement would be developed further during the detailed design phase in accordance with the relevant Austroads Guide to Road Design and would include:

- Swept paths
- Details of any ancillary works are to be provided including (but not limited to) line marking, intersection and road name signage, drainage transitions, batter slopes, vegetation removal, services relocation, and road reserve widening acquisition.
- Renewal of existing signage and line marking (if required).

As described in Section 4 construction traffic movements are anticipated to comprise:

- Up to 100 two-way light vehicle movements per day (total of 100 light vehicle movements per day in both directions) associated with workers coming to site
- 20 two-way heavy vehicle movements per day (total of 20 heavy vehicle movements per day in both directions), associated with transport of equipment, and materials including batteries
- 36 OSOM movements across the construction period.

To assess the worst-case scenario, all of the light vehicle movements have been assumed to occur within the hour prior to shift start and the hour after shift end. As construction would commence at 7am and finish at 6pm, light vehicle movements are anticipated to largely occur outside of background peak hours (7:45 – 8:45 for the AM peak hour and 15:15 – 16:15 for the PM peak hour).

To assess the worst-case scenario, it was assumed that there would be 36 OSOM deliveries, comprising 12 MV transformer deliveries, 20 MV switchgear deliveries and up to four HV transformer deliveries over the construction period. Heavy vehicle movements associated with the transport of equipment, materials and batteries would be uniformly distributed across the shift periods. This would entail two heavy vehicle trips per hour. The majority of construction and delivery traffic would be coming from the south, predominantly from Lithgow and Sydney via the Great Western Highway. These movements would be undertaken in accordance with applicable licences and permits. The proposed haulage routes will be addressed in a comprehensive Construction Traffic Management Plan with appropriate permits applied for with TfNSW as nominated by the contractor in the subsequent stages of the Project

The construction traffic impact assessment considered the following items during the construction phase of the Project:

- Impact on intersections
- Impact on road link capacity (Castlereagh Highway)
- Site access assessment.

Intersection performance

Generally, unsignalised intersections with minor roads with relatively low volumes of through and turning vehicles are not capacity constrained and detailed analysis of capacity is not warranted.

In accordance with the *Road Planning and Design Manual Chapter 5, Traffic Parameters and Human Factors* (2004) guideline, for a cross intersection with a two-lane, two-way road, capacity analysis is not considered to be warranted when the maximum hourly volumes are below:

- Major road 400 vehicles per hour, minor road 250 vehicles per hour
- Major road 500 vehicles per hour, minor road 200 vehicles per hour

- Major road 650 vehicles per hour, minor road 100 vehicles per hour.

Comparison between the threshold volumes and the peak hourly volumes at the key intersections (Section 8.2.1) have been assessed for the following scenarios:

- Base Year 2021 AM and PM peak hour traffic conditions
- Construction Year 2022 AM and PM peak hour traffic conditions
- Construction Year 2023 AM and PM peak hour traffic conditions
- Construction Year 2024 AM and PM peak hour traffic conditions.

The expected construction generated volumes of two heavy vehicle movements during both AM and PM peak hours is considered to be negligible and is not anticipated to have an impact on road network performance (noting that light vehicles are anticipated to be traveling outside of the local road peaks).

An assessment of key intersections surrounding the Project during the current and future construction years (2021, 2022, 2023 and 2024), has been undertaken to identify if a detailed capacity analysis is required and is shown in Table 8-1.

Table 8-1 Capacity analysis screening

Intersection	Major Road Volume	Minor Road Volume	Detail assessment required
2021			
Castlereagh Highway / Great Western Highway	AM Peak Hour: 350 veh/h PM Peak Hour: 475 veh/h	AM Peak Hour: 6 veh/h PM Peak Hour: 6 veh/h	N
Castlereagh Highway / Wolgan Road	AM Peak Hour: 301 veh/h PM Peak Hour: 454 veh/h	AM Peak Hour: 28 veh/h PM Peak Hour: 41 veh/h	N
Castlereagh Highway / Main Street	AM Peak Hour: 286 veh/h PM Peak Hour: 397 veh/h	AM Peak Hour: 61 veh/h PM Peak Hour: 88 veh/h	N
2022			
Castlereagh Highway / Great Western Highway	AM Peak Hour: 360 veh/h PM Peak Hour: 489 veh/h	AM Peak Hour: 6 veh/h PM Peak Hour: 6 veh/h	N
Castlereagh Highway / Wolgan Road	AM Peak Hour: 310 veh/h PM Peak Hour: 468 veh/h	AM Peak Hour: 29 veh/h PM Peak Hour: 42 veh/h	N
Castlereagh Highway / Main Street	AM Peak Hour: 294 veh/h PM Peak Hour: 409 veh/h	AM Peak Hour: 62 veh/h PM Peak Hour: 90 veh/h	N
2023			
Castlereagh Highway / Great Western Highway	AM Peak Hour: 371 veh/h PM Peak Hour: 503 veh/h	AM Peak Hour: 6 veh/h PM Peak Hour: 6 veh/h	N
Castlereagh Highway / Wolgan Road	AM Peak Hour: 319 veh/h PM Peak Hour: 481 veh/h	AM Peak Hour: 29 veh/h PM Peak Hour: 43 veh/h	N
Castlereagh Highway / Main Street	AM Peak Hour: 303 veh/h PM Peak Hour: 420 veh/h	AM Peak Hour: 64 veh/h PM Peak Hour: 93 veh/h	N

Intersection	Major Road Volume	Minor Road Volume	Detail assessment required
2024			
Castlereagh Highway / Great Western Highway	AM Peak Hour: 382 veh/h PM Peak Hour: 519 veh/h	AM Peak Hour: 7 veh/h PM Peak Hour: 7 veh/h	N
Castlereagh Highway / Wolgan Road	AM Peak Hour: 328 veh/h PM Peak Hour: 519 veh/h	AM Peak Hour: 31 veh/h PM Peak Hour: 45 veh/h	N
Castlereagh Highway / Main Street	AM Peak Hour: 312 veh/h PM Peak Hour: 433 veh/h	AM Peak Hour: 66 veh/h PM Peak Hour: 96 veh/h	N

As detailed above, the major / minor road traffic volumes including traffic from the Project would not exceed the thresholds identified within the *Road Planning and Design Manual Chapter 5, Traffic Parameters and Human Factors* (2004) guideline and further capacity analysis for key intersection is not considered to be warranted.

Given the relatively low volumes of traffic on the Castlereagh Highway and the minor volumes of construction traffic proposed, the Project is anticipated to have a negligible impact on the surrounding road network during construction.

Road link capacity impacts

A road link capacity impact analysis has been undertaken of Castlereagh Highway (the key road link from the Project site). According to *Austroads Guide to Traffic Management Part 3, Traffic Analysis* (2020), the typical roadway capacity of a two-lane highway is 1700 passenger car units per hour (pcu/h/direction). The existing volume to capacity ratio under base year 2021 conditions are:

- Volume to capacity ratio of 0.20 (350/1700) during the AM peak hour
- Volume to capacity ratio of 0.27 (475/1700) during the PM peak hour.

As shown, there is a surplus of 80% roadway capacity during base year 2021 AM peak hour conditions and 73% of roadway capacity during base year 2021 PM peak hour conditions.

An assessment of the impact on road capacity during future construction years (2022, 2023, 2024) is shown in Table 8-2. Cumulative traffic impacts have been considered in Section 23.

Table 8-2 Construction Phase Road Link Capacity Impact

Construction Year	AM Peak Hour	PM Peak Hour	Spare Capacity (%)
2022	Volume to Capacity Ratio: 0.21	Volume to Capacity Ratio: 0.28	AM Peak Hour - 79% PM Peak Hour - 72%
2023	Volume to Capacity Ratio: 0.21	Volume to Capacity Ratio: 0.29	AM Peak Hour - 79% PM Peak Hour - 71%
2024	Volume to Capacity Ratio: 0.22	Volume to Capacity Ratio: 0.30	AM Peak Hour - 78% PM Peak Hour - 70%

During all construction years, the Castlereagh Highway would continue to have a significant percentage of spare capacity even with the inclusion of construction traffic. It is considered that there would be no impact on roadway capacity from the construction of the Project.

Site access assessment

The suitability of the proposed temporary construction site access has been evaluated using a turn warrant assessment, absorption capacity assessment, vehicle delay assessment, gap acceptance probability and sight distance assessment.

Turn warrants assessments of the proposed access to the Project Site during construction and operation have been conducted based on the provisions of *Austroads Guide to Road Design - Part 4A: Unsignalised and Signalised Intersections, Section 4.8 (Warrants for BA, AU and CH Turn Treatments)* with full details provided in Appendix C. The assessments indicate that based on the expected peak hour traffic volumes basic left turn (BAL) and basic right turn (BAR) treatments would be sufficient for the access to accommodate the construction stage turn movement volumes. These would be based on Rural access requirements outlined in *Austroads Guide to Road Design Part 4 Intersections and Crossings*. Swept path analysis has shown that the proposed layout of the access would be sufficient to accommodate the design vehicle turn path requirements for both B-doubles and OSOM vehicles.

An absorption capacity assessment was conducted to calculate the average delay expected to be experienced by construction vehicles entering Castlereagh Highway from the proposed access and is detailed in Appendix C. As mentioned, the majority of construction and delivery traffic would be coming from the south, predominantly from Lithgow and Sydney. As such it was assumed that all peak hour construction vehicles (two during the AM peak and two during the PM peak) would enter the through a left turn movement from Castlereagh Highway and exit the access through a right turn movement to Castlereagh Highway. As the left turn movement is unobstructed, it would only be the right turn movement which would experience an impact on delay as construction vehicles would access and exit to the south. The assessment found that at the proposed temporary construction access the Castlereagh Highway would have sufficient absorption capacity to accommodate the construction traffic demand during both AM and PM peak hours of all construction years.

The average vehicle delay expected at the accesses for the ingress and egress movements were calculated based on the equations contained and adopted from the *Road Planning and Design Manual* (Department of Transport and Main Roads, October 2006). This is a universal industry accepted analysis procedure within the traffic engineering industry, used to calculate absorption capacity and average delay of an access. This represents the average delay which the minor movement would experience to enter or cross a major movement flow. Full details of the delay analysis are provided in Appendix C. The delay analysis results indicate that the construction traffic vehicles would experience insignificant levels of vehicle delay to enter the major stream traffic flow and the accesses would operate within acceptable levels of vehicle delay

To determine the likelihood and probability of critical gaps being available to allow vehicles to turn on to Castlereagh Highway, a gap acceptance probability analysis was carried out. Full details of the gap acceptance probability analysis are provided in Appendix C. The analysis identified that there would be acceptable likelihoods (probabilities) that gaps more than the required critical gaps would occur within the major stream of flow to allow right turn heavy vehicles to enter during all construction years at both AM and PM peak hours.

Safe Intersection Sight Distance (SISD) is the minimum sight distance which should be available along the major road at any intersection. An evaluation of the available SISD was carried out for the proposed

access location. The SISD assessment was based on the provisions of *Austroads Guide to Road Design - Part 4A: Unsignalised and Signalised Intersections*. The existing longitudinal grade (vertical alignment) of the major road was measured in Google Earth at the proposed temporary site construction access. Based on a desktop assessment, it was found that some roadside vegetation clearance would be required in order to meet the minimum sight distance requirements for SISD. This would be required for the south to north approach along Castlereagh Highway. The extent of vegetation clearance or maintenance within the road reserve would be determined during the detailed design stage of the access upgrade works. Sufficient SISD is considered available for the north to south movement along Castlereagh Highway.

Public Transport

There are no public transport routes on the roads adjacent to the Project and the Project is not expected to have a significant impact on the local road network during construction. As such, it is not anticipated that public transport routes will be impacted by construction of the Project.

Over Size Over Mass deliveries

Over Size Over Mass (OSOM) vehicles would be required for the delivery of large items, such as transformers, during construction (up to 36 metres). OSOM movements would be scheduled outside of peak periods where feasible and may occur outside of standard construction hours. These movements would be infrequent and would be undertaken in accordance with the Project Construction Traffic Management Plan (CTMP) and applicable licences and permits. OSOM deliveries and are not anticipated to result in a significant impact on the road network during construction.

Swept path analysis has shown that the proposed layout of the access would be sufficient to accommodate the required OSOM vehicles. Measures to manage potential impacts from OSOM deliveries would be incorporated in the CTMP which will be developed prior to construction of the Project.

8.4.2 Operation

The operational traffic impact assessment evaluated the following items to identify the potential operational impacts of the Project:

- Impact on intersections
- Impact on road link capacity (Castlereagh Highway)
- Site access assessment.

During operation of the Project, the estimated workforce would consist of a small number of workers (up to five staff). In a worst-case scenario if all workers travel alone, this will equate to five (two way) vehicle trips per day. It is expected that there may be some irregular heavy vehicle movements during the operational stage for maintenance activities, such as replacing of transformers etc, however these movements are expected to be infrequent and would have a negligible impact on the road network.

Intersection performance

Given the very low volumes of operational traffic generation, no impact on intersection capacity is expected. Regular maintenance of vegetation would be required to eliminate any obstruction to safe intersection sight distances and marginal gap acceptance sight distances.

Road link capacity impacts

A road link capacity impact analysis has been undertaken for Castlereagh Highway. The operational phase impact analysis evaluates the impact on roadway capacity at opening year 2024 (after completion of the construction phase) as well as opening + 10 years i.e. year 2034. The analysis found that there would continue to be sufficient available roadway capacity during both the AM and PM peaks at opening year and in 2034. The Project would not impact on roadway capacity of Castlereagh Highway during operation.

Site access assessment

It is expected that the access configuration required to accommodate the operational phase traffic would be unchanged from the construction layout. The operational generated traffic would be minimal and is expected to have a lesser impact than the construction generated traffic. As such, a basic left and basic right turn treatment requirement would continue to be sufficient.

8.5 Mitigation measures

This section details the mitigation measures that would be implemented to minimise the potential traffic impacts from construction and operation of the Project.

Table 8-3 Traffic and transport mitigation measures

ID	Mitigation
Construction	
TA1	A visual pavement condition assessment of Castlereagh Highway will be undertaken prior to construction and post final stage of construction activities. Following completion of construction, the pavement condition of the Castlereagh Highway will be returned to the same or better, than that identified during the initial visual pavement condition assessment.
TA2	A reduction in speed limit on the Castlereagh Highway (in the vicinity of the Project) during construction from 100 km/h to 80 km/h.
TA3	Advanced truck turning signage during construction will be installed to warn road users that heavy vehicles may be turning in and out of the Project site access.
TA4	All temporary road works at the Project Site access road, including diversion and signage, will be constructed in accordance with relevant road design and road sign manuals.
TA5	Construction activities and vehicle movements will be minimised where reasonable and during background peak hours.
TA6	A Construction Traffic Management Plan (CTMP) will be developed prior to construction as part of the CEMP for the Project. The CTMP will include details on: • Road safety measures including speed restrictions, driver fatigue, in-vehicle communications, signage, demarcations, maintenance, safety checks, and interaction with public transport, transport of hazardous and dangerous goods and emergency response and disaster management. • Details of a travel demand management (TDM) campaign to inform the public on works and their effect on network operations • Hours of work and deliveries, staff transport and staff parking • A process for ongoing consultation with relevant authorities

ID	Mitigation
	• A process for developing specific traffic management plans for special events developed in conjunction with the relevant stakeholders • A process for managing OSOM deliveries • Secondary alternative construction route activities for use in the event of the primary route is blocked off by an emergency • Signage that would be established within and surrounding the Project site.
Operation	
TA7	An Operational Traffic Management Plan (OTMP) will be developed as part of the OEMP for the Project.

9 Noise and vibration

This section provides an assessment of the potential noise and vibration impacts associated with the Project. Resonate has undertaken an assessment of the potential noise and vibration impacts associated with the Project to address the SEARs issued by DPIE. The Construction and Operational Noise and Vibration Assessment for the Project is provided in Appendix D of this EIS.

Appendix A provides a summary of the relevant SEARs which relate to noise and vibration and where these have been addressed in this EIS.

9.1 Methodology

The methodology of the Noise and Vibration Impact Assessment included:

- Noise monitoring to identify existing background noise levels at the Project Site, in accordance with the *Noise Policy for Industry* (NPfI) (NSW EPA, 2017)
- Development of a noise model to predict changes to the existing noise environment from construction and operation of the Project
- An Operational Noise Impact Assessment in accordance with the NPfI (NSW EPA, 2017)
- A Construction Noise Impact Assessment in accordance with the *Interim Construction Noise Guideline* (ICNG) (Department of Environment and Climate Change (DECC), 2009)
- A Construction Vibration Impact Assessment, in accordance with *Assessing Vibration: A Technical Guideline* (DEC, 2006)
- A road traffic noise assessment in accordance with the '*Road Noise Policy*' (RNP) (DECCW, 2011)
- Identification of environmental management measures required to avoid, minimise and/or mitigate any potential noise and vibration impacts identified.

9.1.1 Background noise level monitoring

To identify the existing noise environment around the Project Site and formulate construction and operational Noise Management Levels (NML), and operational noise trigger levels, unattended noise monitoring was conducted from 24 March 2021 to 6 April 2021. Noise was characterised into two 'noise catchment areas' (NCA), with background noise within NCA01 being characterised using monitoring data from the noise logger at 4 Millers Road and NCA02 being characterised using monitoring data from the noise logger at 2 Blaxland Street.

The location of all NCAs and noise monitoring equipment (noise loggers) in relation to the Project Site are shown in Figure 9-1.

NCA01 is representative of the conditions of Wallerawang town centre and could be considered suburban in nature. NCA02 is representative of the rural receivers surrounding Wallerawang township and is characterised by lower noise levels than NCA01.

Attended noise monitoring was also conducted during collection of the noise loggers at each of the logger locations. In accordance with the NPfI, the captured noise data was reviewed to identify times of unfavourable weather conditions, such as wind and rain conditions, which result in adverse impacts on background noise levels. The captured noise data was assessed against half-hourly weather data,

obtained from the Bureau of Meteorology (BoM) Mount Boyce (Station number: 60800) weather observation station, located approximately 20 kilometres from the Project.

Noise data has been excluded from the processed results if:

- Rain was observed during a measurement period, and/or
- Wind speed exceeded five metres per second (m/s) (18 km/h) at the measurement height of 1.5 metres above ground.

Further detail on noise logging data, including the data that has been excluded due to adverse weather conditions, is included in Appendix D of the EIS.

Figure 9-1 NCA's and noise monitoring locations

9.1.2 Noise modelling

Potential operational noise impacts from the Project at surrounding receptors have been modelled using the CONCAWE algorithm within SoundPLAN v8.2.

Terrain has been based on one metre LIDAR scans of the area sourced from NSW Spatial Services. Noise sources and receivers have been based on aerial imagery. Building footprints and heights have been based on a combination of aerial imagery, street level photography and site inspections.

Certain meteorological conditions may increase noise levels by focusing soundwaves towards a single point. Refraction of sound waves will occur during temperature inversions (where temperature increases with height above ground level) which can vary from hour to hour. Adverse meteorological conditions are to be considered where relevant for an industrial activity. A review of the local meteorological conditions in accordance with the NPfI indicates that temperature inversions are not a feature of the area and as such have not been assessed further.

9.1.3 Construction

To quantify the potential impacts from construction of the Project, a noise model was produced that included:

- Noise levels of the anticipated construction equipment
- The location of nearby sensitive receivers
- The number of plant items likely to be operating at any given time
- The distance between the construction equipment and receivers.

Construction noise source levels for typical construction plant and equipment expected to be used as part of the Project have been detailed in Appendix D of this EIS. These have been used to establish total sound power levels for each stage of construction work. The predicted noise level results are presented as a summary of the potential noise impacts for each NCA, when the work is located at the nearest position within the Project construction footprint to the sensitive receiver in question. In reality, the noise levels would vary as plant would move around the worksite and would not necessarily all be operating concurrently. As such, noise levels are likely to be lower than the worst-case noise levels presented for notable periods of time during the works.

The total activity sound power level for each stage is calculated as a logarithmic sum incorporating indicative operation time in a 15-minute period for impulsive equipment and the total number of plant items required within a 15-minute period.

The stages used in the construction noise assessment include:

- Bulk Earthworks
- Construction of BESS/compound removal
- Connection to substation switchyard
- Delivery and installation of the BESS and ancillary facilities
- Establishment of hardstand areas
- Landscaping
- Mobilisation and site establishment
- Permanent environmental management and pollution control measures

- Roadside works
- Finishing works.

As described in Section 4 of the EIS, construction of the Project is planned to commence in Quarter 2 of 2022 and would likely take approximately 12-24 months to complete.

Works are proposed to be undertaken during standard hours (7am to 6pm Monday to Friday and 8am to 1pm Saturdays). However, some out of hours works may be required.

Construction noise management levels

The Interim Construction Noise Guideline (ICNG) (DECC, 2009) has been used to develop project-specific construction NMLs, assess potential impacts and recommend any necessary mitigation, management measures or provisions for monitoring.

Table 9-1 shows the construction NML guidance for residential noise sensitive receptors developed in accordance with the ICNG.

Table 9-1 Construction airborne NML for residential receivers

Time of day	Management Level LAeq,15min (dB(A))	How to apply
Recommended standard hours: • 7 am to 6 pm Monday to Friday • 8 am to 1 pm Saturdays • No work on Sundays or Public Holidays	Noise affected (RBL + 10 dB(A))	The noise affected level represents the point above which there may be some community reaction to noise. Where the predicted or measured $LA_{eq,(15min)}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to minimise noise. The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected (75 dB(A))	The highly noise affected level represents the point above which there may be strong community reaction to noise. Where noise is above this level, the proponent should consider very carefully if there is any other feasible and reasonable way to reduce noise to below this level. If no quieter work method is feasible and reasonable, and the works proceed, the proponent should communicate with the impacted residents by clearly explaining the duration and noise level of the works, and by describing any respite periods that will be provided.
Outside recommended standard hours (as described above)	Noise affected (RBL + 5 dB(A))	A strong justification would typically be required for works outside the recommended standard hours. The proponent should apply all feasible and reasonable work practices to meet the noise affected level. Where all feasible and reasonable practices have been applied and noise is more than 5 dB(A) above the noise affected level, the proponent should negotiate with the community.
Note: RBL = Rating background level, LA_{eq} = Equivalent continuous sound level, dB(A) = Decibel, A-weighted		

Based on the guideline criteria presented in Table 9-1, the project-specific construction NML for works within and outside the recommended standard hours for construction are shown in Table 9-2. It is anticipated that all construction activities would be conducted within standard construction hours. Where Out-of-Hours Works (OOHWs) are required (e.g. for emergency works, oversized equipment delivery, etc) these would be undertaken in accordance with an OOWH protocol which will be included in the CEMP.

A full list of NMLs based on the receiver types is presented in Table 4 of the Construction and Operational Noise and Vibration Assessment (Appendix D).

Table 9-2 Noise Management Levels for residential receivers

Receiver	Construction NML $L_{eq,\ 15\ minute}$, dB(A)				High Noise Affected, $L_{eq,\ 15\ minute}$, dB(A)	Sleep Disturbance, dB(A)
	Standard hours	Out of hours			Daytime (Standard Hours)	Night-time only
	Day	Day	Evening	Night		Lmax
NCA01 (Residential)	42	37	36	35	75	50
NCA02 (Residential)	49	44	43	41	75	50

Construction road noise criteria

The NSW Road Noise Policy (RNP) provides guidance, criteria and procedures for assessing noise impacts from existing, new and redeveloped roads and traffic generating developments. The assessment of road traffic noise impacts on public roads is assessed under the RNP.

If road traffic noise during the Project construction is within 2 dB(A) of current levels, then the objectives of the RNP are met and no specific mitigation measures are required. Where the Project road traffic noise levels exceed 2 dB(A) of current levels then consideration should be given to the actual noise levels associated with construction traffic and whether or not these levels comply with the RNP criteria.

An estimation of the anticipated noise level contribution of construction traffic on local roads has been conducted using the TfNSW Construction Noise Estimator Tool. The following indicative construction road traffic has been assumed:

- 100 two-way light vehicle movements per day.
- 20 two-way heavy vehicle movements per day.

Using the background noise monitoring undertaken for the Project, an existing $LA_{eq,\ 15hour}$ noise level of 49 dB(A) (including a façade correction) has been predicted for a typical receiver offset distance of 90 metres from the Castlereagh Highway. When including the construction traffic numbers as identified, a total combined noise level of 49 dB(A) is predicted (no change from the existing). As there would be no increase in road traffic noise in accordance with the RNP, no further assessment of construction road traffic is required.

Construction vibration assessment

Construction vibration assessment is generally undertaken with consideration to human exposure to vibration and the potential for building damage from vibration. Given the substantial distance from the Project construction boundary to the nearest building or residence (i.e. greater than 150 m) there is limited potential for vibration impacts on sensitive receivers and no further assessment is required.

9.1.4 Operation

Primary noise sources for operation of the Project have been calculated based on an indicative battery system that would meet the Project requirements. The sound power levels for the operational battery units vary, depending on the cooling requirements of the battery and operational fan loads or 'fan duty'. Operational noise sources including the sounds power levels for varying fan duties are shown in Table 9-3.

Table 9-3 Operational noise sources

Operational source	Source type	Indicative Number of units	Combined SWL dB(A)
Transformer 33kV Trx1	Area source	133	75
Battery units 80% fan duty[1]	Area source	266	117
Battery units 40% fan duty[1]	Area source	266	108
Battery units 20% fan duty[1]	Area source	266	103

Note: A 5 dB(A) penalty has been added to receiver noise levels to account for potential tonality of the electrical equipment. This will be reviewed during detailed design for the Project.

Using these noise sources, the following assessment scenarios have been modelled:

- **Scenario 1 Base case without mitigation**: Battery units at 80% fan duty without noise barriers.
- **Scenario 2 Mitigation Case 1:** Reduced source sound power levels and noise barriers i.e. battery units at 40% fan duty with noise barriers.
- **Scenario 3 Mitigation Case 2:** Further reduced source sound power levels and noise barriers i.e. battery units at 20% fan duty with noise barriers.

The Scenario 1 Base Case noise level predictions assumed a maximum 80% fan duty. Based on historic climatic conditions, the units are expected to operate at 20% fan duty most of the time with periods of 40% fan duty when under load or warmer ambient conditions during the day and evening periods. During the night-time period, the units would operate at 20% fan duty with the exception of around 1.65 days per year (during particularly warm periods), where they would operate at 40% fan duty for night-time periods.

As such, to assess a realistic 'worst case' scenario, the potential impacts of 40% fan duty have been assessed as Scenario 2. However, potential impacts of 20% fan duty have also been assessed (Scenario 3) to identify the 'standard' operational conditions.

Operational noise criteria

The NPfI provides a framework for assessing environmental noise impacts from industrial premises and industrial development proposals in NSW. The NPfI recommends the development of noise trigger levels, which provide a benchmark for assessing a proposal or site. The intrusive noise levels and amenity noise levels have been calculated in accordance with the NPfI and are detailed in Appendix D of the EIS. Noise trigger levels have been developed based on the lower value of the intrusiveness noise level and the amenity noise level and are shown in Table 9-4.

Table 9-4 Project noise trigger levels

Receiver	Project noise trigger level $LA_{eq,\ 15\ min}$ dB(A)		
	Day	Evening	Night
NCA01 (Residential)	45	43	38
NCA02 (Residential)	37	36	35

Non-residential noise trigger levels are detailed in Table 7 of Appendix D of this EIS.

Night-time noise occurring over a short duration has the potential to cause sleep disturbance despite complying with noise trigger levels. Since the Project is intended to operate on a 24-hour basis, maximum noise levels need to be considered for potential sleep disturbance. In accordance with the NPfI, the sleep disturbance noise criteria for assessing the operations of the Project is 52 L_{max} dB(A).

Road noise criteria

During operation of the Project, the estimated workforce would comprise a small number of workers (up to five staff). In a worst-case scenario if all workers travel alone, this will equate to five (two way) vehicle trips per day. Given the negligible additional traffic volumes on the road network during operation a change to road traffic noise is not anticipated and no further assessment of road noise during operation has been undertaken.

9.2 Existing Environment

9.2.1 Existing ambient noise levels

The existing ambient environment that surrounds the Project Site is typically dominated by distant road traffic noise from surrounding roads.

Noise was characterised into two noise catchment areas, with NCA01 being characterised by the noise logger at 4 Millers Road (L1) and NCA02 being characterised by the noise logger at 2 Blaxland Street (L2).

The extent of each NCA as well as each monitoring location are outlined in Figure 9-1.

- NCA01 is characterised by road noise associated with Wallerawang township itself and distant sounds of nature.
- NCA02 is typically characterised by the sounds of nature and distant road noise from surrounding highways.

Measurements taken at each of the logger locations are considered to representative of background levels within each NCA.

A summary of results from the unattended noise surveys, representing the existing ambient noise environment is presented in Table 9-5. The RBL and overall average noise level (LA_{eq}) are provided for each assessment period.

The RBL for each period is the median value of the average background values for the period over all the days measured. There is an RBL value for each period (day, evening and night). The LA_{eq} or equivalent noise level is the energy averaged noise level over the measurement period.

Table 9-5 Background noise levels results

Logger ID	Address	Noise level dB(A)							
		Day (7 am to 6 pm)		Evening (6 pm to 10 pm)		Night (10 pm to 7 am)		Day 15 hour (7am to 10pm)	Night 9 hour (10pm to 7am)
		RBL	L_{eq}	RBL	L_{eq}	RBL	L_{eq}	$LA_{eq\ -\ 15\ hour}$	$LA_{eq\ -\ 15\ hour}$
L1	4 Millers Road Wallerawang	39	49	38	53	36	46	51	45
L2	2 Blaxland St Wallerawang	32	48	31	47	30	38	46	37

9.2.2 Sensitive receivers

Six residential receivers are located near to the Project Site.

The closest residential property to the Project Site is located to the east of the Castlereagh Highway, along Springvale Lane and about 150 metres south-east of the boundary of the Project Site. These properties are separated from the Project Site by the Castlereagh Highway and a forestry plantation just north-west of the residential receivers.

Wallerawang township is located about 1.5 kilometres west of the Project Site, on the western side of the Coxs River.

9.3 Potential Impacts

9.3.1 Construction

Using the methodology described in Section 9.1.3, the estimated total sound power levels (SPL) of each construction stage have been calculated and are presented in Table 9-6. These levels are indicative only as equipment may change once construction commences.

Table 9-6 Predicted construction noise sound power levels for each construction stage

Stage	Total SPL (Lw, dB(A))	Total SPL including operating times (Lw, dB(A))
Mobilisation and site establishment	116	115
Bulk earthworks	123	119
Establishment of hardstand areas	120	119
Permanent environmental management and pollution control measures	118	119
Delivery and installation and switchyard fitout	118	119
Construction of BESS compound/compound removal	119	119
Connection to substation switchyard	116	116

Stage	Total SPL (Lw, dB(A))	Total SPL including operating times (Lw, dB(A))
Roadside works	123	119
Landscaping	119	118
Finishing works	120	118

Using the established total sound power levels, predictions were undertaken for each construction scenario and the results were compared to the established criteria. Exceedances for each construction stage are shown in Table 9-7.

Table 9-7 Construction NML exceedances

Phase	Number of standard hour NML exceedances	Avg exceedance standard hours works (dB(A))	Maximum predicted noise level (dB(A))
NCA01			
Mobilisation and site establishment	66	1	3
Bulk Earthworks	582	3	9
Permanent environmental management and pollution control measures	582	3	9
Establishment of hardstand areas	582	3	9
Delivery and installation	336	3	7
Construction of BESS compound/compound removal	703	3	7
Switchyard fitout	580	4	16
Connection to substation switchyard	182	3	11
Roadside works	402	3	8
Landscaping	928	4	11
Finishing works	243	3	6
NCA02			
Mobilisation and site establishment	2	3	3
Bulk Earthworks	43	3	9
Permanent environmental management and pollution control measures	43	3	9
Establishment of hardstand areas	43	3	9
Delivery and installation	29	3	7
Construction of BESS compound/compound removal	78	3	7

Phase	Number of standard hour NML exceedances	Avg exceedance standard hours works (dB(A))	Maximum predicted noise level (dB(A))
Switchyard fitout	6	12	14
Connection to substation switchyard	6	6	8
Roadside works	99	7	21
Landscaping	74	4	11
Finishing works	20	2	6

Exceedances average between 2 dB(A) to 3 dB(A) for residential properties in NCA01 and 3-12 dB(A) for NCA02, most of these exceedances would be classified as noticeable. Predicted noise levels at receivers are generally low in the context of typical construction noise. However, there are a number of exceedances of NML's due to the relatively low background noise levels of NCAs.

9.3.2 Operation

Operational noise impacts for the three assessment scenarios are presented in this section. When assessing potential impacts, the subjective change in apparent loudness should be considered. For reference the subjective effect of changes to sound levels is shown in Table 9-8.

Table 9-8 Subjective effect of changes to sound levels

Change in sound level (dB(A))	Subjective change in apparent loudness
1	Not perceptible
2 – 3	Just perceptible
5	Clearly noticeable
10	Half or twice as loud
20	Much quieter or louder

Scenario 1 – Base case

The operational 'base case' Scenario 1 comprised an assessment of the battery units at 80% fan duty without noise barriers in place. This scenario is considered unrealistic and highly conservative as the battery units would not operate at this level.

An overview of predicted operational noise levels for Scenario 1 is shown in Figure 9-2. The calculated noise levels include a 5 dB(A) penalty to account for tonality in the noise sources of the battery units. Detailed single point receiver noise levels are provided in Appendix B of the Construction and Operational Noise and Vibration Assessment (Appendix D of the EIS).

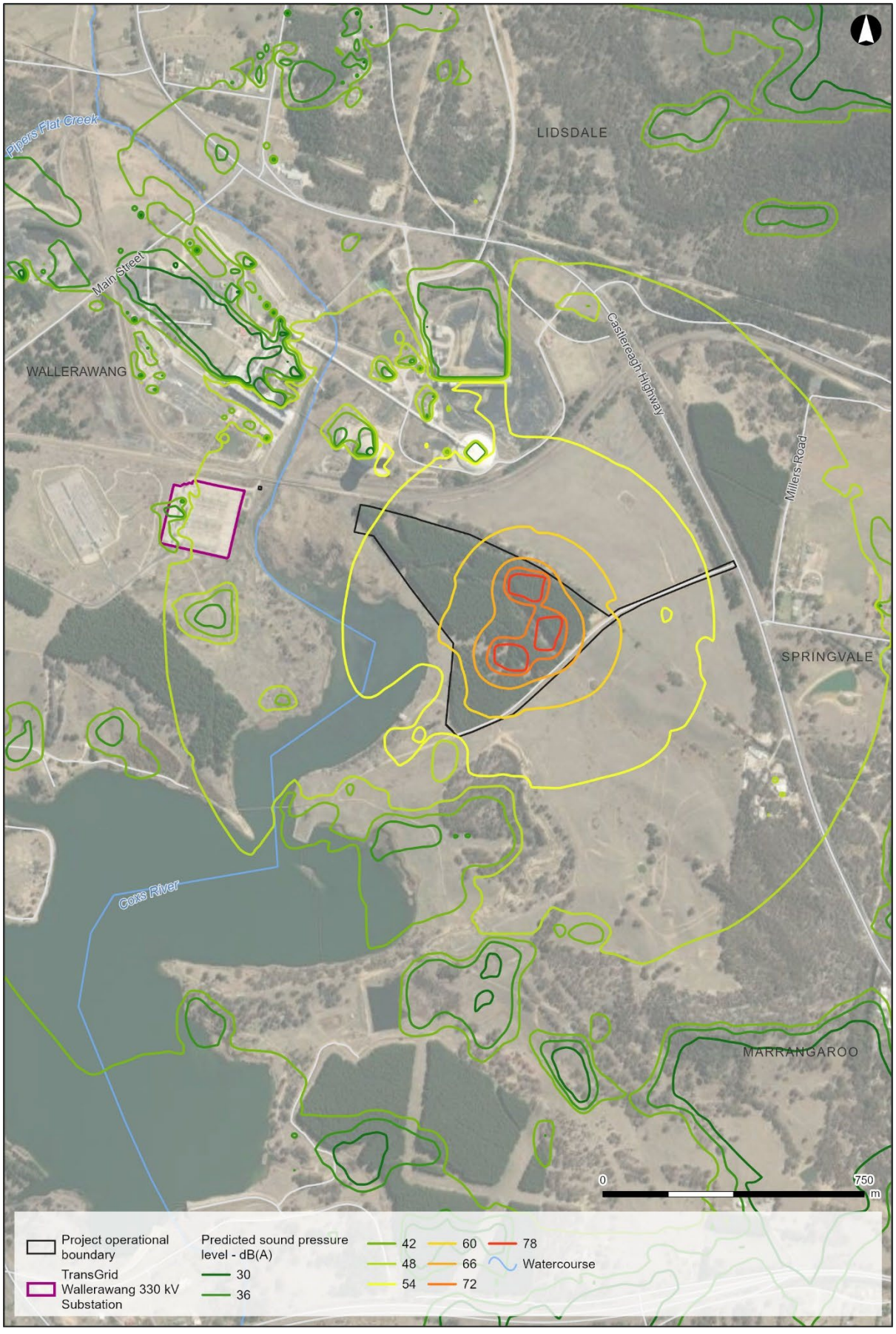


Figure 9-2 Scenario 1 - Predicted operational noise levels overview (including tonality penalty)

The assessment of Scenario 1 identified a number of exceedances of the established noise criteria, particularly during the night-time period. On the basis of the predicted exceedances, it was identified that design refinements and further refinement of the operational noise scenarios were required to reflect realistic operational conditions and to achieve compliance.

Design refinements and the predicted operational noise outcomes with further refinement of the operational scenarios is presented in the following sections.

Design refinements

Based on the predicted noise levels for Scenario 1, design refinements were made to the indicative design to reduce the potential noise impacts to nearby receivers.

These design refinements are based on the sound power levels of the current indicative battery solution and are intended to demonstrate that acceptable noise outcomes could realistically be achieved. The current indicative battery solution is subject to change based on commercial and contractual considerations. Sound power levels for the final design would be updated and the potential noise impacts reassessed as required. The final layout including the location of battery units and noise walls would also be refined further during detailed design and would achieve compliance with the predicted noise levels in this assessment.

Source controls (reduction in sound power level)

The major contributing factor to noise from the Project is the cooling system which includes fans. The Scenario 1 noise level predictions assumed a maximum 80% fan duty. To further optimise acoustic predictions, thermal load modelling was undertaken using temperature data of the surrounding area. Based on historic climatic conditions, the units are expected to operate at 20% fan duty most of the time, with periods of 40% fan duty when under load or when there are warmer ambient conditions during the day and evening periods. During the night-time period, the units would generally operate at 20% fan duty with the exception of around 1.65 days per year (during particularly warm periods), where they would operate at 40% fan duty.

To assess a realistic ‘worst case’ scenario, the potential impacts of 40% fan duty has been assessed. However, potential impacts of 20% fan duty has also been assessed to identify the ‘standard’ operational conditions.

Site layout

Based on the current indicative battery solution, to further reduce potential impacts, megapacks and transformers should be divided evenly into clusters with increased setback distances from the nearest and most potentially affected receivers. This layout has been modelled for the purpose of this assessment; however, the final layout may vary subject to detailed design and would aim to achieve the project specific criteria identified in this report.

Path controls (noise barriers or mounds)

Based on the current indicative battery solution each cluster should have a minimum five metre high, solid barrier with a minimum surface mass of 15 kg/m^2 on the eastern, northern and southern edges. The final noise barrier solution would be refined as part of the detailed design process.

Scenario 2: 40% fan duty and noise barriers

Noise contours, showing an overview of the predicted operational noise levels operating at 40% fan duty with the noise barriers in place is provided in Figure 9-3.

Based on the predicted noise levels the following key observations have been made relating to operational noise criteria for Scenario 2. These are summarised in Table 9-9.

- Exceedances of the daytime criterion are predicted at 14 Millers Road, 32 Millers Road, 14 Springvale Lane, and 31 Springvale Lane ranging between 1 dB to 3 dB. An exceedance of 4 dB is predicted at 4 Millers Lane.
- Exceedances of the evening criterion are predicted at 12 receivers located on Castlereagh Highway, Springvale Lane, Millers Road and Millers Lane ranging between 2 dB and 5 dB.
- Exceedances of the night-time criterion are predicted at 38 receivers within Wallerawang Township to the west (Talia Place, Wolgan Road, Blaxland Street, Koolyn Place, Kremer Crescent, Blackett Drive, Blaxland Street, Curringa Place, Walker Drive, Pindari Place, Duncan Street, James Parade, Skelly Road and Main Street). The exceedances range between 1 dB and 3 dB, with an average exceedance of 1.5 dB.
- Exceedances of the night-time criterion are predicted at 10 receivers to the east located on Great Western Highway, Castlereagh Highway, Springvale Lane, Millers Road and Millers Lane ranging between 1 dB and 6 dB, with an average exceedance of 2.6 dB.
- The operation of the BESS facility would result in steady state continuous noise emissions without impulsive noise events. Therefore, the Leq based assessment would control the mitigation outcomes and sleep disturbance impacts are not anticipated on this basis.
- No non-residential / rural primary production receivers are predicted to exceed the established criteria.

Table 9-9 Potential noise impacts under Scenario 2

Assessment period	Number of residences where exceedances are predicted	Level of exceedance (dB(A))
Day	4	1 to 3
	1	4
Evening	12	2 to 5
Night	38	1 to 3 (east of Project) average 1.5
	10	1 to 6 (west of Project) average 2.6

The average predicted exceedance for Scenario 2 is 1.5 dB(A) to the west and 2.6 dB(A) to the east. Typically, these exceedances would be considered *not perceptible / just perceptible*, but for receivers located closest to the site with exceedances up to 6 dB(A), these are considered clearly noticeable,

Potential impacts from Scenario 2 are considered to be a realistic 'worst case' scenario. However, given that the conservative assumptions have been used for this Scenario, impacts would likely be less than this and the units would only operate at 40% fan duty for some of the time. It should be noted that the indicative battery solution is only expected to operate at 40% fan duty during the night-time period for up to 1.65 days per year.

Most of the exceedances would be *not perceptible/ just perceptible*. The battery unit cooling systems would operate in cycles and while the fan duty noise would be steady state in nature, fans would not be continuously operating at all times.

There is potential for the final selected battery solution to have a lower sound power level than those used in this assessment and the Project would aim to further reduce the number and magnitude of

exceedances during the detailed design phase. Optimisations to site layout may also assist in further reducing or eliminating potential exceedances. As such, this scenario is considered a worst-case outcome. If optimisation during detailed design is unable to eliminate these potential exceedances, the facility would be operated with limitations on fan duty to ensure full compliance with the project specific noise criteria.

Scenario 3: 20% fan duty and noise barriers

Noise contours, showing an overview of the predicted operational noise levels operating at 20% fan duty with the noise barriers in places is provided in Figure 9-4.

Based on the predicted noise levels potential impacts under Scenario 3, the following key observations have been made relating to operational noise for the controlling night-time assessment period for this scenario. Potential impacts are summarised in Table 9-10.

- No exceedances of the daytime criterion are predicted.
- No exceedances of the evening criterion are predicted.
- No exceedances of the night-time criterion are predicted.
- The battery enclosures are expected to operate at 20% fan duty for approximately 99.55% of the standard calendar year during the night time period.
- The operation of the BESS facility would result in steady state continuous noise emissions without impulsive noise events. Therefore, the Leq based assessment would control the mitigation outcomes and sleep disturbance impacts are not anticipated on this basis.
- No non-residential / rural primary production receivers are predicted to exceed the established criteria.

Table 9-10 Potential noise impacts under Scenario 3

Assessment period	Number of residences where exceedances are predicted	Level of exceedance
Day	0	-
Evening	0	-
Night	0	-
	0	-

This assessment and scenario shows that compliance with Project criteria could be achieved with 20% fan duty (which would occur for the majority of the time for this battery solution).

The purpose of this scenario is to demonstrate that practical compliance with Project criteria may be achieved with an alternative site layout and alternative battery solutions.

Detailed design will ensure compliance with the Project specific noise criteria. If and where required, this will include adjustments to the choice of equipment and/or refinements to the facility layout.

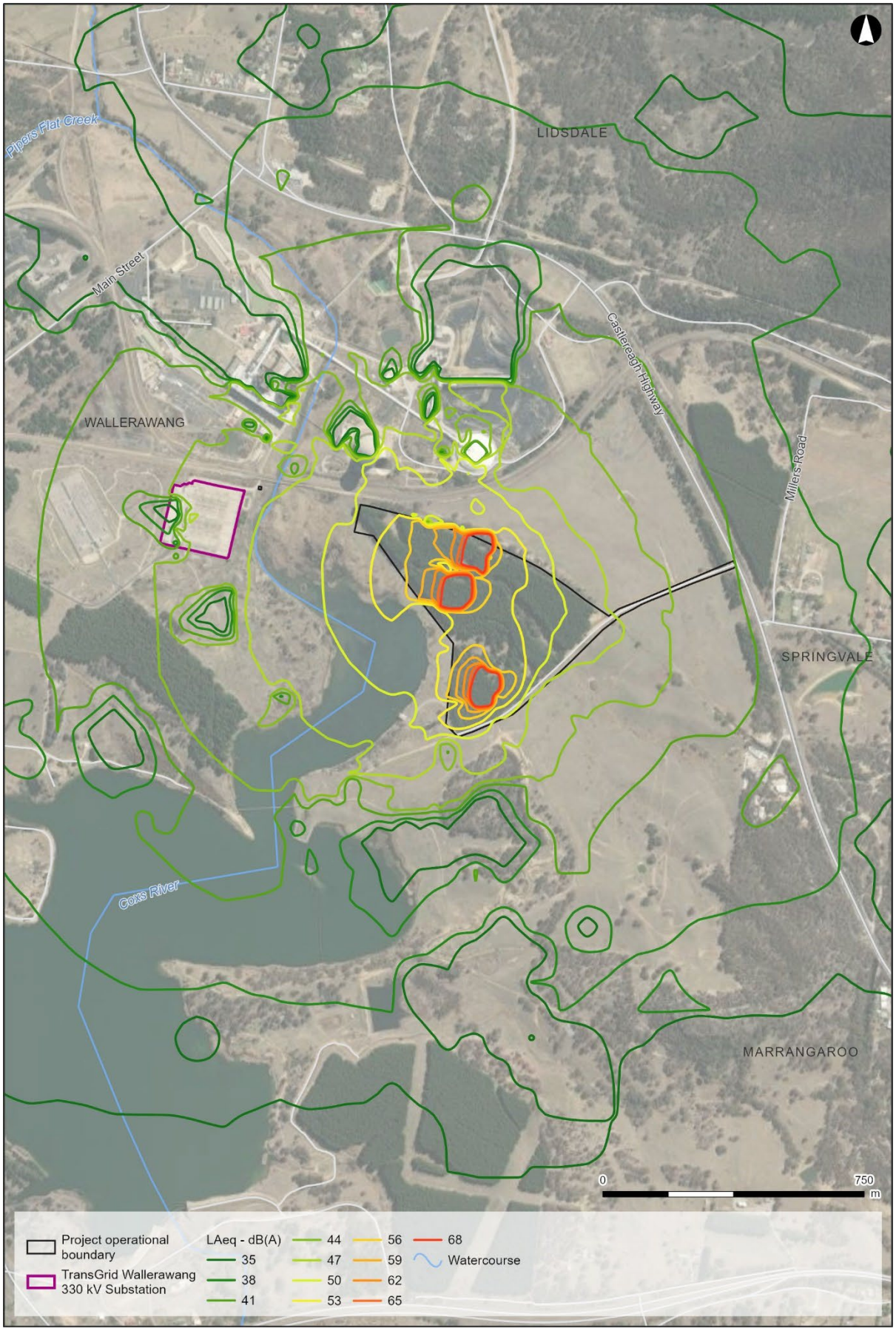


Figure 9-3 Scenario 2 – Predicted noise contours at 40% fan duty

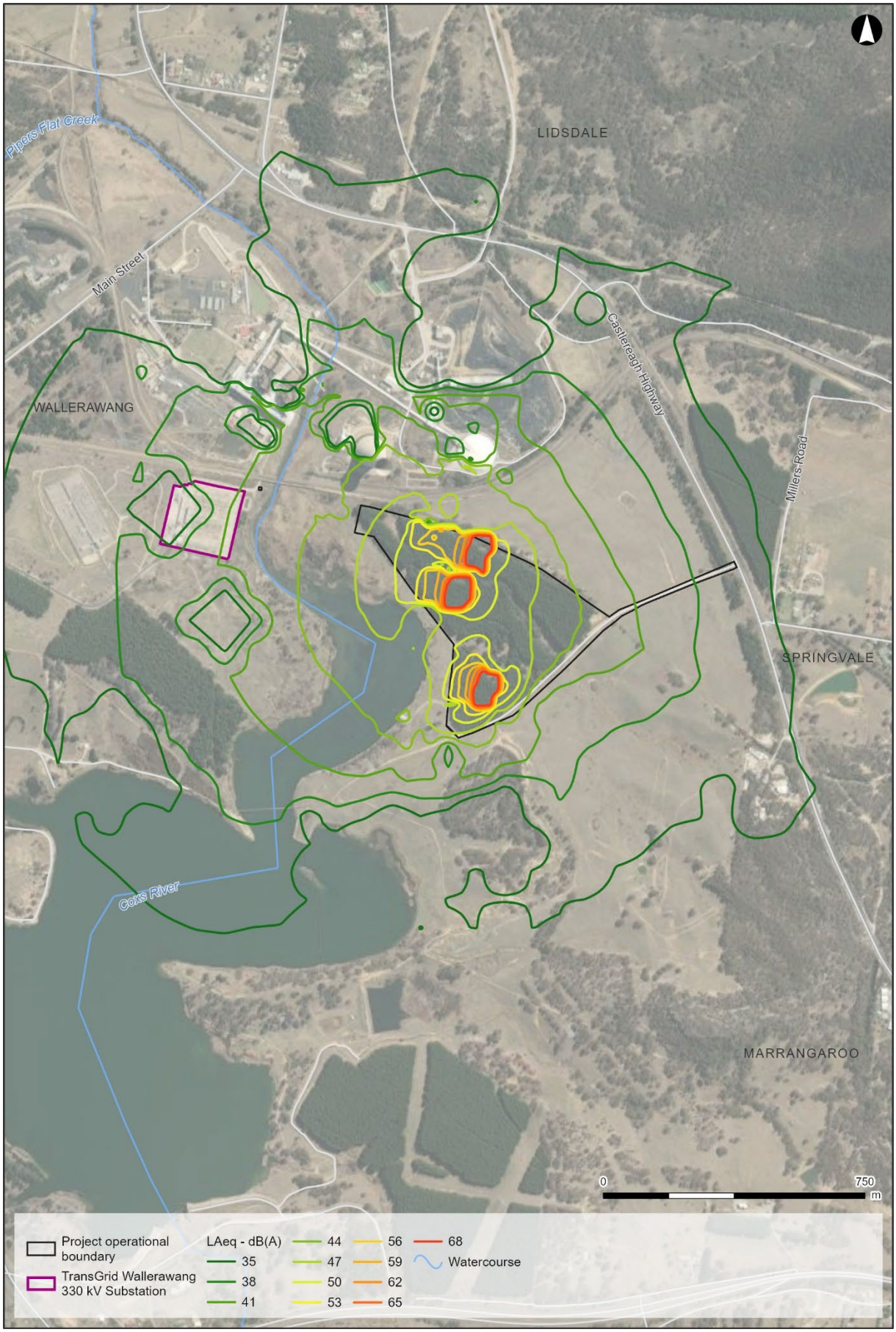


Figure 9-4 Scenario 3 – Predicted noise contours at 20% fan duty

9.4 Mitigation measures

This section details the mitigation measures that would be implemented to minimise the potential impacts from Noise and Vibration of the Project.

Table 9-11 Noise and Vibration mitigation measures

Reference	Management measure
Detailed Design	
NV1	Detailed design will aim to ensure compliance with the Project specific noise criteria. If and where required, this will include adjustments to the choice of equipment and/or refinements to the facility layout or mitigation that does not introduce additional environmental impact. If full compliance is unable to be achieved in detailed design optimisation, management measure NV8 will apply.
Construction	
NV2	The community consultation developed and implemented for the Project would include a procedure for notifying noise-sensitive receivers about the works and their expected duration.
NV3	Prepare and implement a Construction Noise and Vibration Management Plan (CNVMP) as part of the CEMP that identifies feasible and reasonable approaches to reduce noise and vibration impacts during construction of the Project.
NV4	Implement a 24-hour hotline and complaints management procedure for noise and other construction related complaints
NV5	Works will be programmed to occur during standard working hours only. These hours are: • 7 am to 6 pm, Monday to Friday • 8 am to 1 pm, Saturday • No work on Sundays or public holidays. If works must occur out of hours for justified reasons (e.g. worker safety or reduction of impact on traffic), preference will be given to day and/or evening time works (i.e. between 7 am and 10 pm). Out of Hours works will be separately assessed with appropriate noise mitigation and community consultation implemented as necessary based on the level of predicted impact.
NV6	Worksite induction training and 'toolbox talks' will include education for workers on noise issues related to the site (e.g. workers will be advised to avoid shouting or whistling on-site near sensitive receivers).
Operation	
NV7	The OEMP will include measures and processes for managing noise resulting from the operation of the Project, including a process for managing complaints.
NV8	If compliance with the project specific noise criteria is unable to be achieved through detailed design, the facility will be operated with limitations on fan duty to ensure full compliance.

10 Soils and contamination

This section of the EIS provides an assessment of the potential soils and contamination impacts associated with the Project.

A summary of the relevant SEARs and where they are addressed in this section is provided in Appendix A.

10.1 Methodology

10.1.1 Guidelines

The soils and contamination assessment has been undertaken in consideration of the following guidelines:

- *Managing Land Contamination: Planning Guidelines SEPP 55 – Remediation of Land* (Department of Urban Affairs and Planning and Environment Protection Authority, 1998)
- *National Environment Protection (Assessment of Site Contamination) Measure* (National Environment Protection Council, 2013)
- *Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997* (NSW EPA, 2015).

10.1.2 Desktop assessment review

A desktop review was carried out on 22 June 2021 to identify the soils, geological characteristics and potential for contamination at Project Site. The assessment consisted of a review of various database searches and a review of publicly available information. This included:

- A review of the *Acid Sulfate Soil Risk Maps* (NSW DPIE, 2019) and CSIRO's Australian Soil Resource Information System Map (ASRIS, 2011)
- A search of the NSW EPA's Contaminated Land Records and notified sites list (NSW EPA, 2021)
- A review of the environmental setting with regards to geology, topography, hydrology, hydrogeology and groundwater
- A review of available zoning plans to determine potentially contaminating activities that may have occurred on the Project Site
- An evaluation of aerial photographs to assist in assessing historical land uses and conditions within and surrounding the Project Site.

10.1.3 Legislation review

The planning and development control process as provided for in the EP&A Act plays an important role in the management and remediation of land contamination. A review of the *State Environmental Planning Policy 55 – Remediation of Land (SEPP55)* has assisted the planning and development control process of land contamination management and will:

- Ensure that changes of land use will not increase the risk to human health or the environment
- Avoid inappropriate restrictions on land use
- Provide information to support decision making and to inform the community.

A key document that is associated with SEPP 55 is *'Managing Land Contamination Planning Guidelines'* by the Department of Urban Affairs and Planning and EPA (1998). This guideline has been reviewed to determine whether the Project Site may potentially be contaminated and need remediation. This is further discussed in Section 10.2.2.

10.2 Existing environment

10.2.1 Soils and geology

The existing soils and geology of the site are described in Table 10-1.

Table 10-1 Soil and geology existing environment

Aspect	Characteristics
Topography	The Project Site is approximately 880 m AHD and is charactered as being relatively flat with surrounding gentle hills. The western side of the Project Site gradually slopes down to the Coxs River and Lake Wallace which lie to the west of the Project Site.
Soil Types	The Project Site is located in the south-western extent of the *Soil Landscapes of the Wallerawang 1:100,000 Sheet*[2] *(DPIE, 2021)* and within the Lithgow soil landscape grouping. This is characterised by flat to undulating rises and broad valley floors on Illawarra Coal Measures and the Berry Formation. Local relief is to 20 m with an elevation of approximately 800-1000 m. Soils are moderately deep (<120 centimetres (cm)) and comprise Red Podzolic Soils, Yellow Podzolic Soils and Yellow Leached Earths on the upper slopes and well drained areas. On the lower slopes and in areas of poor drainage, the soils are moderately deep to deep (>170 cm) and comprise Solods/yellow Solodic Soils.
Acid Sulfate Soils	Acid Sulfate Soils are naturally occurring sediments which contain iron sulphides and when exposed to air, oxidation of the iron sulfide minerals produces sulphuric acid. The released acid has potential to acidify groundwater and to corrode concrete and steel structures. A review of the Australian Soil Map Classification (ASRIS, 2021) indicated the Project Site is located in an area predicted to have a low probability and low confidence of acid sulfate soil. A review of *Acid Sulfate Soil Risk Maps* (NSW DPIE, 2019) indicated no acid sulfate soils are present within the area.
Salinity	Salinity refers to the accumulation of salts in the landscape. A review of the Lithgow LEP mapping (2014) indicated the Project Site is in an area that is predicated to have a low salinity occurrence. The Soil Map Classification (ASRIS, 2011) indicated that electric conductivity layers of the surface soil have not been recorded.
Geology	A review of the geology mapping (1:100,000 Western Coalfield geological map Department of Mineral Resources, 1992) for the region indicates that the Project Site is located within the Sydney Basin underlain by Permian age siltstone, lithic sandstone and conglomerate of the Shoalhaven Group.
Hydrogeology	The regional aquifer is likely to slope to the east within this region. The Project Site groundwater is likely to slope towards the Coxs River and Lake Wallace, to the west of the site. ERM (2020) determined groundwater levels ranged from 1 metre below ground level (mbgl) to 4 mbgl at the Wallerawang Power Station site.

[2] https://data.nsw.gov.au/data/dataset/soil-landscapes-of-the-wallerawang-1-100000-sheet8844c/resource/ba2f1ecd-3547-4a9a-9d47-7121f9ec573d

Aspect	Characteristics
Hydrology	The nearest waterways to the Project Site are Coxs River and Lake Wallace, a part of the Upper Coxs River Catchment. More details relating to hydrology of the Project Site is provided in Section 16.
Groundwater use	Bores recorded by NSW Natural Resource Atlas (NR Atlas, 2020) identified 22 groundwater bores within a 10 km radius of the Project Site that range from 1 mbgl to 33 mbgl. These bores are predominantly used for industrial and agricultural uses.
Previous land use	The surrounding area is characterised by past industrial and agricultural activities that dominated in the 20th century. More detail of previous land use is provided in Section 22 and Appendix L of this EIS.

10.2.2 Potential contamination

The EPA publishes a list of notified contaminated sites each month. This includes sites that have been notified to the EPA as being potentially contaminated, under Section 60 of the *Contaminated Land Management (CLM) Act 1997*. A search of the NSW EPA Contaminated Land Records[3] for the Project Site was undertaken on 22 June 2021 (NSW EPA, 2021). The Project Site was not listed on the EPA list of contaminated sites in NSW. However, both the Wallerawang Power Station and Lidsdale Coal Loading Facility are listed on the NSW EPA Contaminated Land Record, although neither require regulation under the CLM Act.

The Wallerawang Power Station is located about 100 metres north of the Project Site at its closest point. It should be noted, continuous monitoring and reporting at the Wallerawang Power Station site has been historically undertaken to ensure any potential elevated concentrations of substances were maintained and monitored.

SEPP55 and Managing Land Contamination Planning Guidelines

The Project Site has played part in the history of the Wallerawang region, due to its associations with pastoralism and industry. Analysis of historical resources and historical aerial imagery indicate that the Project Site and surrounding vicinity was primarily used as grazing paddocks, for railway and Power Station infrastructure in early 1820s through to 1950s and as a pine plantation from the 1980s.

SEPP55 and the Manging Land Contamination Planning Guidelines (DUAP, EPA, 1998) was reviewed and evaluated against the criteria provided in the guideline to determine whether potential contamination may be present. As the history of Project Site is known and has been largely unused for approximately past 100 years, it is not considered to be a contaminated land area.

10.2.3 Sensitive receiving environments

Sensitive receiving environments in the vicinity of the Project Site that could be affected by potential soil impacts include:

- Coxs River located about 150 metres to the west of the Project Site
- Lake Wallace located about 30 metres to the south-east of the Project Site.

Potential impacts from the Project on these sensitive receiving environments are discussed in Section 10.3.

[3] https://www.epa.nsw.gov.au/your-environment/contaminated-land/notified-and-regulated-contaminated-land/list-of-notified-sites

10.3 Potential impacts

10.3.1 Construction

Erosion and sedimentation

Construction of the Project would involve excavation and earthmoving and some clearing of vegetation. These activities would expose the soil surface and subsurface and increase the risk of erosion and sedimentation and potential impacts on the sensitive receiving environments, including impacts on water quality in the Coxs River and Lake Wallace, if not managed appropriately.

Stockpiling of spoil and topsoil as a result of the earthwork may be required temporarily and may also result in sedimentation downstream of the stockpile, if not managed appropriately.

During construction erosion and sediment controls would be managed in accordance with the *Managing Urban Stormwater: Soils & Construction* (Landcom, 2004).

Acid sulfate soils

As defined in the *NSW EPA Waste Classification Guidelines Part 4: Acid Sulfate Soils* (2014), acid sulfate soils are those naturally occurring sediments and soils which contain sulfides, mainly iron sulfide and iron disulfide or their precursors. The risk of exposing potential and/or actual acid sulfate soils may cause major environmental, agricultural and structural impacts in affected areas if not adequately managed. Potential impacts may include:

- Negative impacts to ecosystems
- Impacts on vegetation growth and agricultural productivity
- Structural damage and corrosion of steel and concrete structures.

The risk of exposing potential and/or actual acid sulfate soils is considered to be low, given the location of the Project and the low / nil potential for acid sulfate soils to be present on the Project Site.

Contamination

As outlined in Section 10.2.2, the potential for contamination to occur at the Project Site is considered to be low. Exposure to previously buried contamination can create potential exposure pathways that lead to risks to both human health and the environment. Potential exposure pathways for contamination may include:

- Direct dermal contact with contaminated soil or groundwater
- Inhalation of contaminated dust or vapour
- Ingestion of contaminated dust
- Mobilisation and / or exposure of contaminants in soil or groundwater through construction activities
- Some construction activities may pose a risk of causing contamination, if not managed appropriately.

During construction, fuels and chemicals required for construction may be stored at the construction compound on a temporary basis. There is potential for fuels and chemicals to spread to the surrounding environment, including the soil and the Coxs River, through spills and leaks if not appropriately managed.

Any disturbances to soil and groundwater contamination would be managed via the mitigation measures identified in Section 10.4.

10.3.2 Operation

Erosion and sedimentation

The Project Site would minimise sedimentation risks during operation by diverting and distributing stormwater via a management system, as further addressed in Section 16 (Water quality and flooding). This system would be designed to avoid sedimentation impacts (Section 16.3) and it is not anticipated that operations would impact on Project Site soils.

Acid sulfate soils

Given that the presence of acid sulphate soils within the Project Site is considered to be low / nil, it is not anticipated that operation of the Project would disturb any acid sulphate soils.

Contamination

The Project includes the operation of BESS and other electrical transmission infrastructure which are considered low risk in terms of the potential for contamination. The operation of the Project is not anticipated to result in contamination impacts.

Potential for contamination from spills and leaks from operation and maintenance would be addressed through the mitigation measures presented in Section 16.4 and potential for contamination from stormwater contaminants would be addressed by the mitigation measures presented in Section 16.

10.4 Mitigation measures

Based the predicted low chance of contamination, the Project Site is considered suitable for the construction and operation of the Project, and it is unlikely that the Project Site will need to be remediated prior to construction. Additionally, the mitigation measures proposed will minimise any potential impacts that may arise through construction and operation.

Table 10-2 Soil and contamination mitigation measures

ID	Mitigation Measures
Construction	
SC1	A detailed Erosion and Sediment Control Plan (ESCP) as part of the CEMP, in accordance with *Managing Urban Stormwater – Soils and Construction, Volume 2D* (Landcom, 2004).
SC2	An Unexpected Finds Protocol will be included in the CEMP to manage any disturbance of material that is odorous, stained or containing anthropogenic materials, in the event these are encountered during construction
Operation	
SC3	The OEMP prepared for the Project will include measures to manage any spills that occur during operation.

11 Biodiversity

This section of the EIS provides a summary of potential biodiversity impacts associated with the Project. The assessment presented in this section draws on information provided by the Biodiversity Development Assessment Report (BDAR) (Arcadis, 2021) The BDAR is included in Appendix E of the EIS.

A summary of the relevant SEARs and where they are addressed is provided in Appendix A.

11.1 Methodology

A Biodiversity Development Assessment Report (BDAR) was prepared by an accredited assessor in accordance with the Biodiversity Assessment Method (BAM) as prescribed under Section 6.7 of the *Biodiversity Conservation (BC) Act 2016*. Assessments of potential impacts to Matters of National Environmental Significance (MNES) identified under the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* have been prepared in accordance *with Matters of National Environmental Significance: Significant Impact Guidelines 1.1* (Commonwealth of Australia, 2013).

The methodology implemented in the BDAR for the Project includes:

- Database searches of:
  - NSW BioNet Wildlife Atlas (BioNet), including Threatened Species Data Collection (TSDC)
  - NSW BioNet Vegetation Information System (VIS) Classification database
  - Protected Matters Search Tool (PMST)
  - NSW WeedWise
  - Fisheries NSW Spatial Data Portal
  - NSW DPI's register of critical habitat
- Review of vegetation maps, topographic maps, aerial photography, reports and published literature
- Assessments of potential impacts to Matters of National Environmental Significance (MNES)
- Potential impacts to Key Fish Habitat and any threatened species listed under the *Fisheries Management (FM) Act 1994*
- Aquatic habitat values assessed against the *NSW Department of Primary Industries Policy and Guidelines for Fish Habitat Conservation and Management* (DPI, 2013).
- Field surveys undertaken between February 2021 and April 2021, including:
  - Random meander surveys to verify vegetation communities and the condition of vegetation across accessible land within the Project Site and adjacent areas
  - Vegetation integrity plots involving quantitative (quadrat/transect) site surveys in accordance with the BAM
  - Floristic analysis of vegetation plot data to determine vegetation community and plant community types (PCTs)
  - Targeted flora and fauna surveys for species identified through the desktop assessment as considered likely to occur in areas that may be impacted by the Project.

The BDAR study area (study area) encompasses approximately 61.58 hectares and included the area located immediately south of the former Wallerawang Power Station site. The study area is defined as all areas which have been surveyed as part of this assessment, including the construction area and the operational footprint. The study area is shown on Figure 11-1 and Figure 11-2.

11.2 Existing environment

11.2.1 Landscape values

IBRA bioregions

The Project Site lies within two Interim Biogeographic Regionalisation of Australia (IBRA) bioregions:

- *The South Eastern Highlands Bioregion*
- *The Capertee Uplands Subregion.*

In accordance with the BAM, separate species and plant community types (PCTs) have been split and assessed according to their IBRA bioregion association.

NSW landscape region

The Project Site is located within the Capertee Plateau Mitchell Landscape (SB Capertee Cpt). The Capertee Plateau Mitchell Landscape is characterised by wide valleys, low rolling hills below sandstone cliffs on Permian conglomerates, sandstones, and shales with coal at the base of the Sydney Basin and exposure of underlying Devonian shale, siltstone, or quartzite (DPIE, 2016).

Cleared areas

The study area for the BDAR comprises approximately 61.58 hectares of which 27.24 hectares is 'cleared areas'. The cleared areas are dominated by exotic vegetation and have been historically cleared and highly disturbed. This vegetation type is not representative of any PCT known from the Capertee Uplands subregion, nor does it conform with the definition of any TECs listed under the BC Act or EPBC Act.

Weeds

Twenty-six exotic species were located in all vegetation zones across the Project Site.

Two are listed as Priority Weeds under the *NSW Biosecurity Act 2015* for the Central Tablelands region, which includes the City of Lithgow LGA:

- *Rubus fruticosus sp. agg.* Blackberry complex
- *Salix fragilis* Crack Willow.

Blackberry complex is also listed as a Weed of National Significance (WoNS).

Feral fauna

Feral fauna refers to significant pest animals as described by DPIE. Two introduced feral fauna species, the European Rabbit and European Red Fox, were recorded within the Project Site during surveys.

In addition, five introduced (exotic) fauna, the Common Blackbird (*Turdus merula*), Common Starling (*Sturnus vulgaris*), House Sparrow (*Passer domesticus*), Red-whiskered Bulbul (*Pycnonotus jocosus*) and House Mouse (*Mus musculus*) were recorded.

Rivers, streams and wetlands

The Project Site is located within the Warragamba Catchment which stretches north of Lithgow to the head of the Coxs River and south of Goulburn along the Mulwaree River. In total, the Catchment covers an area of 9,050 km^2. The study area also receives water as part of the Fish River water supply scheme.

The Coxs River, a perennial river within the Hawkesbury-Nepean system, runs through the western extent of the Project Site and is a sixth order stream according to the Strahler stream classification system. The Coxs River is impounded at Lake Wallace to form a cooling source for the former Wallerawang Power Station, and downstream at Lake Lyell where it is used for water supply. The Coxs River and Lake Wallace are both mapped both as a 'Sensitive Waterway' under the Lithgow LEP and Key Fish Habitat (DPI, n.d.).

Both Lake Wallace and the Coxs River provide habitat for threatened and/or migratory birds, some of which were recorded during the current surveys.

An ephemeral creek is located within the forestry area (Section 16 Water quality, flooding) but has not been identified as key fish habitat. The creek is largely infested with weeds, including Blackberry and is considered to be of low habitat value.

The Project Site does not support any wetlands, including wetlands listed under the *State Environment Planning Policy (Coastal Management) 2018* (Coastal Management SEPP) or important wetlands listed in the Directory of Important Wetlands in Australia (DIWA). No wetlands of international importance (Ramsar) are located within or near the study area.

Connectivity features

The BAM (DPIE, 2020) defines connectivity as a measure of the degree to which an area(s) of native vegetation is linked with other areas of vegetation. Patches of remnant vegetation within the BDAR study area have been fragmented and exist in narrow, isolated bands along the Castlereagh Highway, east of the Pine Plantation, and adjacent to the Coxs River/Lake Wallace in the western extent of the site.

The Castlereagh Highway, the existing infrastructure of the old Wallerawang Power Station, the cleared areas and surrounding rural and residential development provide potential barriers to habitat connectivity and are likely restrict connectivity to more mobile fauna (e.g. birds and bats).

Areas of geological significance and soil hazard features

The BDAR study area does not contain any areas of geological significance, including crevices, cliffs, karst, or caves. The nearest areas of geological significance lie approximately 700 metres to the west of the Project Site, on the Newnes Plateau.

The study area is situated on three soil landscape types 'Lithgow', 'Cullen Bullen' and 'Disturbed Terrain' (DPIE, 2021c). The Lithgow soil landscape type predominately covers the area between the Castlereagh Highway and western edge of the pine plantation, while the Cullen Bullen soil landscape covers areas around the Coxs River/Lake Wallace, and Disturbed Terrain is in the northern extent of the study area, adjacent to the former Wallerawang Power Station.

Areas of Outstanding Biodiversity Value

Areas of Outstanding Biodiversity Value (AOBVs), as defined under the BC Act, are currently limited to areas previously declared as critical habitat under the TSC Act. No AOBVs occur within or surrounding the study area. The closest AOBV to the study area is the Wollemi Pine declared area (critical habitat of the critically endangered Wollemi Pine in Wollemi National Park), approximately 56 kilometres north-east of the study area.

11.2.2 Flora

Native vegetation

Following the vegetation surveys, three native Plant Community Types (PCTs) were identified within the Project Site. These are listed in Table 11-1 and shown in Figure 11-1.

Table 11-1 PCTs within the study area from ground-truthed vegetation mapping

PCT No.	PCT Name	Area within study area (ha)
677	Black Gum grassy woodland of damp flats and drainage lines of the eastern Southern Tablelands; South Eastern Highlands Bioregion	2.4
732	Ribbon Gum grassy open forest in the north east of the South Eastern Highlands Bioregion	0.2
1299	Wetlands on alluvial valley floors of the South Eastern Highlands Bioregion	5.08
Total		**7.68**

Two vegetation types that do not conform to the definition of any PCTs were also identified within the study area. These vegetation types were cleared exotic grassland and exotic roadside vegetation.

Threatened Ecological Communities

A search of the BioNet identified six Threatened Ecological Communities (TECs) that are predicted to have the potential to occur within 10 kilometres of the study area. The PMST identified that three TECs listed under the EPBC Act are predicted to occur within one kilometre of the Project Site:

- *Natural Temperate Grassland of the South Eastern Highlands* – critically endangered under the EPBC Act
- *Upland Basalt Eucalypt Forests of the Sydney Basin Bioregion* – endangered under the EPBC Act
- *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 under the BC Act and EPBC Act.

None of the vegetation identified at the Project Site is equivalent to any TEC listed under the BC Act or the EPBC Act.

Threatened flora

The candidate threatened species for assessment in BDAR were identified using the Biodiversity Assessment Method Calculator and also through a review of database searches (BioNet, PMST). These database searches informed the field surveys.

Targeted surveys recorded two threatened flora species listed as vulnerable under the BC Act and EPBC Act:

- *Eucalyptus aggregata*
- *Eucalyptus pulverulenta*.

11.2.3 Fauna

Key terrestrial fauna habitat

The key terrestrial fauna habitat types identified for the Project include:

- Woodland including scattered eucalyptus trees located near the forestry area within the central portion of the Project Site and adjacent to the Castlereagh highway verge
- Cleared grassland which occurs mostly in the eastern portion of the Project Site.

Threatened fauna species

The Biodiversity Assessment Method Calculator (BAMC) identified a total of 13 threatened fauna species with potential to occur within the study area. This includes six species or dual credit species. The full list of species is provided in Appendix E.

Ten threatened and/or migratory fauna species were recorded within the study area during the surveys. Threatened fauna species recorded in the Project Site are shown in Figure 11-2.

This was refined to two species considered likely to occur within the study area during desktop research based on available information on the PCTs present and other habitat information.

The two fauna species listed as threatened under the EPBC Act were recorded within the study area during surveys. Both are listed as vulnerable under the BC act and EPBC Act:

- Grey-headed Flying Fox
- Large-eared Pied Bat.

Serious and irreversible impact species

Two species recorded during surveys are listed as potential serious and irreversible impact species:

- Grey-headed Flying Fox
- Large-eared Pied Bat.

Serious and irreversible impacts for these species is any impact to breeding habitat.

Large-eared Pied Bat habitat

DPIE's Threatened Biodiversity Data Collection (TBDC) states that the species polygon for the Large-eared Pied Bat should align with PCTs on the subject land to which the species is associated and that are within two kilometres of identified potential roost features. PCT 732 is listed in the TBDC for the species, however this PCT is located outside of the Project construction footprint.

The Large-eared Pied Bat was recorded within PCT 677, a PCT which is not associated with the species. Based on advice from the DPIE BAM Support Team, PCT 677 should be included within the species polygon.

PCT 732 is shown as habitat for the Large-eared Pied Bat, and PCT 677 has been included in the species polygon. Both areas are shown in Figure 11-2.

11.2.4 Migratory species

During the site survey, one individual of Latham's Snipe (*Gallinago hardwickii*) was flushed from a small farm dam located adjacent to the Project Site and was not within the BDAR survey area. Latham's Snipe is a migratory species listed under the EPBC Act (Figure 11-2).

11.2.5 Groundwater dependant ecosystems

Groundwater dependent ecosystems (GDEs) are ecological communities that are dependent, either entirely or in part, on the presence of groundwater for their health or survival. A review of the BoM GDE identified that there are no potential terrestrial or subterranean GDE's within the Project Site. There is one moderate potential aquatic GDE within the Project Site along Coxs River. No other potential GDEs are located within close proximity to the Project Site.

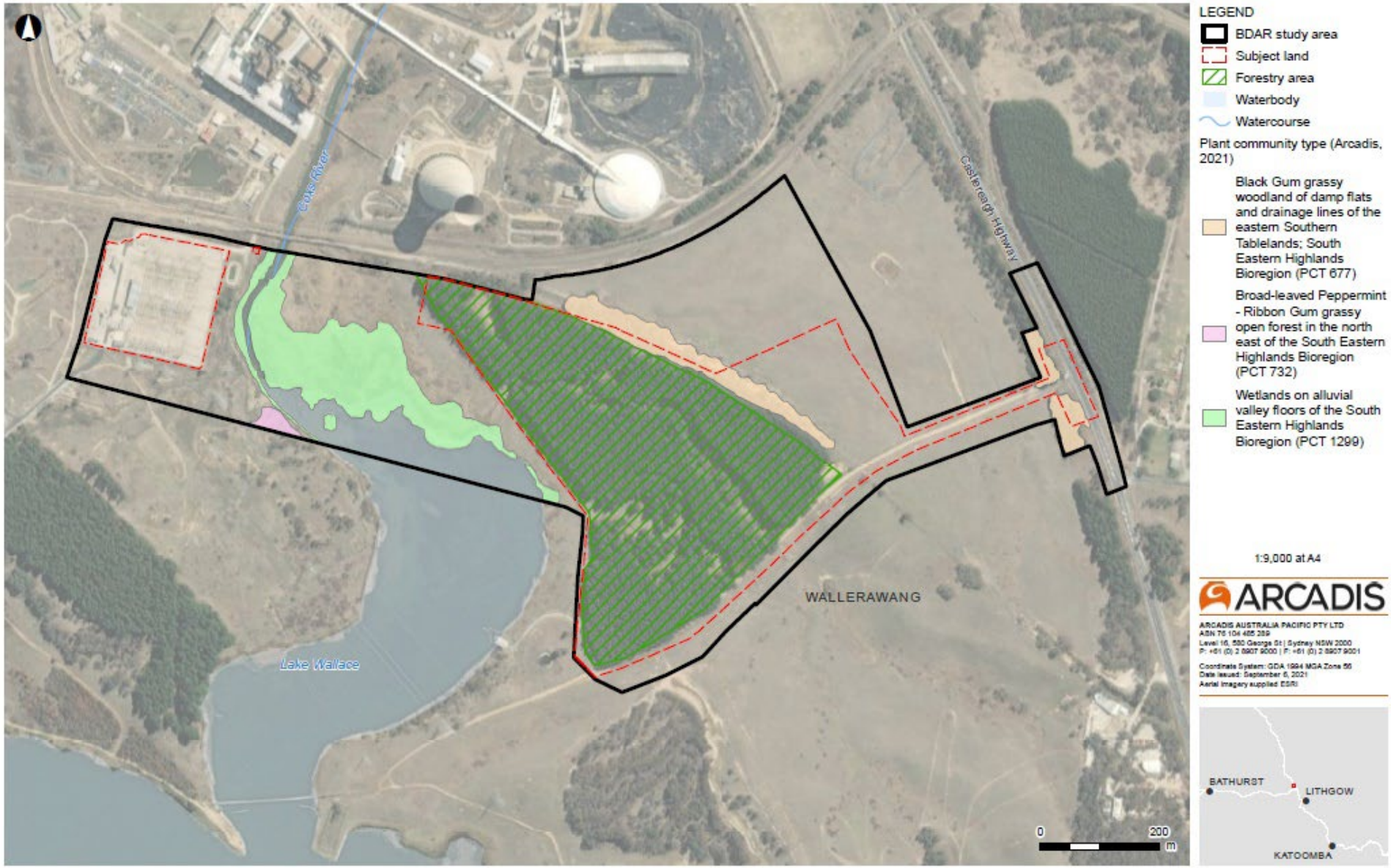


Figure 11-1 Plant Community Types located within the Project Site

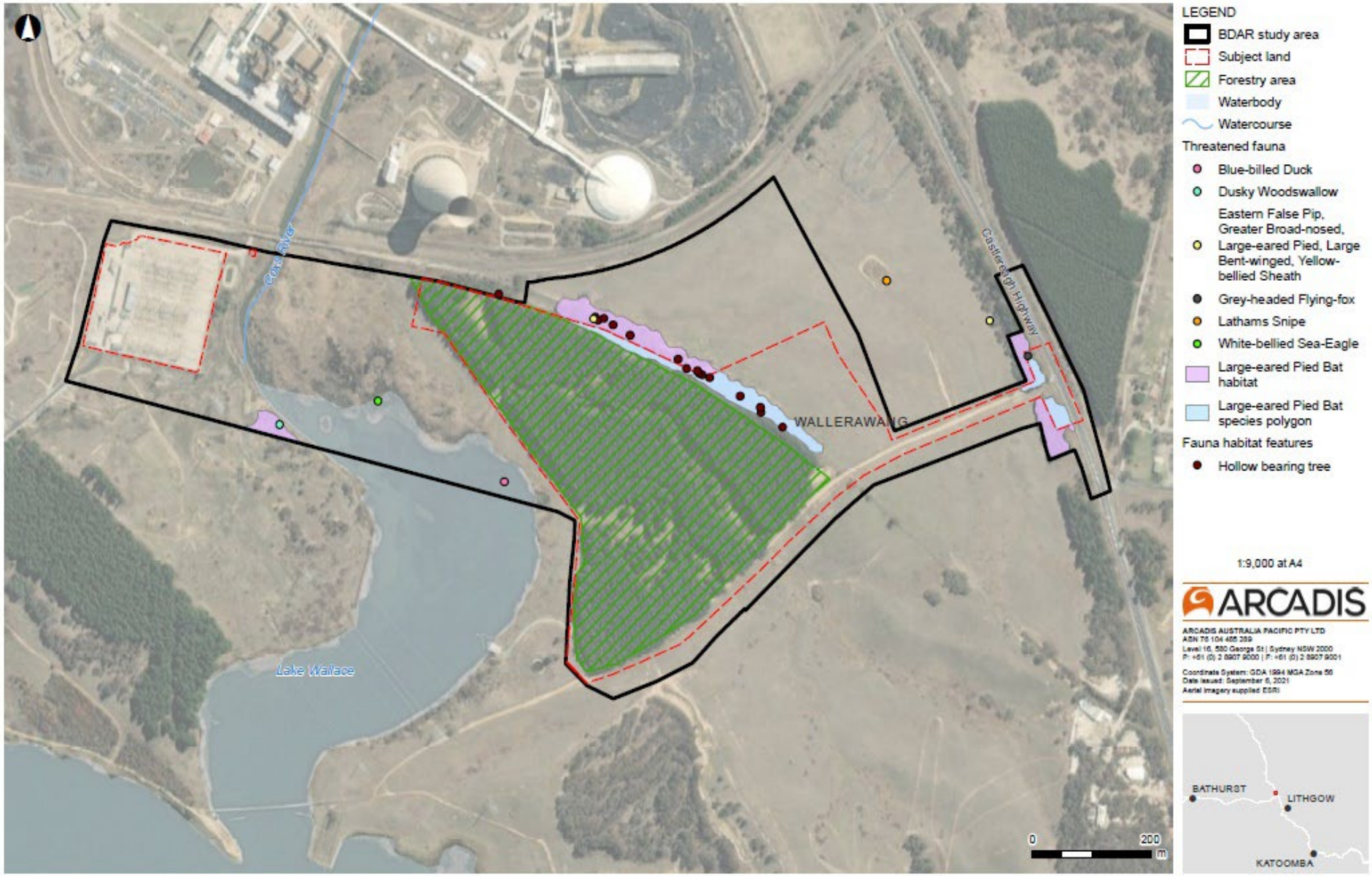


Figure 11-2 Threatened fauna species recorded within the study area

11.3 Potential impacts

Potential impacts from the Project include removal of threatened tree species, PCTs and native vegetation, fauna mortality and indirect impacts. These are described in more detail in the following sections.

11.3.1 Direct construction impacts

Direct impacts on native vegetation

All vegetation in the construction area would be removed prior to construction commencing. This includes 1.15 ha of PCT 677, and 6.48 ha of exotic vegetation.

The impacts of the Project on native vegetation that require offset in accordance with the BAM, and as determined using the BAMC, is outlined Table 11-2. The full biodiversity offset credit reports are provided in the BDAR in Appendix E.

For the purposes of the BDAR, subject land refers to the extent of the construction area and operational footprint for the Project.

Table 11-2 PCT native and other vegetation removal and ecosystem credit requirements

PCT ID	PCT Name	Condition	Vegetation integrity score	Extent in the study area (ha)	Extent in the subject land (ha)	Ecosystem credits required
677	Black Gum grassy woodland of damp flats and drainage lines of the eastern Southern Tablelands; South Eastern Highlands Bioregion	677_Good	46	1.70	0.91	26
677	Black Gum grassy woodland of damp flats and drainage lines of the eastern Southern Tablelands; South Eastern Highlands Bioregion	677_Moderate	23.9	0.70	0.24	4
732	Broad-leaved Peppermint - Ribbon Gum grassy open forest in the north east of the South Eastern Highlands Bioregion	732_Moderate	34.6	0.20	0	
1299	Wetlands on alluvial valley floors of the South Eastern Highlands Bioregion	1299_Moderate	30.8	5.08	0	
Other vegetation types		Exotic roadside vegetation	15.6	0.17	0.01	
		Exotic cleared grassland	0.5	27.24	6.47	
Total area native vegetation				**7.68**	**1.15**	**30**
Total area vegetation				**35.09**	**7.63**	

The three PCTs identified within the Project Site do not correspond to any TECs and therefore no ecological communities are considered at risk of serious and irreversible impacts.

Direct impacts on threatened flora habitat

Two threatened flora species were identified in the Project Site. The individuals of one species, Eucalyptus aggregata, would be removed as a result of the Project. The counts of individuals of these species and their habitat to be directly impacted by the Project are detailed in Table 11-3. Counts are based on the methodology outlined in the BAM.

Direct impacts on threatened fauna habitat

A total of 1.15 hectares of known or potential habitat for threatened fauna species would be cleared from within the construction area. Threatened fauna species habitat to be removed is comprised of 1.15 hectares of PCT 677, which includes loss of important habitat features such as hollow-bearing trees and foraging resources (e.g. blossoms). The 6.47 hectares of exotic grassland and 0.01 hectares of exotic roadside vegetation is not considered to provide suitable habitat for any threatened flora or fauna species.

Approximately 16 hollow-bearing trees were identified within the study area, of which six are within the subject land and would be cleared as a result of the Project. These hollow-bearing trees are in the form of stags and generally comprise small hollows and fissures suitable for microbat species as well as some common frogs, arboreal mammals, reptiles and birds. The removal of hollow-bearing trees could potentially impact several threatened species.

Two species recorded during surveys are listed as potential serious and irreversible impact (SAII) species. Targeted surveys did not detect any breeding sites for these species, therefore no SAII assessments are required.

Clearing of the native vegetation from the construction area would also result in the removal of specific fauna habitat components, including live trees, tree hollows, foraging resources, ground-layer habitats such as ground timber and well-developed leaf litter.

Direct impacts on threatened species and credit requirements

The credit requirements for each species as a result of the Project is listed in Table 11-3. The full biodiversity offset credit reports are provided in in the BDAR in Appendix E.

Table 11-3 Impacts on threatened species and the species credit requirements

Threatened species	Status		Habitat in the study area	Habitat within the subject land	Individuals in the study area	Habitat or individuals within the subject land	Habitat or individuals within the subject land	Species credits required
	BC Act	EPBC Act						
Eucalyptus aggregata	V*	V	2.75	1.28	69	677_Good	3 individuals	6
						677_Moderate	44 individuals	88
Large-eared Pied Bat	V	V	2.6	1.15	-	677_Good	0.91 ha	31
						677_Moderate	0.24 ha	4
							Total	**129**

*V = vulnerable

The available options for delivery of offsets under the Biodiversity Offsets Scheme are as follows:

- An appropriate number and class of like-for-like biodiversity credits may be retired.
- If all the required like-for-like biodiversity credits cannot be sourced, an appropriate number and class of variation biodiversity credits may be retired. The use of variation offset rules must be approved by the consent authority. The use of variation offset rules cannot be approved unless an applicant can demonstrate that they have taken reasonable steps to secure like-for-like biodiversity credits.
- Alternatively, the Offsets Payment Calculator may be used to determine the cost of all or part of the credit obligations, and a payment may be made to the Biodiversity Conservation Fund (BCF).

For the purpose of this BDAR, it has been assumed that a future offset requirement would be met through a contribution to the BCF. The BCF is administered by the Biodiversity Conservation Trust (BCT) who take on responsibility for sourcing the requisite land offsets from a proponent once the payment to the BCF has been made.

11.3.2 Indirect impacts on native vegetation and habitat

The BAM identifies 16 potential indirect impacts that, as a minimum, must be considered as a part of a BDAR. Only that the indirect impacts relevant to the Project were considered in the BDAR and include impacts on TECs/PCTs and/or threatened species and their habitat beyond the construction area. The potential indirect impacts are described in the following sections.

Fauna injury and mortality

Fauna injury or mortality may occur during vegetation clearing activities (particularly during the felling of hollow-bearing trees) or may result from collisions with work vehicles or plant, or accidental entrapment in plant, trenches or other works.

The majority of fauna species recorded within the Project Site were highly mobile bird and mammal species and these species are likely to be able to move away from vegetation clearing activities quite readily.

Edge effects on native vegetation

Habitat adjacent to the construction area is limited to a small area along the Castlereagh Highway and the vegetation bordering the Coxs River. Both these areas of vegetation are already subject to high levels of edge effects and highly fragmented from other areas of native vegetation. Construction activities as a result of the Project are not likely to exacerbate these edge effects and reduce the viability of these adjacent areas of habitat.

Noise, dust and light spill impacts

The Project would result in minor increases to noise, dust and light spill as a result of construction and operational activities. The surrounding habitat is already subject to high levels of noise, dust and light spill as a result of surrounding developments and the Castlereagh Highway. Therefore, any increases to noise, dust and light spill are expected to be negligible and would not reduce the viability of adjacent habitat.

Spread of weeds, pathogens and disease

Weeds are abundant across the Project Site. An increase in the movement of people, vehicles, machinery, vegetation waste and soil during and following construction may facilitate the introduction or spread of weeds and pathogens that currently occur within the construction area into the adjacent vegetation.

Trampling of threatened flora species

Threatened flora species recorded in areas adjacent to the Project Site include mature *Eucalyptus aggregata*. Due to the large size of these individuals, trampling is not considered a risk.

Impacts to aquatic habitats

The Project has the potential to result in indirect impacts to the Coxs River through sedimentation from construction activities and construction occurring in close proximity to the Coxs River.

Impacts to groundwater dependent ecosystems

Excavation required for the Project is unlikely to encounter the water table. In the event there are any impacts to the water table this is anticipated to be minor and would not impact upon groundwater dependent ecosystems.

11.3.3 Impacts to migratory species

The Latham's Snipe was recorded at a small farm dam adjacent to the Project Site. Potential habitat for Latham's Snipe within the Project Site includes the Coxs River and vegetation immediately surrounding it. None of this vegetation would be removed as a result of the Project and no aquatic impacts to the Coxs River are expected as a result of the Project.

11.3.4 Impacts to Matters of National Environmental Significance

Table 11-4 summarises the EPBC Act listed threatened species recorded at the Project Site.

Table 11-4 Impacts on threatened flora

Threatened species		Status	
		BC Act	EPBC Act
Threatened flora	• *Eucalyptus aggregata*	Vulnerable	Vulnerable
	• *Eucalyptus pulverulenta*	Vulnerable	Vulnerable
Threatened fauna	• Large-eared Pied Bat	Vulnerable	Vulnerable
	• Grey-headed Flying-fox	Vulnerable	Vulnerable
Migratory species	• *Gallinago hardwicki* (Latham's Snipe)	NA	NA

Significant Impact Assessments using the EPBC Act *Significant Impact Guidelines* (DoE, 2013) were undertaken for these listed species. A summary of the findings is provided below.

Eucalyptus aggregata

This species has been recorded across Wallerawang, particularly to the east, north and west of the study area. A large stand is located approximately 700 metres to the east of the Project Site. The Project would result in the removal of 1.28 ha of habitat for this species. While this is a slight reduction in the area of occupancy for the species, the small area of habitat to be removed does not represent a significant area of habitat in comparison to the surrounding areas.

Eucalyptus pulverulenta

The Project would not impact on any *Eucalyptus pulverulenta,* One individual of the species was recorded within PCT 677 within the study area along the Castlereagh Highway.

Large-eared Pied Bat

As identified in Section 11.2.3, the Large-eared Pied Bat was recorded during surveys and is listed as a potential serious and irreversible impact species. No breeding habitat for this serious and irreversible impact species was identified within the study area, so no SAII assessments are required.

The Large-eared Pied Bat is also a dual credit species[4]. Vegetation within the study area provides potential foraging and/or dispersal habitat for the Large-eared Pied Bat, however the species was recorded within PCT 677, a PCT not generally associated with the species. Based on the advice of the BAM Support Team, a species polygon has been created for species credit habitat within the study area and has been included in the calculations for the direct impacts on threatened species and credit requirements (See Table 11-3).

Grey-headed Flying-fox

One individual Grey-headed Flying-fox was recorded temporarily roosting in vegetation adjacent to the Castlereagh Highway. While this individual was roosting, it was not observed in subsequent surveys, and no other individuals were recorded within the study area. Although this species may opportunistically disperse, forage and/or temporarily roost within the study area, no breeding or permanent roosting habitat would be impacted and as such, species credits are not required for the Grey-headed Flying-fox.

Latham's Snipe

The Project Site provides potential breeding, feeding, migration and resting behaviour for Latham's Snipe. None of this habitat would be removed as a result of the Project and no aquatic impacts to the Coxs River are expected as a result of the Project.

Summary

The results of the significant impact criteria assessments determined that the Project would not significantly impact on any of the threatened species assessed. As such, the Project is not considered likely to require referral to the Commonwealth Minister for the Environment for impacts to MNES.

11.3.5 Operational impacts

There is some potential for edge effects during maintenance activities through the operational period of the BESS. Trampling of adjacent native vegetation, rubbish dumping, soil disturbance and weed spread could occur, though this is likely to be minor and localised. No further impacts on biodiversity are anticipated during operation of the Project.

[4] The BAM measures two types of credits. **Ecosystem credits**, which measure the offset requirement for impacts on threatened ecological communities, threatened species habitat for species that can be reliably predicted to occur with a plant community type, and other plant community types generally. **Species credits**, which measure the offset requirement for impacts on threatened species individuals or area of habitat. **Dual credit species** are assessed for both species and ecosystem credits.

11.4 Mitigation measures

Table 11-5 Biodiversity mitigation measures

ID	Mitigation Measure
Construction	
B1	A Construction Flora and Fauna Management Plan (CFFMP) will be prepared. Clearing of native vegetation and threatened species habitat within the Project Site will not occur until the CFFMP is approved. This CFFMP would include the following: • Plans showing areas to be cleared and areas to be protected, including exclusion zones, protected habitat features and revegetation areas • Pre-clearing survey requirements • Procedures for unexpected threatened species finds and fauna handling • Protocols to manage weeds and pathogens.
B2	Pre-clearing surveys will be undertaken to identify any breeding or nesting activities by native fauna in hollow-bearing trees and native vegetation. No breeding attempts or active nests should be disrupted, as far as practical.
B3	Site inductions for construction staff will include a briefing on the potential presence of threatened species and their habitat adjacent to the development site, their significance and locations and extents of no-go zones.
B4	Clearance of native vegetation will be minimised as far as is practicable.
B5	The limits of vegetation clearing will be marked on plans and on-site with signed fencing so that clearing activities are constrained to approved areas only.
B6	A two-stage approach to clearing will be undertaken which will include the following steps: • Remove non-hollow-bearing trees at least 48 hours before habitat trees are removed • Hollow-bearing trees will be knocked with an excavator bucket or other machinery to encourage fauna to evacuate the tree immediately prior to felling • Felled trees will be left for a short period of time on the ground to give any fauna trapped in the trees an opportunity to escape before further processing of the trees • Felled hollow-bearing trees will be inspected by an ecologist as soon as possible (no longer than two hours after felling).
B7	A pre-start-up check for sheltering native fauna of all infrastructure, plant and equipment and/or during relocation of stored construction materials will be undertaken.
B8	If any pits/trenches are to remain open overnight adjacent to native vegetation, they will be securely covered, if possible. Alternatively, fauna ramps (logs or wooden planks) will be installed to provide an escape for trapped fauna.
B9	Appropriate sediment and erosion controls will be installed prior to the commencement of earthworks and construction, around the impact area, to reduce run-off into adjoining vegetation and downstream to the Coxs River and Lake Wallace.
B10	Where possible, earthworks will be undertaken during dry weather conditions. Clearing of vegetation should be avoided during overland flow events.

12 Aboriginal heritage

This chapter describes the potential Aboriginal heritage impacts associated with the Project. The assessment presented in this section draws on information provided by the Aboriginal Cultural Heritage Assessment (ACHA) Report (NGH, 2021) The ACHA Report is included in Appendix G of the EIS.

A summary of the relevant SEARs and where they are addressed is provided in Appendix A.

12.1 Methodology

The preparation of the ACHA was carried out in accordance with:

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

The assessment included consultation with Aboriginal stakeholders, a review of the history of the Project Site including a review of previous investigations in the area and heritage databases, a summary of the Aboriginal history and context, and a site inspection to identify the presence of any heritage items or places of value.

An Aboriginal Heritage Information Management System (AHIMS) extensive search was conducted on 27 April 2021 with a buffer of one kilometre around the Project Site to site to identify any Aboriginal sites which may have been previously recorded. DPIE maintains the AHIMS database; a comprehensive register of Aboriginal sites that have been recorded across NSW.

12.1.1 Consultation process

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 guide outlines a four-stage process of consultation. Table 12-1 describes the four stages, and what activities were undertaken to address each stage.

A total of six Aboriginal groups registered their interest in the Project following Stage 1 of the consultation steps outlined in the ACHCRP guide.

Table 12-1 ACHCRP Stages and consultation undertaken for the Project

Stage	Description	Consultation undertaken	Consultation period
1	Notification of project proposal and registration of interest	• Letters outlining the development proposal and the need to carry out an ACHA were sent to the Bathurst Local Aboriginal Land Council (LALC) and various statutory authorities including Heritage NSW, as identified under the ACHCRP. • An advertisement was placed in the local Lithgow Mercury on 28 April 2021 seeking registrations of interest from Aboriginal people and organisations. • Further letters were sent to other organisations as identified by Heritage NSW.	14 Days

Stage	Description	Consultation undertaken	Consultation period
2	Presentation of information about the proposed project	• The proposed Assessment Methodology for the Project was issued on 18 May 2021 to six Registered Aboriginal Parties (RAPs) and to Bathurst LALC on 15 June 2021 due to a late registration. • Details of the background to the proposal, a summary of previous archaeological surveys, and the proposed heritage assessment methodology for the Project were included. • Comments regarding the proposed methodology and information about known items of Aboriginal culturally significant values associated with the Project area and/or any Aboriginal objects contained therein were encouraged. • None of the registered parties raised any objections to the methodology and all expressed interest in participating in fieldwork. • A written request to provide any information that may be relevant to the cultural heritage assessment of the study area was also included. No such information was received.	28 days
3	Gathering information about cultural significance	• Survey of the proposed Project Site was undertaken with two of the six RAP groups selected for fieldwork participation by the Proponent. The fieldwork was carried out on the 22 June 2021.	NA
4	Review of draft cultural heritage assessment report.	• A draft version of the ACHA was issued to members of the six RAPs on 6 September 2021. Comments on the results, significance, assessment and recommendations within the ACHA were encouraged. • No comments were received from the RAPs following the consultation period.	28 days

12.2 Existing Environment

12.2.1 Landscape context

The geological formations found within and surrounding the Project Site suggests that raw stone material appropriate for the manufacture of stone tools was locally available, specifically quartz, chert, mudstone and quartzite. This is supported by the frequency of artefact sites of this type being recorded on AHIMS within the wider region.

The landscape context assessment for the Project Site utilises the national Interim Biogeographic Regionalisation of Australia system to better understand the archaeological modelling of the area. This system identifies the Project area as being located on the eastern edge of the Sydney Basin Bioregion, which contains 14 subregions. The Project Site is located with the Wollemi subregion and within the Capertee Plateau under the Mitchell landscapes system.

12.2.2 Hydrology

The Project Site is located adjacent to Coxs River and Lake Wallace, a man-made water storage area. Several other first order and ephemeral tributary streams intersect the project area and likely flow into Lake Wallace during wet periods. The hydrology within and surrounding the Project area has been significantly altered by historical land use as a result of infrastructure such as dams, roads and railways. Such waterways and shelter would have provided ideal conditions for transitional camp sites for Aboriginal people living in the area due to the combination of shelter provided by the landforms present, and the ease of access to fresh running water.

12.2.3 Flora and fauna

The Project Site has been completely cleared of its native vegetation. Surrounding vegetation types suggest that the Project area was likely to have been comprised of Southern Tableland Dry Sclerophyll Forests, with small patches of Eastern Riverine Forests and Subalpine Woodlands. Such vegetation communities would have provided a variety of resources for Aboriginal communities living in the area during the Holocene period prior to European occupation.

12.2.4 Ethnographic setting

The Project Site and surrounding area would have likely been used by Aboriginal people during migration between favourable camp locations of elevation and reliable water sources further south-east along the Coxs River. Consequently, the entire area is considered to be archaeologically sensitive, however historic land use practices have resulted in significant but spatially discrete ground and site disturbances. As a result, it is considered that only undisturbed areas within the Project area are likely to retain intact archaeological deposits. Disturbed areas may still contain Aboriginal objects and sites, though they are no longer likely to be *in situ*.

12.2.5 Archaeological context

A significant number of studies have been undertaken in Wallerawang and the wider region which provide a sound archaeological context for the Project area.

A search of the AHIMS database in April 2021 confirmed that there are no recorded Aboriginal sites within 50 metres of the Project Site. Six previously recorded Aboriginal sites are within one kilometre of the Project Site. One isolated Aboriginal heritage finding was reported by a previous field survey undertaken in August 2017 by Biosis as part of the Wallerawang Power Station Demolition Report (Aurecon, 2018). The artefact was considered of low significance. Two other Potential Archaeological Deposits (WPSPAD1 and WPSPAD2) located on the western side of the Wallerawang Power Station site would not be impacted by the Project.

The ACHA site inspection confirmed the presence of Aboriginal objects and areas of potential subsurface deposits within the survey area. This comprised one Isolated Find (Wallerawang BESS IF+ PAD 02) within an associated Potential Archaeological Deposit (PAD) area and two artefacts (Wallerawang BESS AFT+ PAD 01) within an associated PAD area, suggesting that there is potential for intact subsurface deposits to remain in parts of the Project area.

Wallerawang BESS AFT+ PAD 01 and Wallerawang BESS IF + PAD 02 have been recorded as AHIMS ID# 45-1-2844 and AHIMS ID# 45-1-2843 respectively.

An additional area of archaeological sensitivity was identified during the site inspection in the eastern extent of the survey area and associated with an ephemeral drainage line and spur. However, this location

is outside of the Project Site and would not be impacted by the proposed works. No other Aboriginal sites were recorded within the Project Site.

Historic land use within the Project Site has resulted in extensive ground disturbance through the historical vegetation clearance, the establishment of the pine plantation, and development of access roads and rail infrastructure. This disturbance has resulted in substantial restructuring of the natural landforms that may have been occupied by Aboriginal people in transitional phases prior to European occupation. Historical development has significantly compromised the overall character of the archaeological record of the proposed construction area resulting in a low archaeological potential.

12.3 Potential impacts

12.3.1 Construction

Construction of the Project would require earthworks and disturbance to the ground surface, which would have the potential to impact on previously recorded sites of Aboriginal heritage significance. No sites of Aboriginal heritage significance have been identified in the Project Site.

The proposed construction footprint has been refined to avoid identified PAD's and to preserve and conserve landforms with *in-situ* archaeological potential. The potential for impacts to Aboriginal heritage within the refined construction area footprint are considered very low given the history of extensive ground disturbance and that no artefacts were identified within the construction footprint.

There is a potential for previously unrecorded items of Aboriginal heritage significance to be present within the Project Site. However, any unexpected finds that are encountered are likely to be located within highly disturbed contexts and therefore may not provide any further information about Aboriginal occupation of the area other than their existence within the landscape.

Construction teams and operating staff would receive cultural training to ensure they understand the cultural values of these sites and their connection to the surrounding landscape and the Local Wiradjuri Aboriginal community that continue to care for country.

12.3.2 Operation

Aboriginal heritage would not be directly impacted during operation of the Project, as ground disturbance / excavation would be restricted to the construction phase of the Project. The introduction of new infrastructure is not expected to impact the setting or value of local Aboriginal items or sites.

12.4 Mitigation measures

Given the heavily disturbed nature of the Project Site and general lack of archaeological potential, proposed mitigation would focus on a procedure for the management of unexpected archaeological finds and would be documented within the CEMP and OEMP for the Project. The Aboriginal heritage mitigation measures are outlined below in Table 12-2.

Table 12-2 Aboriginal heritage mitigation measures

ID	Mitigation Measure
Construction	
AH1	No ground disturbing activities are to take place within a 5 m buffer of the marked PAD boundaries of Wallerawang BESS AFT + PAD 01 (AHIMS ID# 45-1-2844) and Wallerawang BESS IF + PAD 02 (AHIMS ID# 45-1-2843).
AH2	The boundary of Wallerawang BESS AFT + PAD 01 (AHIMS ID# 45-1-2844) and Wallerawang BESS IF+ PAD 02 (AHIMS ID# 45-1-2843) will be demarcated as an environmentally sensitive zone during construction phases and future use of the site.
AH3	In the unlikely event that human remains are discovered during the development, all work will cease in the immediate vicinity. The discovery will be reported to Enviroline, Heritage NSW, the local police and the RAPs. Further assessment will be undertaken to determine if the remains were Aboriginal or non-Aboriginal.
AH4	Further archaeological assessment will be required if the Project activity extends beyond the construction footprint. This will include consultation with the RAPs and may include further assessment of impacts and mitigation measures and archaeological subsurface investigation.
AH5	Construction teams and operations staff will receive cultural training to ensure they understand the cultural values of these sites and their connection to the surrounding landscape and the Local Wiradjuri Aboriginal community that continue to care for country.
Construction and Operation	
AH6	If unexpected heritage items are identified during construction, operation and maintenance, the Unexpected Finds Protocol (included in the CEMP and the OEMP) will be followed in line with the *NSW National Parks and Wildlife Act 1974*.

13 Non-Aboriginal heritage

This chapter describes the potential non-Aboriginal heritage impacts associated with the Project. NGH prepared a Statement of Heritage Impact (SoHI) for the Project to determine the presence of any heritage items or historical archaeology of significance. The SoHI for the Project is provided in Appendix G.

Appendix A provides a summary of the relevant SEARs which relate to non-Aboriginal Heritage and where these have been addressed in this EIS.

13.1 Methodology

The SoHI assessment was prepared in accordance with the following guidelines and publications:

- *Statements of Heritage Impact* (NSW Heritage Office[5], 2002)
- *Assessing Heritage Significance* (NSW Heritage Office, July 2001)
- *The Burra Charter – The Australia International Council on Monuments and Sites (ICOMOS) Charter for Places of Cultural Significance* (ICOMOS, 1999).

The primary piece of State legislation protecting environmental heritage items both natural and cultural in NSW is the *Heritage Act 1977.* Items of environmental heritage under the Act are listed on the NSW State Heritage Register and are afforded automatic protection against any activities that may damage an item or its significance under the Act. Under Section 170 of the Heritage Act, State agencies and authorities in NSW are required to keep a register of heritage places for which they are responsible.

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (Commonwealth) applies to those items which are of World, Commonwealth or National heritage significance.

The *Environmental Planning and Assessment Act 1979* establishes the framework for cultural heritage values to be formally assessed in the land use planning and development consent process, with local heritage items being listed under their relevant Local Environmental Plans.

A desktop review of the following heritage registers was carried out on 22 February 2021.

- State Heritage Register
- Lithgow LEP 2014
- Section 170 State Agency Heritage and Conservation Registers (State Heritage Inventory)
- Commonwealth Heritage List
- National Heritage List
- World Heritage List and
- Register of the National Estate.

In addition to the desktop analyses, a site inspection was undertaken on 16 June 2021. The aim was to determine if any unrecorded heritage items or values were present within the Project Site and to assess the visual impact of the proposed works on the views to and from the adjacent heritage items.

[5] Now Heritage NSW, was formerly NSW Heritage Division and formerly Heritage Office.

13.2 Existing heritage

The Project Site has played part in the history of the Wallerawang region, due to its associations with pastoralism and industry. Analysis of historical resources and historical aerial imagery indicate that the Project area has been primarily used as grazing paddocks, for railway and Power Station infrastructure and as a pine plantation, which resulted in the repurposing of grazing land in the 1980's. There is the potential that archaeological evidence remains of these activities.

However, the history of the Project Site indicates that the archaeological potential is low. An unexpected find would likely relate to the previous pastoral history and could include roads and tracks, fences and gates and metal, for example nails and structural fittings, horseshoes and accessories.

13.2.1 Desktop review

The desktop review identified nine listed non-Aboriginal heritage items within one kilometre of the Project Site. These are described in Table 13-1.

Table 13-1 Non-Aboriginal Heritage Items within one kilometre of the Project Site

Item	ID	Significance	Address	Distance from project / direction
Church of St John the Evangelist	SHR 01702 I112	State Heritage Register Lithgow LEP 2014	Main Street, Wallerawang	530 m north-west
Stone Viaduct Coxs River	SHR 01064 I440	State Heritage Register Lithgow LEP 2014	Main Great Western Railway, Wallerawang	30 m north
Wallerawang rail bridges over Coxs River	SHR 01064	State Heritage Register State Agency Register TAHE - Country Rail Network		
Coxs River Rail Bridge at Wallerawang	Place ID: 15887	Register of the National Estate (Non-statutory archive)		
Wallerawang Railway Station and yard group	SHR 01282	State Heritage Register State Agency Register Transport Asset Holding Entity	Main Great Western Railway, Wallerawang	890 m west
Walker-Barton Private Cemetery	A109	Lithgow LEP 2014	North bank of Lake Wallace	500 m south
Tunnel Hill tunnels and overbridge	I439	Lithgow LEP 2014	Main Great Western Railway, Wallerawang	400 m north-east
Former Wallerawang Public School	I225	Lithgow LEP 2014	Main Street, Wallerawang.	530 m west
Old Wallerawang School (former National School)	I113	Lithgow LEP 2014	Main Street / Castlereagh Highway, Wallerawang.	760 m north-west

Item	ID	Significance	Address	Distance from project / direction
The Cottage	I191	Lithgow LEP 2014	Skelly Road, Lidsdale	820 m north
Wallerawang Conservation Area	C13	Lithgow LEP 2014	Main Street, Wallerawang	950 m west
Wallerawang A and B Power Stations chimney stack	3431007	Delta Electricity Section 170 Heritage and Conservation Register	Wallerawang Power Station, Main Street, Wallerawang	500 m north-west

There are no Commonwealth listed non-Aboriginal heritage items identified within one kilometre of the Project Site.

13.2.2 Site inspection

A site inspection was undertaken on 16 June 2021. The Project Site was traversed from east to west to sample all areas. During the site inspection, the closest surrounding items of listed heritage significance, i.e. the Wallerawang rail bridges over Coxs River / Stone Viaduct Coxs River, were inspected to assess the visual impact of the proposed works on the views to and from these adjacent heritage items.

Two additional items not previously listed on any register were identified as holding potential heritage significance: the Original Western Line railway alignment, and a sandstone culvert running beneath the former railway alignment. The location of these items is provided on Figure 13-1.

These potential heritage items were assessed against the seven NSW Heritage Significance criteria, and a statement of significance was prepared to outline their overall heritage value.

A summary of the items of heritage significance on and adjacent to the Project Site is shown in Table 13-2.

Table 13-2 Heritage items in or in close proximity to the Project Site

Item	Description	Photograph
Wallerawang rail bridge over the Coxs River (Stone Viaduct Coxs River) (I440, SHR 01064)	The Viaduct style bridges are spaced approximately 10 – 20 m apart, with the colonial sandstone Viaduct style bridge on the south alignment, immediately adjacent to the Project area and the mid-century grey/brown brick bridge to the north	

Item	Description	Photograph
Original Great Western Railway alignment	The Great Western Railway originally ran through the Project area. The original railway embankment remains providing a physical remnant of the railway line alignment prior to the 1927 deviation of the line from a point just before Marrangaroo Station to the Coxs River Viaduct. The deviation was built when the line was being duplicated. The photograph shows the apex of the rail embankment, looking south, with surface exposures of rail ballast and fill present.	
Sandstone culvert	This culvert is two metres in width and one metre in height and is located under the railway embankment. It is constructed out of sandstone bricks approximately 20 cm in width and various lengths forming a half circle 80 cm diameter passage. The sandstone bricks, seemingly of local origin were noted to have chisel marks suggesting colonial stone masonry techniques were employed. The railway embankment and sandstone have locally significant heritage values.	

Figure 13-1 Non-Aboriginal Heritage item within close proximity of the Project

13.3 Potential impacts

13.3.1 Construction

Construction of the Project would not result in impacts to listed Commonwealth, State or local heritage items.

The Project would be developed on a dense vegetated parcel of land located within the forestry area, managed by Forestry Corporation of NSW which is scheduled for harvesting (under a separate agreement) prior to the commencement of construction of the BESS. For construction of the Project a section of the Original Great Western Railway embankment located within the proposed construction footprint will need to be removed to level out the area. This material will be utilised as fill in accordance with the current cut/fill design. The sandstone culvert is located within the section of embankment that will be retained and will be avoided during construction. There is a potential for secondary impacts on the culvert to occur as a result of vibration from construction activities, however impacts are considered unlikely.

While the railway embankment and sandstone culvert comprise a section of the original Great Western Railway line alignment, they are not rare and 130 metres (33%) of the embankment will be preserved, including the sandstone culvert. The physical change to the railway embankment would not impact upon its identified heritage values and significance. The proposed partial retention of the embankment and associated sandstone culvert would conserve existing values. The other nearby heritage items (Wallerawang rail bridges over Coxs River / the Stone Viaduct Coxs River Wallerawang) are located outside of the construction footprint and would not be impacted.

The assessment of heritage impacts has found that the overall impact is minor and that any partial adverse impacts to the original Great Western Railway heritage impact can be mitigated by the retention of the sandstone culvert and the completion of an archival recording.

13.3.2 Operation

The Project would operate 24 hours per day, seven days per week. Operational noise and vibration associated with the inverters and transformers installed on the BESS may have a minor impact to the longevity of the Sandstone Culvert, however, overall, the operational impacts to non-Aboriginal Heritage are anticipated to be low to negligible.

13.4 Mitigation measures

Given the already altered state of the Project Site and lack of archaeological potential, proposed mitigation would focus on a procedure for the management of unexpected archaeological finds which would be documented within the OEMP for the Project. The non-Aboriginal heritage mitigation measures is provided in Table 13-3.

Table 13-3 Non-Aboriginal heritage mitigation measures

ID	Mitigation Measure
Pre-Construction / Post-construction	
NAH1	An archival recording of the railway embankment and culvert will be completed both before and after construction.
Construction	
NAH2	In the event of an unexpected archaeological/heritage item find during construction, works within the area will cease and a suitably qualified heritage professional will be engaged to assess the significance and management of the finds. The Unexpected Finds Protocol (included in the CEMP) will be followed.
NAH3	Construction works are unlikely to cause secondary impacts on the culvert through vibrational impacts, a structural engineer may be consulted to consider how vibration risks to the culvert can be minimised and avoided.
Operation	
NAH4	It is possible that unexpected heritage items may be identified during operation and maintenance works. In this case, the Unexpected Finds Protocol (included in the OEMP) will be followed.

14 Bushfire risk

This section provides a summary of the potential bushfire risk associated with the Project. A Bushfire Risk Assessment has been prepared by Bushfire Consulting Services Pty Ltd and is provided in Appendix H.

Appendix A provides a summary of the relevant SEARs related to bushfire risk and where these have been addressed in this EIS.

14.1 Methodology

Bushfire Consulting Services Pty Ltd undertook a site inspection on 26 March 2021. The NSW Spatial Services mapping website (NSW Department of Finance Services and Innovation) along with *Ocean Shores to Desert Dunes, the Native Vegetation of NSW and the ACT* (David Keith, 2004), in determining the vegetation type.

This assessment included an analysis of the hazard, threat and subsequent risk to the Project and provides recommendations that satisfy the aim and objectives of *Planning for Bushfire Protection* 2019 (NSW RFS, 2019). Chapter 8 of the *Planning for Bushfire Protection 2019* (PBP) describes this type of development as 'other non-residential development' and therefore the aim and objectives of Chapter 1 and 8 of *Planning for Bushfire Protection* are applicable.

14.1.1 National Construction Code

The National Construction Code (NCC) is a uniform set of technical provisions for the design, construction and performance of buildings and plumbing and drainage systems throughout Australia (NSW Government 2021d). It is published and maintained by the Australian Building Codes Board (ABCB), on behalf of and in collaboration with the Australian Government and each State and Territory Government.

The NCC was used to classify and assess the potential bushfire risks to buildings and structures proposed for the Project.

14.1.2 Bushfire prone land mapping

The Project Site is located within bushfire-prone land as identified by the Lithgow City Council bushfire prone land map (see Figure 14-1) and as defined by Section 10.3 of the EP&A Act. The requirements stipulated by legislation therefore apply to any new development on the site.

Based on the Lithgow City Council bushfire prone land map, the site has been assessed as containing Category 1 and Category 3 Bushfire Prone Vegetation. As per the *Guide for Bush Fire Prone Land Mapping (Version 5b)* (Rural Fire Service (RFS), November 2015), these categories are described as:

- Vegetation Category 1 is considered to be the highest risk for bush fire and has the highest combustibility and likelihood of forming fully developed fires including heavy ember production. Vegetation Category 1 consists of areas of forest, woodlands, heaths (tall and short), forested wetlands and timber plantations. All of Vegetation Category 1 is subject to a Pine Plantation Deed and will be harvested by Forestry Corporation of NSW before construction commences.
- Vegetation Category 3 is considered to be medium bush fire risk vegetation. It is higher in bush fire risk than Category 2 but lower than Category 1. This Category consists of grasslands, freshwater wetlands, semi-arid woodlands, alpine complex and arid shrublands.

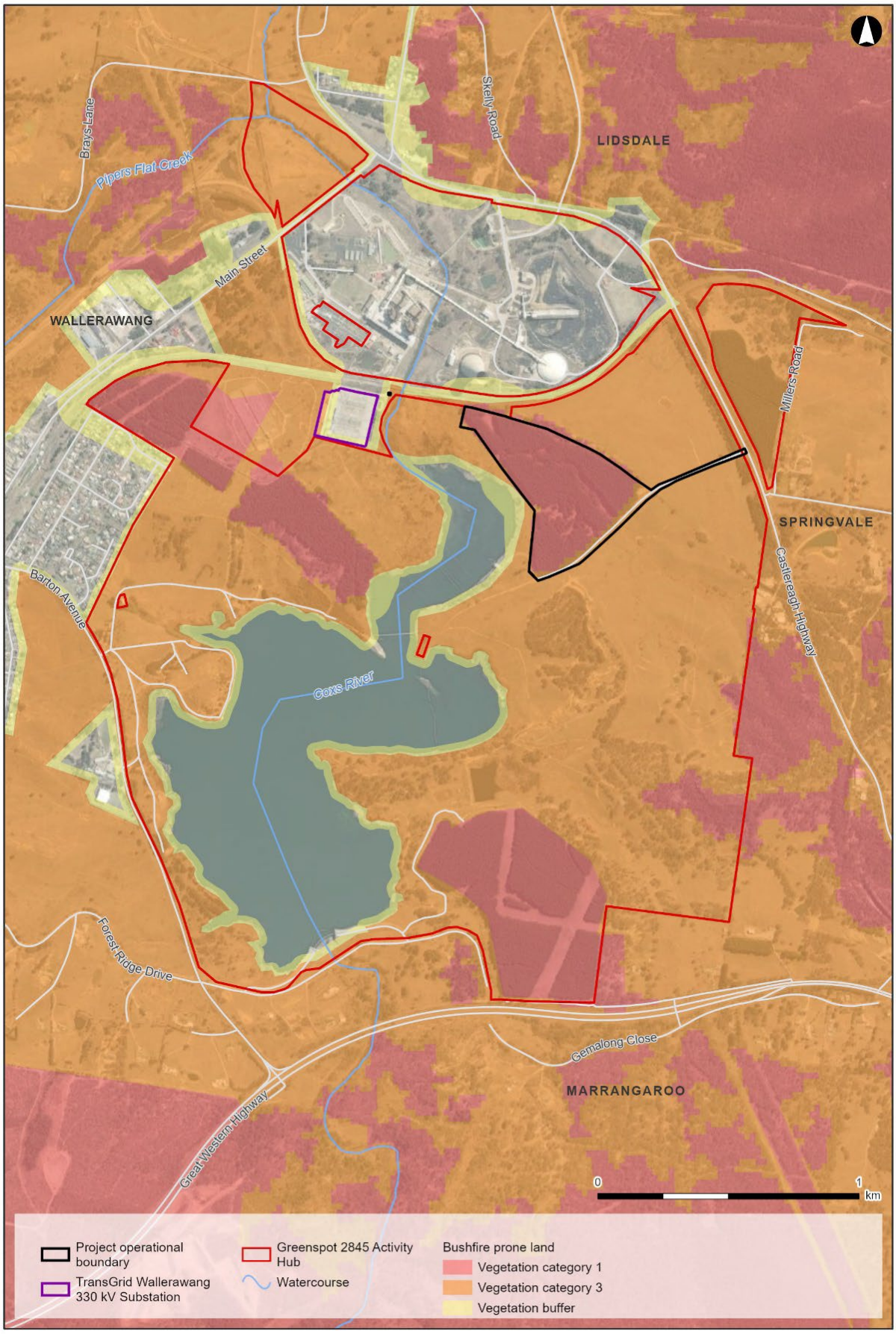


Figure 14-1 Bushfire prone land (as mapped by Lithgow City Council)

14.2 Bushfire attack assessment

14.2.1 Vegetation formations

The PBP (2019) guideline provides a methodology for determining the predominant bushfire prone vegetation for at least 140 metres in all directions from a proposed development. The vegetation classification system used is based on the *Ocean Shores to Desert Dunes* (Keith, 2004) framework. Using Keith (2004), the hazardous vegetation formations within 140 metres for each aspect of the Project have been identified. These are summarised Table 14-1.

Table 14-1 Vegetation formations

Vegetation classification	Description
Bushland	• Bushland is located to the north, east, south and west of the Project Site. • This includes vegetation predominantly within the boundaries of the buffer lands, with some hazard vegetation existing on the northern side of the Main Western Railway Line. • The primary bushland vegetation is most representative of Grassland in all directions.
Freshwater Wetlands	• Wetlands surround the Coxs River at distances greater than 100 m to the west of the BESS and also located within, and to the south of the 330 kV overhead transmission line corridor.
Pine forest	• At the time of site inspection, parts of the Project Site and eastern section of the proposed 330 kV overhead transmission line corridor represented a pine forest. • The forest is subject to a Pine Plantation Deed and will be harvested by Forestry Corporation before construction commences. • The tree stumps and residual vegetation will be removed prior to construction commencing. It is therefore considered that this will not represent hazard vegetation for the purposes of the Project.
Remnant vegetation	• An area of remnant vegetation, approximately 35-40 m in width and variable, exists along the east boundary of Lot 3 in DP1018958 and Lot 3 in DPI 226927 adjacent to the Castlereagh Highway. • The PBP states that remnant vegetation is a parcel of vegetation with a size of <1 ha or a shape that provides a potential fire run not exceeding 50 m that could threaten buildings. • These remnants are considered a low hazard. This vegetation is located approximately 300 m (i.e. >100 m) to the east of the Project, however the proposed main entrance and primary access road to the Project Site pass through this area.

14.2.2 Effective slope

The effective slope influences the rate of fire spread, the intensity of the fire and the level of radiant heat flux on an asset. For example, fires tend to race more quickly up a vegetated slope than down a vegetated slope. This influences the size of the required asset protection zones (APZ) to mitigate the threat. The effective slope of the land from a new building for a distance of 100 metres is derived from a site assessment combined with the most detailed contour data available.

The effective slope within 100 metres of the BESS was estimated manually during the site visit and generally ranges between 0° (all upslope and flat land) and >0-5° (downslope) The south-eastern section of the Project Site has a slope of 8.1°. The effective slope is consistent with the topographical information from NSW Spatial Service LIDAR data.

14.2.3 Fire weather

The Project is located within the Lithgow Council area, a part of the Central Ranges Region, which has a Forest Fire Danger Index (FFDI) of 80. The PBP typically assigns worst-case FFDl to a region based upon a one in 50-year climate event that has been determined from historical data.

The McArthur FFDI is a score from 0 to 100 that measures the relative degree of danger of fire in Australian Forests, based upon climate conditions. It is calculated using air temperature, relative humidity, average wind speed and the Keech-Byram Drought Index, available from the Bureau of Meteorology. An FFDI of 80 represents 'Extreme' (lower than Catastrophic) conditions. The FFDI is used to determine the required APZ for a development in the region.

14.2.4 Buildings

All new buildings, new building work, and new plumbing and drainage systems must comply with the NCC. As classified by the NCC, the proposed buildings include a Class 5 office and a Class 7a carpark.

For buildings with occupants (i.e. NCC Class 5-8), in order to meet PBP requirements potential building footprints should not be exposed to radiant heat levels exceeding 29 kW/m^2. Where radiant heat levels of <29 kW/m^2 can be demonstrated it is anticipated that the building will not be subject to flame contact during a bushfire. These buildings should be protected by an Asset Protection Zone (APZ) and an Inner Protection Area (IPA), both described in more detail in Section 14.3. The bushfire assessment has demonstrated that with the APZ and IPA measures, the proposed buildings for the Project are not anticipated to experience flame contact during a bushfire.

Class 10 buildings are non-habitable buildings or structures. The water tank, the BESS, switchyard and overhead transmission line components are considered to be NCC Class 10b. These components of the Project will also be protected with an IPA.

14.3 Mitigation Measures

14.3.1 Asset protection zones

An APZ is a fuel-reduced area surrounding a built asset or structure which provides a buffer zone between a bush fire hazard and an asset and is an area of reduced bush fire fuel that allows suppression of fire. The APZ also provides an area from which back burning or hazard reduction can be conducted, allows emergency services access and provides a relatively safe area for firefighters and occupants to defend a property.

Minimum PBP APZ requirements are designed to ensure that buildings will not be expected to experience radiant heat flux levels of greater than 29 kW/m^2. The recommended APZ to avoid flame contact is provided in Table 14-2. This has been determined based on the relevant FFDI (80, Section 14.2.3), vegetation formation (Section 14.2.1) and effective slope (Section 14.2.2) using Table A1.12.3 of the PBP 2019.

Table 14-2 Minimum distances of APZs

Aspect	Vegetation classification	Slope under classified vegetation	APZ Required	APZ recommended
North-east	Grassland	Downslope (>0-5°)	11 m	20 m
South-east	Grassland	All upslope and flat land (0°)	10 m	20 m
South-west	Not applicable	Not applicable	Not applicable	Not applicable
North-west	Not applicable	Not applicable	Not applicable	Not applicable

The PBP 2019 has minimum specification for APZs to be established around buildings. These need to be managed as an Inner Protection Area (IPA).

14.3.2 Inner protection areas

The Inner Protection Area (IPA) is the area within the APZ closest to the buildings and creates a fuel-managed area which can minimise the impact of direct flame contact and radiant heat on the development and can act as a defendable space. This space provides a safe working environment in which efforts can be undertaken to defend the structure, before and after the passage of a bush fire. The IPA must be kept free from surface fuel and elevated fuel with minimum canopy cover.

A 20-m IPA is proposed for the switchyard, the 330 kV overhead transmission line corridor and any supporting pylons. This exceeds the requirements of the *ISSC3 Guideline for Management Vegetation near Power Lines (November 2016)* which provides a set of requirements for the management of the risks associated with the impact of vegetation on electricity assets for the benefit of public safety.

Table 14-3 summarises the mitigation measures that would be implemented to minimise the potential impacts from bushfire risks of the Project.

Table 14-3 Summary of bushfire mitigation measures

ID	Mitigation
Asset Protection Zones	
BR1	At the commencement of the development, and for the life of the development the curtilage surrounding the proposed BESS shall be managed as an Inner Protection Area (IPA) and Asset Protection Zone (APZ) in all directions for a distance of at least 100 m and otherwise to the boundary of the proposed BESS facility footprint whichever is the greater distance.
BR2	The curtilage surrounding the proposed Wallerawang Switchyard, the 330 kV overhead transmission line corridor and associated structures, and the office and carpark shall be managed as an IPA and APZ from the proposed buildings in all directions for a distance of at least 20 m.
Water supply	
BR3	Water supply will comply with the relevant requirement of Planning for Bushfire Protection 2019 Table 7.4a.
BR4	A static water supply of two 20,000 litre water tanks will be made available for fire suppression activities, with multiple tanks being provided as required.
BR5	A connection for firefighting purposes is to be located within the IPA or non-hazard side and away from the structure

ID	Mitigation
Access	
BR6	Property access road will be two-wheel drive, all weather roads, with a minimum 4 m carriageway width
BR7	Suitable access for a Category 1 fire appliances will be available to within 4 m of the static water supply
BR8	Access to the site will comply with the relevant requirements of the PBP 2019 (Tables 7.4a and 5.3b)
Overhead transmission line	
BR9	Vegetation within the overhead transmission line corridor will be managed in accordance with the ISSC3 *Guideline for Management Vegetation near Power Lines (November 2016)*
General	
BR10	A Bushfire Management Plan will be prepared as part of the CEMP and the OEMP
BR11	An Emergency Evacuation Plan will be prepared as part of the CEMP and the OEMP

15 Hazards and risk

This section provides a summary of the potential hazards and risk impacts associated with the Project. Sherpa Consulting has undertaken an assessment of the hazards and risks associated with the Project to address the SEARs issued by DPIE. The Preliminary Hazard Analysis (PHA) for the Project is provided in Appendix I.

Appendix A provides a summary of the relevant SEARs which relate to hazards and risks and where these have been addressed in this EIS.

15.1 Methodology

The Department of Planning (DoP) (2011) guideline "*Applying State Environmental Planning Policy (SEPP) No. 33 Hazardous and Offensive Development*" (SEPP 33) provides a risk screening procedure to identify whether a PHA is required. However, as the SEARs for the Project include a requirement for a PHA, the SEPP 33 risk screening process has not been completed.

The PHA was carried out in accordance with the *Multilevel Risk Assessment Guideline* (DoP, 2011) (MLRA). The MLRA sets out three levels of risk analysis, i.e. qualitative, partially qualitative and quantitative. Qualitative analysis can be used if there are no potential events with significant off-site consequences and societal risk is negligible. The PHA was also carried out in accordance with the *Hazardous Industry Planning Advisory Paper (HIPAP) No.6 – Hazard Analysis* (DoPE, 2011) with particular regard to the potential risk to people, property and the biophysical environment that may occur as a result of the accidental release of potential hazardous material and energy (Appendix I).

The PHA included the following steps:

- Establishment of the study context.
- Identification of hazards resulting from the operations of the BESS and events with the potential for off-site impact *(Hazard Identification)* (Section 15.3.1).
- Analysis of the severity of the consequences for the identified events with off-site impact, e.g. fires and explosions *(Consequence Analysis)* (Section 15.3.1).
- Determination of the level of analysis and risk assessment criteria.
- Analysis of the risk of the identified events with off-site impact (*Risk Analysis*) (Section 15.3.2).
- Assessment of the estimated risks from identified events against risk criteria to determine acceptability (*Risk Assessment)* (Section 15.3.2).

The PHA assessed the events associated with proposed operation of the BESS (i.e. excluded construction related events). The Project operational boundary was used to define and determine off-site impact (i.e. impact extending outside of the Project operational boundary).

Bushfire risk was not addressed in the PHA as a separate bushfire risk assessment was undertaken by a bushfire consultant. The Bushfire Risk Assessment is provided in Appendix H and is discussed in Section 14 of this EIS.

15.2 Existing environment

Neighbouring properties may be impacted by hazards and risks of the Project, should the hazard spread from the Project Site. As discussed in Section 2 of this EIS, the closest buildings to the Project include those to the north of the Project Site within the decommissioned Wallerawang Power Station and the TransGrid Wallerawang 330kV Substation to the west. There are also commercial and residential areas located within the township of Wallerawang, residential properties on the eastern side of the Castlereagh Highway (Springvale Lane) and commercial businesses just south of the Project.

The Project Site and immediately surrounding areas is largely rural in nature and comprise undeveloped grasslands, plantations and several forestry areas. Areas around the Coxs River and Lake Wallace and surrounds to the west is used recreationally for camping and fishing.

15.3 Assessment of impacts

15.3.1 Hazard identification and consequence analysis

Hazard Identification (HAZID) was used to identify all reasonably foreseeable hazards and associated events that may arise due to the operation of the facilities and to define the relevant controls through a systematic and structured approach. The HAZID process was completed using the following input:

- Review of the battery Safety Data Sheet (SDS)/emergency response guide for potential hazardous events and controls provided.
- Review of AS/NZS 5139:2019 Electrical installations – Safety of battery systems for use with power conversion equipment.
- Literature detailing research of past incidents involving similar BESS systems.
- Previous risk assessments for similar BESS systems.

Events with the potential to result in substantial impacts to people (i.e. injury and/or fatality) were identified, but excluded hazards related to Occupational Health & Safety (OH&S), e.g. slips, trips and falls.

Table 15-1 summarises the hazards and events identified for the Project using the methodology described in Section 15.2. Table 15-1 also identifies the specific BESS components which may have a potential for creating hazards and risk impacts.

Table 15-1 *Identified hazards and events applicable to BESS components*

Hazard	Event	Battery Modules	BMS	TMS (HVAC)	PCE (e.g. Inverters
Electrical	Exposure to voltage	✓	✓	-	✓
Energy	Release of energy (i.e. arc flash)	✓	✓	-	✓
Fire	Infrastructure fire, exposure to overhead line	✓	✓	✓	✓
Chemical	Release of hazardous materials	✓	✓	✓	-
Explosive gas	Generation of explosive gas	✓	-	✓	-
Reaction	Battery thermal runaway	✓	-	-	-

Hazard	Event	Battery Modules	BMS	TMS (HVAC)	PCE (e.g. Inverters
EMF	Exposure to Electric and Magnetic Fields	✓	✓	-	✓
External Factors	Unauthorised access/trespasser, bushfire, lightning storm, water ingress (rain and flood, loss of containment from firewater tank), loss of containment from Wallerawang Power Station Ash Repository and Dam	✓	✓	✓	✓

Note: BMS (battery management system), TMS (thermal management system), HVAC (heating, ventilating and air conditioning), PCE (power conversion equipment)

No other hazardous materials or dangerous goods apart from the battery components are expected to be stored or present on-site. Two 20,000 litre water tanks for firefighting purposed would be located at the BESS facility. The firewater tanks are not expected to be a hazard source affecting the BESS facility in terms of off-site impact. The Wallerawang Power Station Ash Repository and Dam (ash dam) was considered a potential hazard source in terms of flooding the site's BESS facility. However, given the ash dam is located over 1.2 kilometres away from the Project, and based on the dam wall position and topography, any spillage from the ash dam would not affect the operational BESS facility.

The potential causes and consequences of the hazard events (summarised in Table 15-1) have been detailed in a HAZID Register included Table 4.3 of the PHA (Appendix I). The hazard events were assessed for potential of causing significant off-site impacts (i.e. injury/fatality).

The HAZID found that for all identified events, the resulting consequences are not expected to have significant off-site impacts. This was determined based on:

- The distance between the Project and the nearest residential receivers at Springvale Lane and Wallerawang Township. The nearest school (Pied Piper Preschool) and hospital (Lithgow Medical Clinic) are located approximately 1.7 kilometres and 10.5 kilometres away from the Project Site respectively
- The localised nature of any hazardous events (e.g. thermal runaway) resulting in potential fire and explosion, therefore no potential for significant off-site consequences.
- The design of the BESS. The BMS provides protection against overheating, overcharging and thermal runaway and fires within the modular units and therefore can be contained preventing escalation.

The HAZID Register has also identified the relevant controls which will be implemented to minimise the potential impacts. The HAZID register identified 13 hazardous events. As the nearest residential receivers (Springvale Lane residents) are located about 650 metres south-east of the nearest BESS enclosure, no events with the potential for significant off-site impact (i.e. serious injury and/or fatality) to the public or off-site receptors were identified.

Based on the above findings, and the MLRA guidance to determine the required level of analysis for the PHA, a fully qualitative approach (i.e. Level 1 analysis) was determined to be appropriate for this study. The risk analysis is presented in Section 15.3.2.

15.3.2 Risk assessment

Risk is defined as the likelihood of a specified undesired event occurring within a specified period or in specified circumstances. It may be either a frequency (the number of specified events occurring in a unit

of time) or a probability (the probability of a specified event following a prior event) depending on the circumstances.

This risk assessment was based on the risk matrix shown in Figure 15-1.

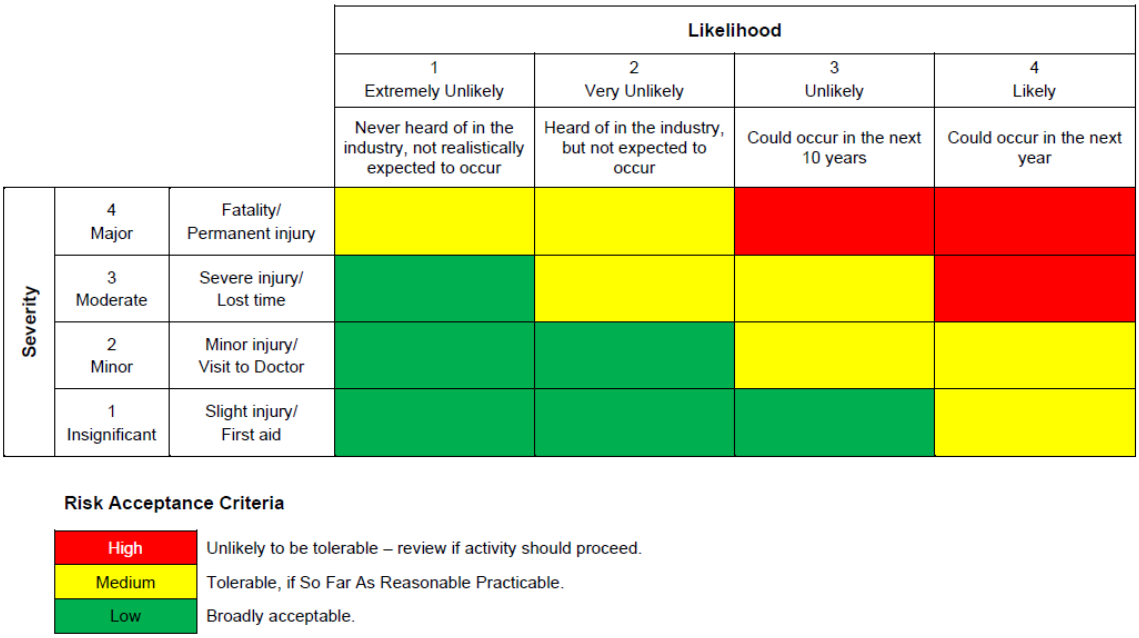


Figure 15-1 Qualitative risk matrix (Source: Sherpa, 2021)

Table 6.1 of the PHA (Appendix I) provides details on the risk assessment for each of the events. The qualitative risk results for the identified events are summarised in Table 15-2.

Table 15-2 Summary of risk analysis

Rating	Number	Comment
High	None	Not applicable
Medium	1	This relates to unauthorised person access to the proposed BESS area resulting in vandalism / asset damage to the infrastructure, with no significant off-site impact expected. A severity rating of 'Major' was assigned to account for the trespasser potentially injuring themselves in the act. The PHA noted that the controls for this event are well understood, and the likelihood was rated as 'Very Unlikely'
Low	12	Most of these relate to fire and/or explosion events, with no substantial off-site impact expected (i.e. more likely to affect on-site employees). The recent fire at the Moorabool battery facility in Victoria highlights that there is some risk of fire with large scale battery systems. The fire did not occur during operations but during pre-commissioning testing and Tesla (battery supplier for the Moorabool site) has previously safely installed more than 5GWh of grid scale BESS globally at more than 900 sites. The battery systems are designed to meet latest fire and safety codes and standards requirements (NFPA 855 and IFC 2018/2021), and the Moorabool fire was contained within 24 hours. Although possible, fires in BESS systems are an infrequent occurrence. Based on the controls provided in Table 15-4, the highest likelihood for these events were rated as 'Very Unlikely'

15.4 Assessment against HIPAP No. 4 criteria

The DoP formulated and implemented risk assessment and land use safety planning processes to account for both the technical and the broader locational safety aspects of potentially hazardous industry. These processes are implemented as part of the environmental impact assessment procedures under the EP&A Act. A number *of Hazardous Industry Advisory Papers (HIPAPS)* and other guidelines have been published by the Department to assist stakeholders in implementing the process.

A qualitative assessment against the HIPAP No. 4 – Risk Criteria for Land Use Safety Planning risk criteria was undertaken. The Project was found to comply with all of the criteria.

15.5 Assessment against ICNIRP

An assessment of the potential hazards and risks associated with electromagnetic fields was undertaken using the International Commission on Non-Ionizing Radiation Protection (ICNIRP) *Guidelines for limiting exposure to Time-varying Electric, Magnetic and Electromagnetic Fields* (EMF) (ICNIRP Guidelines).

15.5.1 Electric and magnetic fields (EMFs)

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. EMFs are also produced wherever electricity or electrical equipment is in use (e.g. household appliances, powerlines). Characteristics of EMFs are summarised in Table 15-3.

Table 15-3 Summary of EMF characteristics

EMF	Description	Units
Electric fields	• Created where there is flow of electricity • Related to and directly proportional to voltage • Strength of electric fields are weakened due to shielding effects from common materials	volts per metre (V/m) or kilo volts per metre (kV/m).
Magnetic field	• Created whenever electric current flows • Directly proportional to the current • Strength of magnetic fields are not weakened due to shielding effects from common materials	Tesla (T) or Gauss (G).

Use of electricity means that people are exposed to EMF as part of daily life. Background electric fields in a typical home are around 20 V/m but are dependent on a number of factors (i.e. number and type of appliances, configuration, positioning etc). For comparison, the typical EMF strengths for common household electrical appliances (at distance of 30 cm) are identified in Table 8.1 of Appendix I.

EMFs associated with the generation, distribution and use of electricity power systems in Australia which have a frequency of 50 Hertz (Hz) are classified by Energy Networks Australia (ENA) as Extremely Low Frequency (ELF). ELF EMF occupies the lower part of the electromagnetic spectrum in the frequency range 0-3000 Hz.

15.5.2 Effects of human exposure to EMFs

Studies have been conducted to determine the effects of EMF exposure. These have been summarised into acute and chronic effects. In general exposure to high levels of EMFs is not normally found in the everyday environment from electrical sources. Some studies have linked prolonged exposure of EMF to increased rates of childhood leukaemia. However, it is the ICNIRP view that the current existing scientific evidence is too weak to ascertain a causal relationship (refer to Appendix I for more information).

Although the adverse health impacts have not been established, the possibility of impact due to exposure to EMF cannot be ruled out. As part of a precautionary approach, the PHA (Appendix I) considered the typical EMF exposure levels from the proposed Project components.

15.5.3 Guidelines for EMF exposure

ICNIRP guidelines for limiting EMF exposure assist in providing protection against adverse health effects. Separate guidance is given for general public and occupational exposure within the guideline.

15.5.4 EMFs of proposed Project infrastructure

Project infrastructure that has the potential to generate EMF include:

- **Power conversion equipment:** The highest direct current (DC) and alternating current (AC) magnetic fields are adjacent to the inverters and transformers and were identified as being lower than the ICNIRP's occupational exposure limit. The strength of the magnetic field attenuates rapidly with distance, and electric fields were negligible to non-detectable.
- **Substation and transformers**: Main sources of magnetic fields within a large substation include transformer secondary terminations, cable runs to the switch room, capacitors, reactors, bus-bars, and incoming and outgoing feeders. For the majority of the cases, the highest magnetic fields are at the boundary and come from the incoming and outgoing transmission lines, the application of electrical safety standards and codes (e.g. fence, enclosure, distance) would result in exclusion of general public exposures from these sources.
- **Transmission lines:** The magnetic field from transmission lines would vary with configuration, phasing and load. The typical magnetic fields near transmission lines measured at one metre above ground level range between 1-20 µT (directly underneath) and 0.2-5 µT (at the edge of the corridor).
- **BESS:** The magnetic field associated with a BESS will vary depending on a number of factors including configuration, capacity and type of housing. Due to the limited information on batteries, the study has assumed the typical magnetic field is not too dissimilar with that of a substation given the proposed designs which include dedicated housing (e.g. enclosures/large building) and also assumed that the BESS will be designed in accordance with electrical safety standards and codes which would result in exclusion of general public exposures from these sources.

15.5.5 Potential impacts of Project EMFs

The potential impacts of EMF exposure would be limited through the following control measures:

- The design, selection and procurement of electrical equipment for the project will comply with relevant international and Australian standards.
- Location selection for the project infrastructure (i.e. accounts for separation distance to surrounding land uses including neighbouring properties and agricultural operations) and fencing within the

project boundary will assist to limit the exposure to EMF for the general public. The distance between the proposed location of the BESS enclosure to the nearest residential receiver at Springvale Lane is approximately 500 m.

- Occupied buildings are located well away from the BESS and proposed components.
- Exposure to EMFs (specifically magnetic fields) from electrical equipment would be localised and the strength of the field attenuates rapidly with distance.
- There is incidental shielding (i.e. the BESS enclosure, substation) and warning signs would be placed within the site and surrounds.

An assessment of EMF impacts from Project infrastructure has been undertaken in accordance with the ICNIRP. In consideration of the controls listed above, the assessment found that EMF from the Project will not exceed the ICNIRP occupational exposure reference levels because:

- Strengths of EMF attenuate rapidly with distance.
- The ICNIRP reference level for exposure to the general public will not be exceeded and impact to the general public in surrounding land uses will be negligible.

Using the risk matrix provided in Figure 15-1, the risk from EMF for the Project was determined to be 'Low' for the following reasons:

- Consequence from exposure to EMFs was assumed to be 'Insignificant' (the lowest level in the matrix). Given the remote location of the BESS and associated infrastructure, the Project is not expected to have off-site impact.
- Likelihood of EMF exposure to the general public was assumed to be 'Extremely Unlikely', while for on-site personnel, the likelihood of EMF exposure is 'Very Unlikely' provided that controls in Section 15.5 are adhered to and avoidance of exposure is practiced (assuming temporary and short-term occupation of Project locations).

15.6 Mitigation measures

This section details the mitigation measures that would be implemented to minimise the potential impacts from hazards and risks of the Project.

Table 15-4 Hazards and risk mitigation measures

ID	Mitigation
Design	
H&R1	Equipment and systems will be designed and tested to comply with relevant international and/or Australian standards (e.g. AS 5139) and guidelines.
Operation	
H&R2	All staff working on-site will undertake a site induction/substation training (i.e. high voltage areas) appropriate to the work activities.
H&R3	Installation and maintenance activities will be undertaken by trained personnel and by reputable contractors
H&R4	All Decisive Voltage Classification (DVC) will be followed, and equipment marked accordingly.
H&R5	An electrical switch-in and switch-out and BMS fault detection and safety shut-off protocol will be developed

ID	Mitigation
H&R6	Warning signs (e.g. electrical hazards, arc flash) will be installed on-site (as required)
H&R7	Earthing will be installed as per manufacturer and standards requirements
H&R8	Appropriate PPE for flash hazard within the arc flash boundary will be used by all staff working in this environment. Conductive items will not be worn while working on or near energised or live conductive parts (e.g. rings, jewellery).
H&R9	Rescue kits (i.e. insulated hooks) will be available on-site
H&R10	An Emergency Response Plan will be prepared as part of the OEMP, which will include firefighting assistance (FRNSW & RFS) from nearby fire stations (i.e. Wallerawang, Lithgow, Lithgow West)
H&R11	The Operation Environmental Management Plan (OEMP) prepared for the Project will include procedures and measures for managing accidental spills during operation.
H&R12	The site will be fenced off with appropriate security measures (e.g. locked gates, CCTV) and will also include hazard/danger signage.

16 Water quality, flooding and water use

This chapter describes the potential water quality, flooding and water use impacts associated with the Project. A Neutral or Beneficial Effect on Water Quality (NorBE) assessment has been undertaken by Arcadis and a Flooding Assessment has been prepared by Hydrology and Risk Consulting Pty Ltd. The NorBE and Flooding assessments have been provided as Appendix J and Appendix K of this EIS respectively.

Appendix A provides a summary of the relevant SEARs which relate to water quality and where these have been addressed in this EIS.

16.1 Methodology

The Water Quality and Flooding Assessment has identified the potential impact associated with the Project as it relates to three key aspects:

- Water quality
- Flooding
- Water use.

16.1.1 Water quality

The Proposal would have the potential to generate pollutants that may impact water quality. These pollutants may include:

- Gross Pollutants (including organic matter, leaves and rubbish)
- Total Suspended Solids (TSS) generated from sediment and dust generating activities
- Total Phosphorus (TP) generated from runoff over leaf litter, soil particles and waste, as well as from general atmospheric deposition
- Total Nitrogen (TN) generated from organic material, as well as from general atmospheric deposition.

As the Project Site is located in the Coxs River Catchment that supports Sydney's main water supply, the assessment of potential water quality impacts specifically a Neutral or Beneficial Effect (NorBE) assessment in accordance with the provisions of *State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011* is required.

Objectives and performance targets have been set to minimise the potential for the above pollutants to impact receiving waterways. Objectives and targets have been derived from a review of:

- Water NSW's current recommended practices and standards
- The provisions of *State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011.*

A Model for Urban Stormwater Improvement Conceptualisation (MUSIC) has been utilised to determine the effectiveness of the proposed operational water quality controls in mitigating impacts and aims to demonstrate compliance with the NorBE criteria. MUSIC was used to simulate the performance of stormwater management systems to determine the pollution reduction achieved for TSS, TP and TN.

The MUSIC model incorporated the following parameters:

- Rainfall data (such as annual rainfall and moisture rates)
- Rainfall runoff parameters (such as soil moisture storage properties)
- Pollution concentrations that would be generated on the Project Site
- The treatment controls incorporated into the design (existing and proposed).

Assessment criteria

Using MUSIC in the Sydney Drinking Water Catchment (Water NSW, 2012), provides guidance on the NorBE criteria and how proposed developments in the Sydney drinking water catchment should demonstrate achieving it, which includes:

- The mean annual pollutant loads for the post-development case (including mitigation measures) should aim for 10% less than the pre-development case for TSS, TP and TN. For gross pollutants, the post-development load only needs to be equal to or less than pre-development load.
- Pollutant concentrations for TP and TN for the post-development case (including mitigation measures) must be equal to or better compared to the pre-development case for between the 50th and 98th percentiles over the five-year modelling period when runoff occurs. Periods of zero flow are not accounted for in the statistical analysis as there is no downstream water quality impact.
- To demonstrate this, comparative cumulative frequency graphs, which use the Flow-Based Sub-Sample Threshold for both the pre- and post-development cases must be provided. As meeting the pollutant percentile concentrations for TP generally also meets the requirements for TSS, cumulative frequency analysis is not required for TSS. Cumulative frequency is also not applied to gross pollutants

16.1.2 Flooding

New amendments to the 'Flood Planning' provisions of the Standard Instrument local environmental plans Schedule 4 of the EPA Regulation 2000 took effect on 14 July 2021. The new provisions have been introduced in connection with the NSW Government's new 'flood-prone land package' which aims to improve the management of flood risk in light of recent flooding events that have caused significant risk to life and damage to property, including up to and beyond the 1% annual exceedance probability (AEP) flood level. To achieve this, consent authorities need to consider the full range of flood behaviour, such as the upper bound of possible flood impacts (the probable maximum flood[6] (PMF)) as well a more frequent event (e.g. 10% AEP).

The Project Site is located adjacent to the Coxs River on potentially flood prone land. To assess the potential for flooding impacts on the Project Site and the impact of the Project on local flood regimes a flooding assessment has been prepared by Hydrology and Risk Consulting Pty Ltd (HARC) (Appendix K of the EIS)[7]. The assessment considers these new amendments.

The hydrological assessment was undertaken using a rainfall runoff model (RORB). Results from RORB were used to inform a two-dimensional (TUFLOW) model, modelling the existing and proposed

[6] Probable Maximum Flood (PMF) is the largest flood that could conceivably be expected to occur at a particular location, usually estimated from probable maximum precipitation. The PMF defines the maximum extent of flood prone land, that is, the floodplain. It is difficult to define a meaningful Annual Exceedance Probability for the PMF, but it is commonly assumed to be of the order of 10^4 to 10^7 (once in 10,000 to 10,000,000 years) (State Emergency Services NSW flood plan glossary, February 2018)

[7] https://www.planning.nsw.gov.au/Policy-and-Legislation/Resilience-and-natural-hazard-risk/Flooding

conditions. The 5% AEP, 1% AEP and PMF design events were established through the RORB model and then modelled using TUFLOW to establish the existing flood extents.

The Project would provide a 'pad' for the proposed battery which would involve filling in an ephemeral natural creek through the centre of the site by moving fill from the south and eastern sides of the site. The cut and fill locations for the Project Site are shown in Figure 4-4.

Note that since the preparation of the flooding assessment the cut and fill plan has been refined as part of the design process to optimise site design. Minor changes to cut and fill levels are not anticipated to affect the outcomes of the flooding assessment.

A 1.2 metre diameter pipe has been assumed to convey the flows of the ephemeral waterway (natural creek) traversing the Project Site. The pipe size was based on capacity to handle a 1 in 100 AEP flow (i.e. 5.5 m^3/s).

16.1.3 Water use

The Project would use water during both the construction and operation phases, primarily for the following activities:

- Construction:
  - Dust suppression
  - To mix concrete
  - Washdown and cleaning.
- Operation:
  - Fire management (using on-site firewater tanks).
  - Site office amenities.

Given the minimal water requirements during operation the operational Project would not be connected to the potable water mains and would utilise captured or imported water. A qualitative assessment of water use for the Project has been undertaken.

16.2 Existing environment

16.2.1 Climate

Mean rainfall, determined using data obtained from the Bureau of Meteorology over the period 1960 to 2020, is greatest in January, with a mean monthly rainfall of approximately 85.1 mm. Mean rainfall is generally lowest in April, with a mean monthly rainfall of approximately 42.5 mm.

Mean monthly maximum temperatures generally peak in January at 26.6°C. Mean monthly minimum temperatures generally occur in July, and are approximately 1°C.

16.2.2 Coxs River catchment

The Project Site is located within the Coxs River catchment. The Coxs River is a perennial river that forms part of the broader Hawkesbury-Nepean catchment and the Warragamba Dam catchment that supports Sydney's main water supply, Australia's largest urban water supply. The Coxs River runs through the Wallerawang Power Station site and continues south leading into Lake Wallace, directly south-west of the Project Site. The water quality of this section of the river has been impacted by the extensive mining and agricultural land uses within the catchment which have the potential to contribute pollutants.

The sub-catchment area directly upstream of the Project Site is primarily grassed agricultural land with small areas of remnant native vegetation.

16.2.3 Hydrological conditions

The Project Site is largely rural in nature and has been modified by historic agricultural land uses. The Project Site currently comprises cleared paddocks featuring exotic and native grasses and patches of remnant native vegetation. A forestry area subject to a Pine Plantation Deed is located in the central area of the Project Site (1983 forestry block). This area is largely comprised of planted Radiata Pine (*Pinus radiata*) which is managed by and will be harvested by the Forestry Corporation of NSW. This would be cleared under a separate approval (if required) prior to commencement of construction of the Project and only tree stumps would remain. For the purposes of this assessment the cleared forestry area is considered to be the 'existing environment'.

The Project Site generally slopes downwards in an east to west direction. An ephemeral creek runs through the central area of the pine forest area connecting catchments to the east of the Project Site with the Coxs River. Within the Project Site this creek has both very shallow channelised areas and areas of overland flow.

With the exception of two culverts beneath the existing site access road and a culvert beneath the former rail line, there are no formal drainage structures located on the site.

It is expected that regional groundwater would flow in an eastward direction following the decline in the regional sedimentary geology. On a local level, it is expected that ground water within the Project Site would flow in approximately a westerly direction to the Coxs River and Lake Wallace.

A search of the Australian Groundwater Explorer was undertaken to identify if there are any groundwater bores within five kilometres of the Project Site. There is one functional bore located about four kilometres north-east of the Project and is used for commercial and industrial purposes and also 20 boreholes used for groundwater monitoring.

16.2.4 Flooding

The existing site flooding conditions have been modelled by HARC as presented in Appendix K of the EIS. As noted, the Project Site is located adjacent to the Coxs River and Lake Wallace. In accordance with the new 'Flood Planning' provisions the 1% AEP, 5% AEP and PMF was assessed for the site. As show in the figures below the existing flooding conditions for the Project Site can be summarised as follows:

- In a 5% AEP scenario, the Project Site would be unaffected by flooding from Lake Wallace. However, there would be a minor increase in the width of the overland flow from the ephemeral creek within the Project Site (See Figure 16-1).
- In a 1% AEP scenario, the Project Site would remain unaffected by flooding from Lake Wallace and there would be a further increase in the width of overland flow from the ephemeral creek within the Project Site (see Figure 16-2).
- In a PMF scenario, the site would be flood affected along the western side from Lake Wallace and the area inundated with overland flow from the ephemeral creek within the Project Site would also increase (see Figure 16-3).

Figure 16-1 Existing flood extent for the 5% AEP

Figure 16-2 Existing flood extent for the 1% AEP

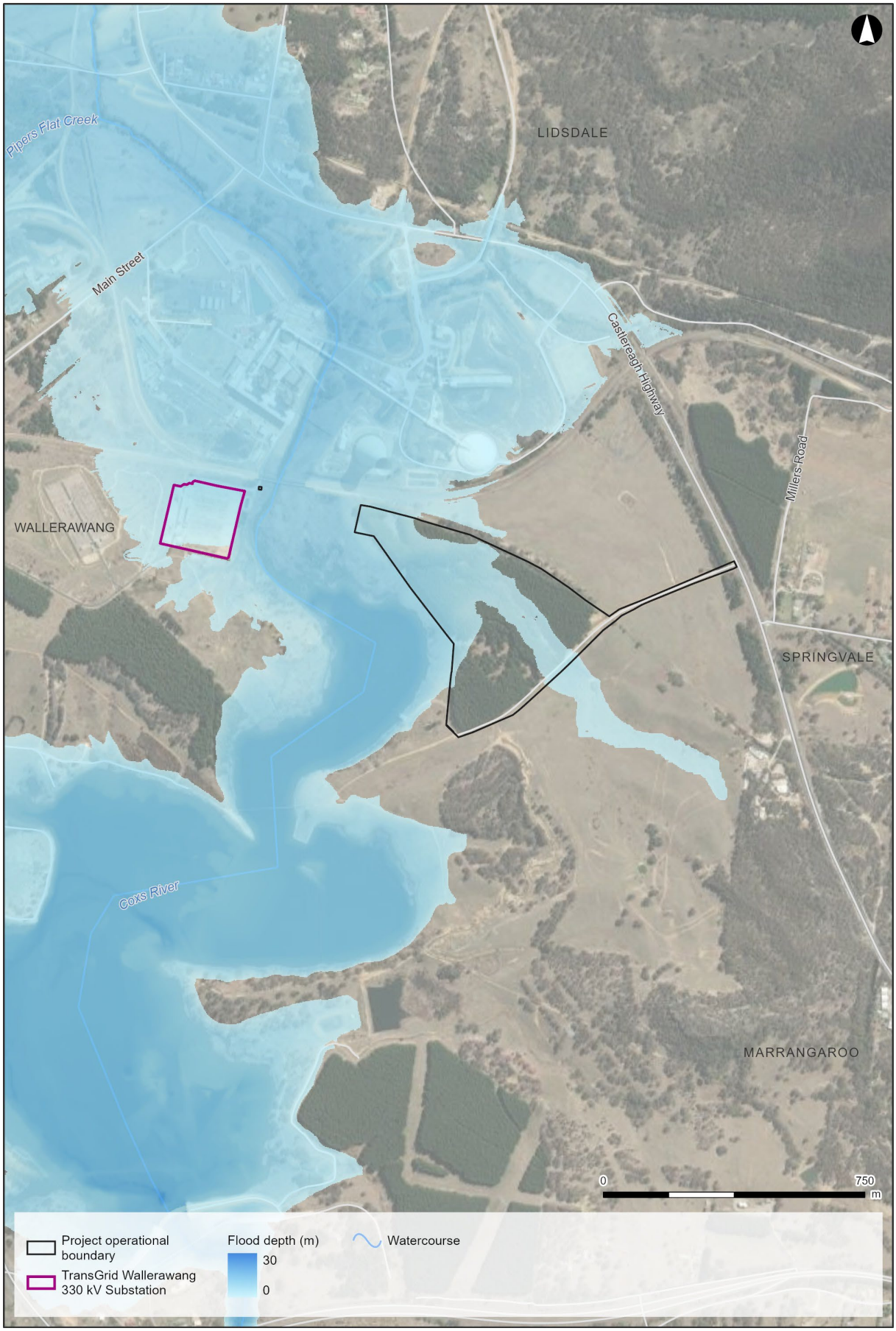


Figure 16-3 Existing flood extent for the PMF

16.3 Potential impacts

16.3.1 Construction

Water quality

Bulk earthworks and vegetation clearing activities during construction, if not managed properly, could result in increased mobilisation of soil and increased surface water runoff (e.g. sediment laden "dirty" water) into the downstream receiving waters of the Coxs River. This could also include pollutants (such as oil, hydraulic fluids and fuels) from spills or leaks from equipment.

To manage the potential water quality impacts during construction an erosion and sedimentation control plan would be prepared in accordance with the guidelines in *Managing Urban Stormwater: Soils and Construction* (Landcom 2004). The controls identified within the plan would be established prior to the commencement of construction of the Project to protect the receiving waters and to manage sediment laden runoff.

Given the temporary nature of the proposed construction works and implementation of erosion and sediment control features, the impacts to surface water are considered minor. Any potential minor impact can be adequately controlled and further minimised through the implementation of mitigation measures described in Section 16.4.

Groundwater

Footings for the transmission towers would extend up to 10 metres deep and would have the potential to encounter groundwater. Excavation for transmission tower footings would be short term and minimised where possible. Any groundwater which is evident in excavations will be either recharged into the groundwater aquifer at the same location or collected and taken off-site for disposal/treatment. It is envisaged that due to the small footprint of excavations for footings, groundwater would largely be able to be recharged to the local aquifer without requiring off-site transportation. No groundwater would be discharged into surrounding surface water bodies near the Project Site.

Under clause 7 of Schedule 4 of the *Water Management (General) Regulation 2018*, a person can take up to 3 ML of groundwater through an aquifer interference activity per authorised project per water year without needing to obtain a water access licence, provided certain conditions are met.[8]: It is considered unlikely that more than 3 ML of groundwater will be extracted. In the event that extraction of more than 3 ML per year of groundwater is required, a relevant water access license in accordance with the *Water Management Act 2000* would be obtained.

As the construction of the Proposal involves vegetation removal and earthworks the surfaces within the catchment and the nature of the stormwater flows into surrounding waterways would change as the works progress over time. These changes would be temporary and would be managed by water management infrastructure in accordance with a soil and water management plan. It is not anticipated that the Proposal would intercept groundwater during the main earthworks for the Project Site

Flooding

Generally, the Project earthworks would involve 'levelling of the site' where isolated elevated sections of the Project Site would be redistributed across depressions on the site.

[8] https://www.industry.nsw.gov.au/natural-resources-access-regulator/licensing-and-approvals/groundwater-wal

Water use

The construction of the Project would have a limited water demand. Water may be used during dust suppression and to mix concrete for use on site. This water would be supplied by truck as required. Some water may also be required for construction site office facilities (e.g. for showers and kitchen use).

16.3.2 Operation

Water quality

The removal of vegetation and inclusion of hardstand (roads and footings) and gravel areas has the potential to result in impacts to water quality during operation of the Project from the entrainment of pollutants associated with operations in stormwater. Potential pollutants include litter, sediments and nutrients from exposed surfaces and hydrocarbons (chemicals, oils, greases) from vehicles and operational equipment. These pollutants have the potential to degrade the water quality of the surrounding waterways, in particular the Coxs River.

The operational water quality assessment identifies a series of stormwater treatment measures that would be incorporated into the design of the Project to manage water quality during operation of the Project. Stormwater treatment measures are detailed in Appendix J and would include:

- All roads would be provided with grassed swales.
- A bioretention basin with an average surface area of 2,821 m^2 would be provided.
- Collected runoff from the BESS facility, switching yard, office/carpark and the majority of the access road would be treated by a Gross Pollutant Trap (GPT) before entering the bioretention basin.

MUSIC modelling was used to assess the effectiveness of the proposed stormwater treatment measures described above. As shown in Table 16-1, MUSIC modelling results for the proposed development indicate that the proposed measures (i.e. the grassed swales, GPT and bioretention basin) successfully achieve the NorBE criteria in relation to mean annual pollutant loads.

Table 16-1 MUSIC modelling results for NorBE assessment

Condition	Gross Pollutants Kg/year	TSS Kg/year	TP Kg/year	TN Kg/year
Pre-development	978	22,800	40	235
Post-development	721	8,900	23	207
Reduction achieved	26%	61%	43%	12%
Reduction required	0%	10%	10%	10%

In addition to the NorBE criteria, the NorBE approach also includes the requirement that pollutant concentrations for TN and TP for the Project are to be equal or better compared to 'without Project' levels, between the 50th and 98th percentiles over the 5-year modelling period when runoff occurs. The model shows that the Project meets the criteria for TN. However, as shown in the cumulative frequency plots for TP concentration in the MUSIC model (Appendix J), TP concentrations are very marginally higher than 'without Project' conditions. Further MUSIC modelling would be undertaken during the refined detailed design stages of the Project to ensure TP concentrations are within the prescribed NorBE criteria.

Groundwater

There is unlikely to be any impacts to groundwater during operation of the BESS.

Flooding

TUFLOW flood modelling was undertaken for the Project to compare the existing and proposed flood conditions for the 1% and 5% AEP and the PMF events. The change in flood levels (afflux) as a result of the Project are shown in Figure 16-4, Figure 16-5 and Figure 16-6.

The assessment shows that for both the 1% and 5% AEP events, there is minimal change to the flood extent. Impacts are largely contained to the area immediately downstream of where the proposed pipe (refer to Section 16.1.2) discharges back onto the floodplain. All changes to the flood regime would be on land owned by the Proponent. An assessment of the depth and velocity changes associated with the Project shows there is minimal incremental impact (less than 100 mm) between the existing and development scenarios for all AEPs.

In the PMF there would be additional flooding across the BESS and substation areas of the site with additional sheet flow of approximately 100 mm depth. The sheet flow is a result of the levelling of the BESS area, as the area slowly drains due to the lack of gradient. The PMF results should be considered as an initial assessment which are likely to be conservative.

Water use

The key demand for on-site water relates to the following activities:

- Internal potable water (for showers and kitchen use)
- Internal non-potable (e.g. toilet flushing)
- Irrigation and landscaping
- Fire water tanks.

A water tank would be provided adjacent to the Project Site offices to collect rainwater from roof areas and provide a valuable on-site water supply. Given the low staff numbers on the operational Project site, it is anticipated that the non-potable water demand could be met using collected rainwater.

The Project Site would not be connected to the mains water service and as such, all potable water for use in the Project office would be brought in via tanker as required.

Two 20,000 litre water tanks would be installed on the Project Site for fire suppression, if required. Water for these tanks would be brought in via tanker from off-site as required.

The water use requirements for the Project Site are minor and are not considered to be a significant impact.

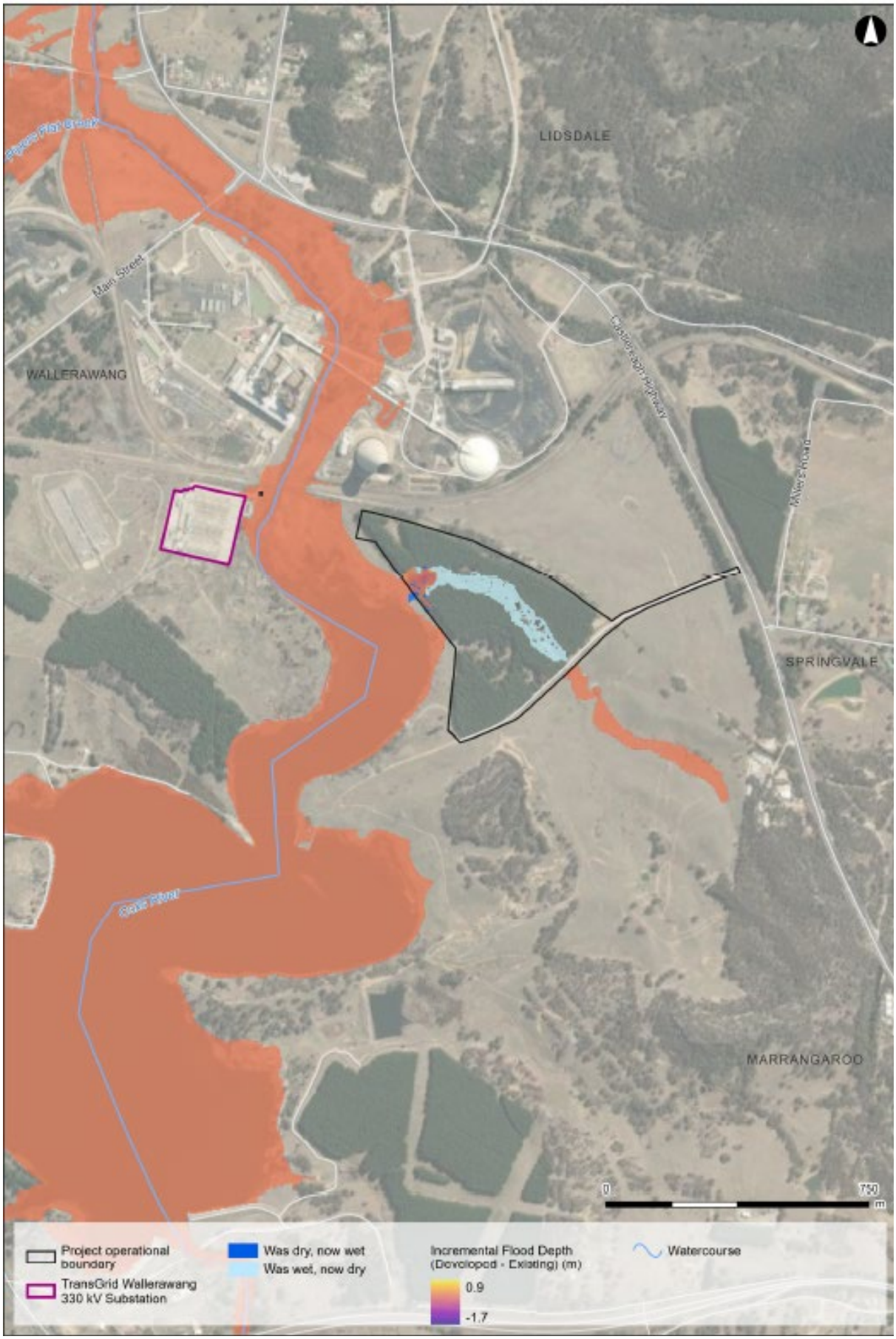


Figure 16-4 5% AEP Incremental flood depth (Project minus Existing)

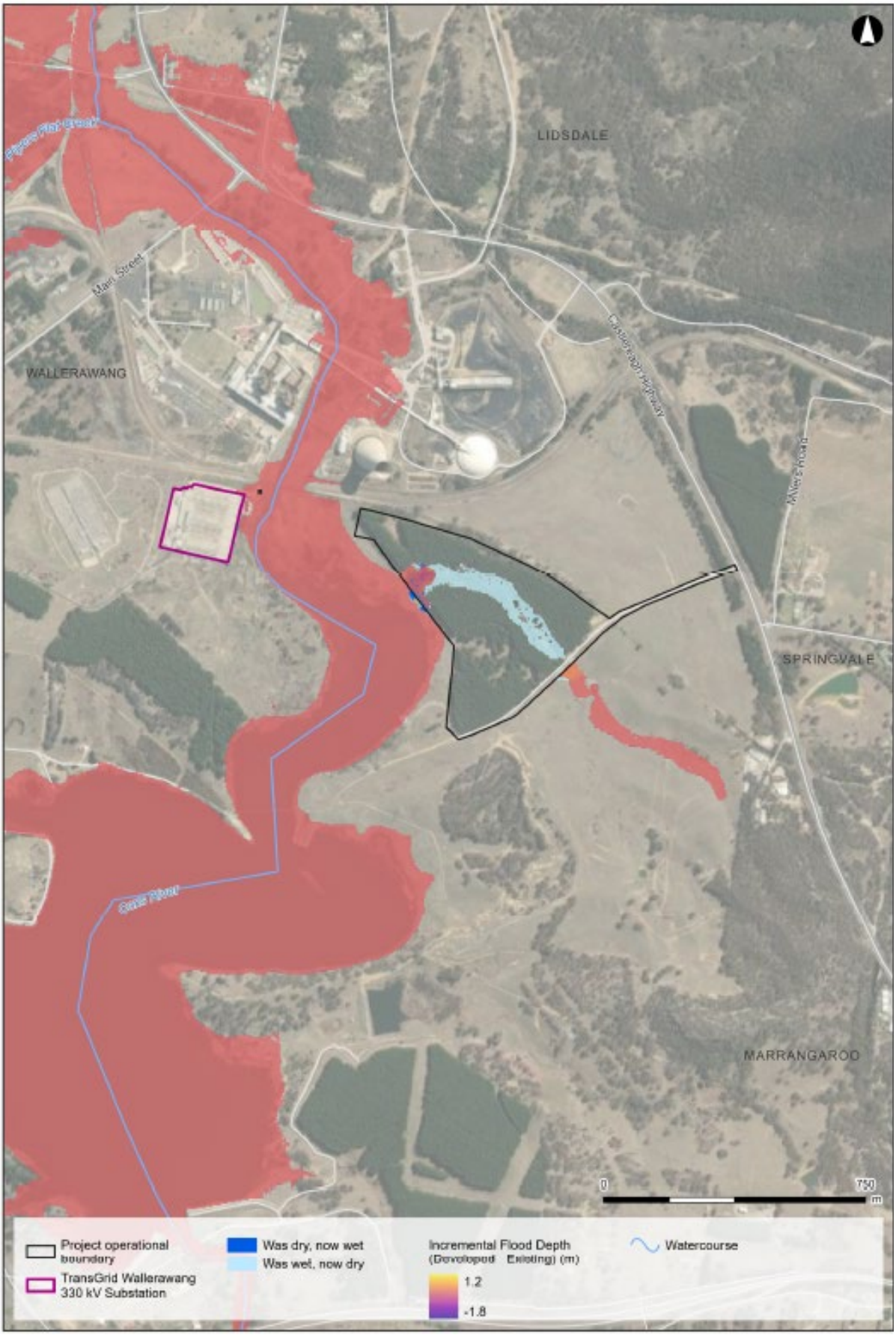


Figure 16-5 1% AEP Incremental flood depth (Project minus Existing)

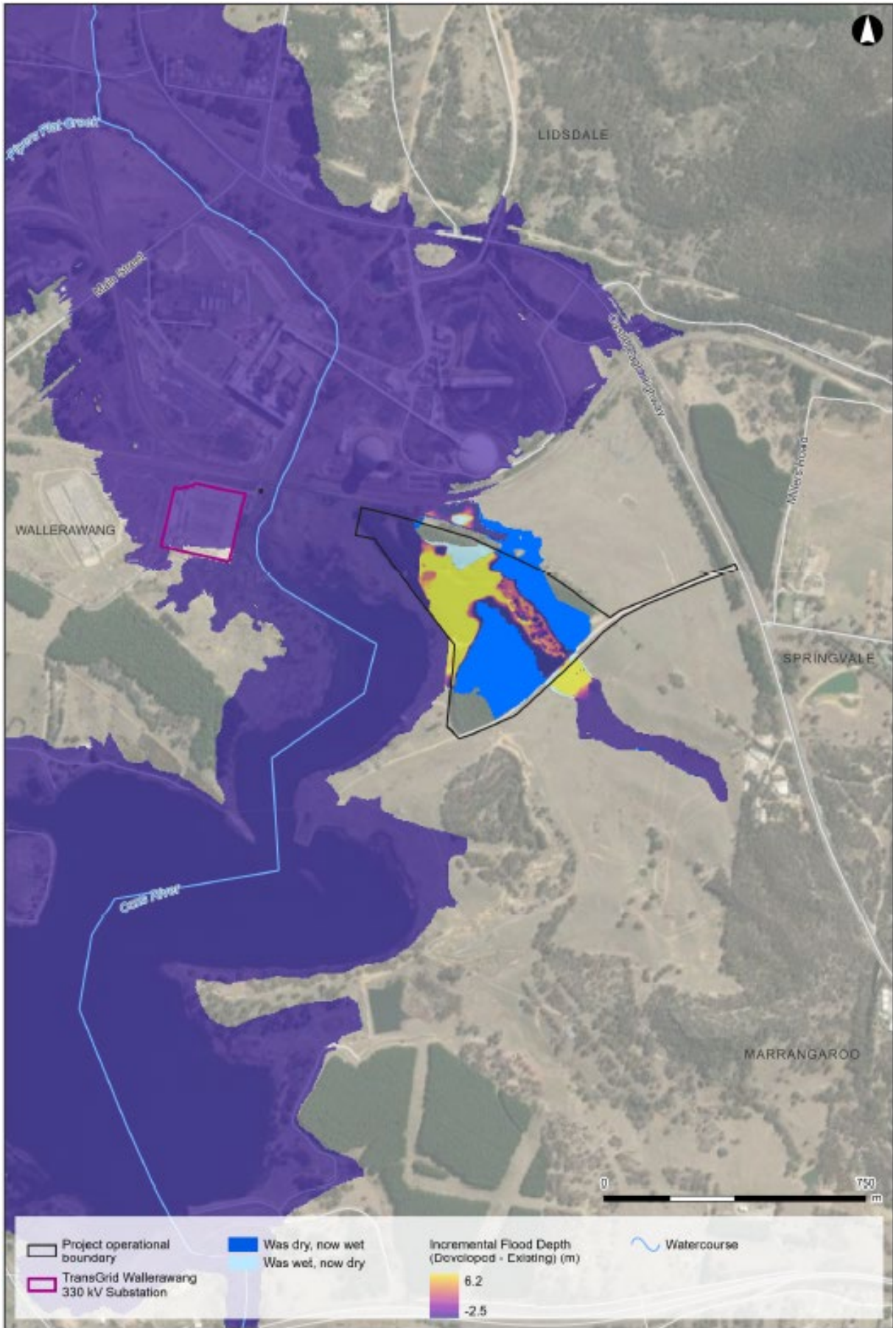


Figure 16-6 PMF Incremental flood depth (Project minus Existing)

16.4 Mitigation measures

This section details the mitigation measures that would be implemented to minimise the potential impacts from water quality and flooding of the Project.

Table 16-2 Water quality, flooding and risk mitigation measures

ID	Management measure
Pre-construction and construction	
WQF1	Prepare and implement a Soil and Water Management Plan and Erosion and Sediment Control Plans as part of the CEMP and in accordance with *Managing Urban Stormwater – Soils and Construction, Volume 2D* (Landcom, 2004).
Operation	
WQF2	The OEMP for the Project will include a management, maintenance and cleaning schedule to ensure that stormwater management system devices are regularly inspected and maintained.

17 Visual amenity

This section of the EIS provides an assessment of the potential visual amenity impacts associated with the Project. A summary of the relevant SEARs and where they are addressed in this section is provided in Appendix A.

17.1 Methodology

The visual impact of the Project was assessed via the following key steps:

1. **Viewpoint identification:** A review of the applicable guidelines and a desktop analysis of the surrounding area was undertaken to identify areas that would potentially be subject to visual impacts as a result of the Project. Based on this assessment, viewpoints were selected and are identified further in Table 17-4 and Figure 17-1.
2. **Site inspection:** Through a site inspection, the relevance of the locations identified in the previous step could be validated. Photographs were taken from key viewpoints and are presented in *Figure* 17-1.
3. **Assessment of visual impact:** The visual impact from the key viewpoints was then assessed qualitatively on the basis of prescribed assessment criteria. This included identification of the sensitivity of the viewer and the magnitude of the modification to the view created by the Project.

The visual impact of the Project was assessed using a range of criteria against which the relative importance of each observer location was determined, including:

- Context and visual setting
- Visual elements
- Visual character
- Development and surrounding land use
- Distance to view (foreground, middle-ground, and background)
- Visual prominence of the development
- Potential changes to the view setting
- Category of viewer (e.g. resident, works, open space user)
- Importance of the view including consideration of perceived cultural and historical values.

For each viewpoint, these criteria were addressed under three categories, described in Table 17-1 below.

Table 17-1 Visual impact assessment criteria

Criteria	Description
Visual sensitivity	Visual sensitivity refers to the susceptibility of a view to accommodate change without losing valued attributes. The values of a view refer to any aspect of landscape or views people consider to be important. Visual sensitivity depends on the distance between the viewer and a development, the category of the viewer (e.g. resident, worker, open space user) and the importance of the view (e.g. is it a view people deliberately seek out). In general, views can be classified as: • High sensitivity – Locations where the quality of view is important to the viewer, there is a sustained duration of view and/or large numbers of viewers (e.g. public look-out spots)

Criteria	Description
	• Moderate sensitivity – Locations where the quality of view is important to the viewer, but the duration of views and/or number of viewers are lower than high sensitivity views (residential communities with direct view) • Low sensitivity – Locations where the quality of view is not particularly important to the viewer (e.g. industrial areas with employees focused on work).
Magnitude of visual change	• The magnitude of visual change refers to the scale of the Project and the extent and proximity of the view to it. The four levels of magnitude used in the assessment are as follows: • High magnitude – Considerable or uncharacteristic modification to the visual setting • Moderate magnitude – Prominent but not substantially uncharacteristic modification to the visual setting • Low magnitude – Minimal alteration and modification consistent with the existing visual setting • Negligible magnitude – No discernible change to the existing visual setting.
Visual impact	• The visual impact is a result of the visual sensitivity and the visual modification and is summarised on a qualitative basis. The resulting overall visual impact rating for each viewpoint was then determined using the assessment matrix presented in Table 17-2 below.

Table 17-2 Overall impact rating as a combination of visual sensitivity and visual adaption

		Magnitude of visual change			
		High	**Moderate**	**Low**	**Negligible**
Visual sensitivity	**High**	High	High-moderate	Moderate	Negligible
	Moderate	High-moderate	Moderate	Moderate-low	Negligible
	Low	Moderate	Moderate-low	Low	Negligible

17.2 Existing environment

The Project Site is located immediately south of the retired Wallerawang Power Station site, approximately 10 kilometres north of Lithgow and 115 kilometres north-west of the Sydney Central Business District (CBD). The town of Wallerawang is located approximately 1.5 kilometres west of the Project Site.

The Project Site is in an established industrial/power generation area that consists of a mix of industrial developments and electrical infrastructure including power lines, low density residential, local commercial businesses and other uses including recreational activities on Lake Wallace. The regional area is characterised by mining and agriculture.

The surrounding landscape consists of large undulating hills and fields. The landscape east of the Project Site comprises of an escarpment and native forestry backing onto Newnes Nature Reserve. Marrangaroo National Park is located approximately five kilometres to the south.

The Project Site is situated within a relatively flat landscape, adjacent to the Coxs River and Lake Wallace that runs west of the Project Site. A strip of vegetation is located alongside the Castlereagh Highway and screens from passing vehicles. Several pine forest plantations surround the Project Site. These include sparse forest located approximately 700 metres west of the Project Site, extending from the north-west

to south-east to screen any potential views from the Wallerawang township and residential area. Dense forest located 150 metres east of the Project Site parallel to the Castlereagh Highway screens residential receivers along Millers Road.

The Forestry Corporation of NSW have indicated harvesting would occur in 2033. The visual impact assessment has not been assessed post 2033, as the Forestry Corporation of NSW plan to revegetate the same areas for visual screening. Further information regarding the forestry plantations is discussed in Section 4.

Infrastructure including a series of powerlines, cooling tower, stacks and buildings associated with the retired Wallerawang Power Station site are located north of the Project Site and range from 10-80 metres in height that can be seen from multiple locations in Wallerawang.

The closest residential dwellings to construction activities are located approximately 150 metres south-east of the Project Site on Springvale Lane. The Lithgow City Rangers Soccer Club is located within the Wallerawang Power Station site, 400 metres north-east of the Project Site. The nearest business is located approximately 600 metres south of the Project Site.

17.3 Potential impacts

17.3.1 Construction

Construction works may be visible from Viewpoints 1 and 2. The most visible elements include construction plant and equipment such as cranes, cherry pickers and forklifts used during construction. The delivery of the BESS components would most likely occur at night with heavy vehicles travelling along the Castlereagh Highway. Given the low-rise nature of construction works and surrounding industrial land uses, it is unlikely that these works would be overly intrusive and visual impacts would be localised and temporary in nature.

17.3.2 Operation

The operation of the Project would generally be consistent with the visual built form and visual character of the broader power generation area and is not anticipated to result in substantial visual impacts to the surrounding receivers. The elements of the Project that would potentially be viewed include the overhead transmission line towers that may range between 30 and 80 metres high, the Wallerawang 330 kV Substation and BESS facility. Sensitive receivers would be shielded by the surrounding developments, native vegetation and the forestry plantations.

Table 17-3 provides an indicative list of the materials and finishes that will be used on these structures (noting that these may change during detailed design).

Table 17-3 Material and finishes

Infrastructure	Item	Indicative materials	Indicative colour palette
BESS facility and substation	Inverters and transformers	Steel	Mix of black and grey cladding Grey
	Overhead transmission lines	Towers – galvanised steel. Conductors – copper or aluminium	
Site entrance	Site entrance gate / wall	Steel	Grey/Black

Glare and reflectivity

It is not anticipated that any substantial glare or reflectivity effects would occur due to the materials used for the various Project components.

Night lighting

Night lighting will be located at the Project Site for security purposes. Lighting will be designed to ensure that there is minimal impact on surrounding receivers consistent with the night lighting standards.

Forestry

Potential visual impacts may result from 2033 for Viewpoints 1, 2, 3, 4 and 5 as a result of the operation of the Project.

Visual impact assessment

The viewpoint locations selected for the visual impact assessment are identified in Table 17-4 and displayed in Figure 17-1. Viewpoints were selected on the basis of:

- The most likely locations surrounding the Project Site which would be potentially subject to views of the Project. This was related to proximity and/or elevation.
- Representation of the range of viewer types in the area.

Table 17-4 Viewpoints surrounding the Project Site

Viewpoint ID	Location	Type	Reason for selection
01	East of the Project Site, along Springvale Lane	Residential	The closest residential land use to the east of the Project Site.
02	East of the Project Site, Project Site Access Road and Castlereagh Highway intersection	Public highway	The most likely location for the Project to be visible to users of the Castlereagh Highway.
03	North-west of the Project Site, Black Gold Motel	Commercial	The closest visually sensitive receiver to the Project Site, within the township of Wallerawang.
04	West of the Project Site, Blackett Drive, Wallerawang	Residential	The most likely location within the main residential area of Wallerawang to receive views of the Project.
05	South of the Project Site, Lake Wallace foreshore	Public open space	The most likely area of public open space to receive views of the Project.
06	South of the Project Site, GoodEarth driveway	Commercial	Representative of views from a commercial land use to the south of the Project Site.

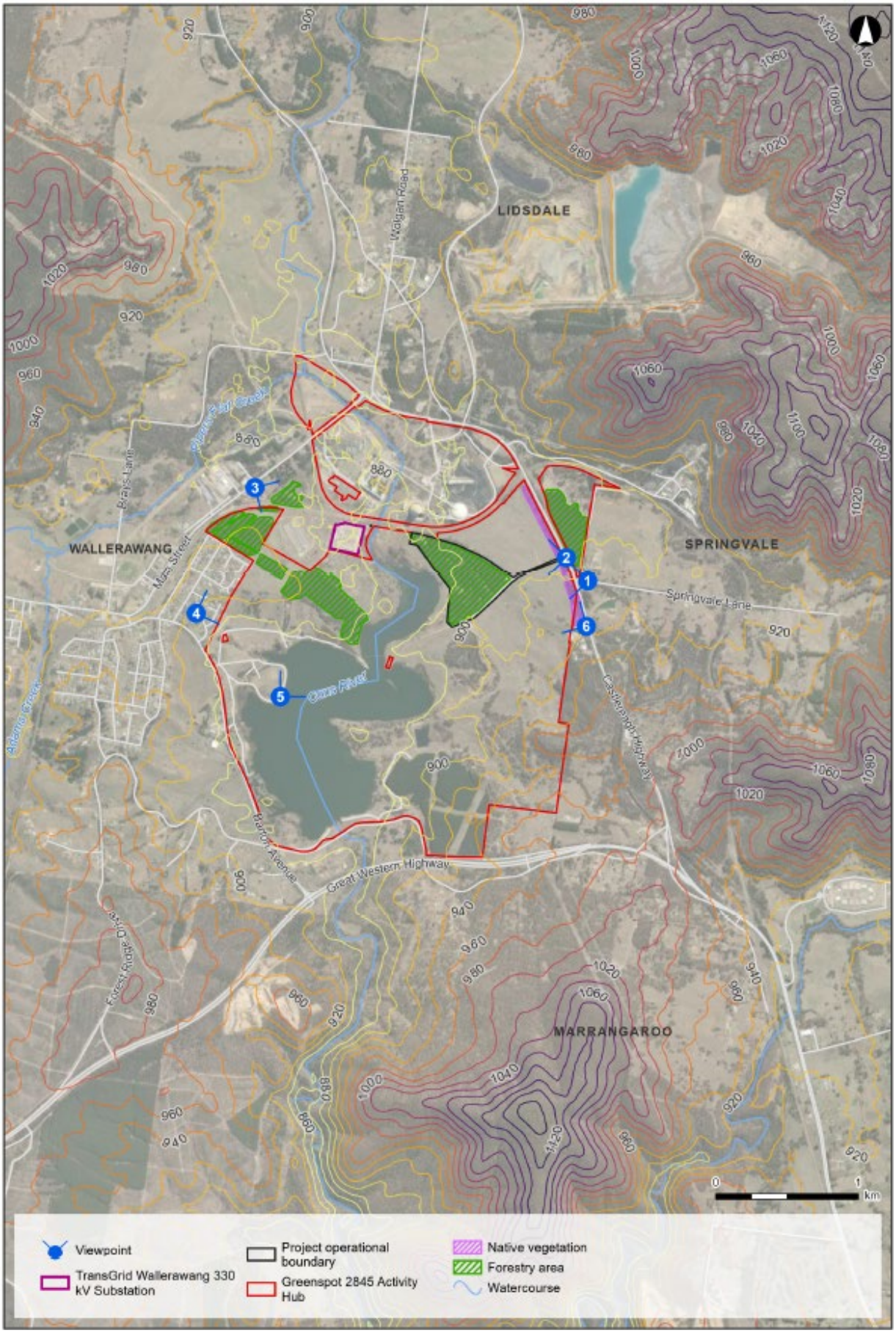


Figure 17-1 Viewpoint locations

Viewpoint 1 – East of the Project Site, along Springvale Lane

Visual sensitivity - moderate

This viewpoint represents residential views south-east of the Project Site. There are a relatively small number of viewers, but the importance of viewing quality is important, and views are of long duration. Therefore, this viewpoint is of moderate sensitivity.

Magnitude of visual change - low

This location is slightly lower in elevation in comparison to the Project Site. The BESS facility is located approximately 500 m from the residential receivers located on Springvale Lane. These receivers may potentially have glimpses of the BESS facility and substation.

Based on a moderate sensitivity and low magnitude, this viewpoint would be subject to a **moderate-low visual impact**.

Plate 17-5 Viewpoint 1
The TransGrid 330kV Substation would be immediately behind the BESS facility in this view. Intervening vegetation would largely screen both, however, there may be some glimpses between foreground vegetation and above middle ground vegetation.

Viewpoint 2 – East of the Project Site, Project Site Access Road and Castlereagh Highway intersection

Visual sensitivity - moderate sensitivity

This viewpoint is representative of the public road users on the Castlereagh Highway. It is looking down a gap in the vegetation along the highway, down the entrance access road to the site. This highway setting is characterised by rural landscape and some industrial land uses. Views of the Project Site would be brief; however, many road users would potentially be subject to these views.

Magnitude of visual change - low magnitude

Castlereagh Highway is located approximately 350 m from the operational Project Site. Road users may potentially glimpse the Project Site (predominantly the BESS facility) and associated infrastructure through gaps in roadside vegetation.

Based on a moderate sensitivity and low magnitude, this viewpoint would be subject to a **moderate-low visual impact**.

Plate 17-6 Viewpoint 2
Castlereagh Highway road users would potentially glimpse the BESS facility and associated infrastructure if looking perpendicular to the highway. The TransGrid 330kV Substation would be obscured behind the roadside pine trees in the foreground.

Viewpoint 3 – North-west of the Project Site, Black Gold Motel

Visual sensitivity - high sensitivity

This viewpoint is representative of the public who may stay at the Black Gold Motel, north-west of the Project Site. The quality of view is somewhat important to these viewers, and there are a relatively large number of viewers. This view is therefore of high sensitivity.

Magnitude of visual change - negligible

The Black Gold Motel is approximately 800 m from the Project Site. These receivers may be subject to potential glimpses of the existing TransGrid Wallerawang 330 kV Substation and the proposed transmission line towers through intervening vegetation, however these are likely to be barely discernible. No other Project elements would be visible.

Based on a high sensitivity and negligible magnitude, this viewpoint would be subject to **negligible visual impact**.

Plate 17-7 Viewpoint 3
The TransGrid 330kV Substation, BESS Facility and proposed transmission line towers would all be in approximate alignment from this view. There may be glimpses of the Substation and transmission line towers through gaps in intervening vegetation. The BESS facility would likely be obscured behind the Substation.

Viewpoint 4 – West of the Project Site, Blackett Drive, Wallerawang

Visual sensitivity - high

This viewpoint represents residential areas in the town of Wallerawang, west of the Project Site. The quality of view would be of importance to the residential viewers and would be subject to long viewing durations. This view is therefore of high sensitivity.

Magnitude of visual change - negligible

The elevation rises to the east of the residential area and would obstruct any potential views of the Project Site. Views of the Project would be also obstructed (in some cases) by other residential dwellings and intervening vegetation.

Based on a high sensitivity and negligible magnitude, this viewpoint would be subject to **negligible visual impact.**

Plate 17-8 Viewpoint 4
Intervening topography, vegetation and houses would screen all elements of the Project from receivers in this location, noting that this viewpoint was chosen as having the highest potential for views to the Project in terms of Wallerawang residential areas.

Viewpoint 5 – South of the Project Site, Lake Wallace foreshore

Visual sensitivity - high

This viewpoint is located on the foreshore of Lake Wallace, south-west of the Project Site. This location is used for recreational activities and a large number of viewers would be present. It is therefore of high sensitivity.

Magnitude of visual change - negligible

The stacks[9] from the Wallerawang Power Station site are visible from this viewpoint approximately 1.3 km away. The elevation and intervening vegetation obstruct any potential view of the Project. Receivers may be subject to glimpses of the top of transmission line corridor and transmission line towers; however, this would be barely discernible.

Based on a high sensitivity and negligible magnitude, this viewpoint would be subject **to negligible visual impact**.

Plate 17-9 Viewpoint 5
Intervening topography and vegetation would screen all elements of the Project except potentially the tops of the transmission line towers from receivers at Lake Wallace foreshore. The upper portions of the existing Wallerawang Power Station stacks are visible and illustrate the screening effect of the topography and vegetation.

[9] These photographs were taken in February 2021, prior to the demolition of the Wallerawang Power Station stacks in November 2021.

Viewpoint 6 – South of the Project Site, GoodEarth driveway

Visual sensitivity - low

This viewpoint is located at the entrance of GoodEarth, a business located on Castlereagh Highway, 600 m south of the Project Site. This location is used by customers for short durations and its quality is of limited importance to viewers. It is therefore of low sensitivity.

Magnitude of visual change - negligible

Receivers may be subject to potential glimpses of the Project Site through intervening vegetation; however, the Project would be barely discernible if visible at all.

Based on a low sensitivity and negligible magnitude, this viewpoint would be subject **to negligible visual impact**.

Plate 17-10 Viewpoint 6
Intervening vegetation would screen potential views of the Project Site at this location

17.4 Mitigation measures

The Project Site has been determined to have a negligible impact on visual amenity at most viewpoints. Table 17-5 outlines the following mitigation measures that would be implemented by Greenspot to further minimise any landscape and visual amenity impacts.

Table 17-5 Visual amenity mitigation measures

ID	Mitigation Measure
V1	The design of the proposed BESS facility will consider the use of materials that integrate with the surrounding landscape.
V2	Cut off and direct light fittings (or similar technologies) would be used where appropriate to minimise glare and light spill onto private property.
V3	Reflective and glare materials and surfaces will be minimised, where possible.
V4	A Landscape Plan will be prepared during detailed design to help the Project into the surrounding landscape and provide screening where appropriate.

18 Air quality

A desktop review of the existing air quality environment within the area surrounding the Project Site was carried out to identify potential impacts from the construction and operation of the Project.

18.1 Ambient air quality guidelines

18.1.1 Air quality criteria

The guidelines used to assess ambient air quality are established by both the NSW DPIE and within the National Environment Protection Measures (NEPM) established by the Department of Water, Agriculture and Environment (DAWE). The particulate NEPM standards were approved by the National Environment Protection Council (NEPC) and came into force on 4 February 2016.

The NEPM air quality standards for ambient dust concentrations are listed in Table 18-1.

Table 18-1 Air quality standards as stipulated by NEPM (updated 2016)

Pollutant	Goal (µg/m^3)	Averaging period
PM_{10} – Particulate matter of aerodynamic diameter <10 µm	50	Daily
	25	Annual
$PM_{2.5}$ – Particulate matter of aerodynamic diameter <2.5 µm	25	Daily
	8	Annual

These standards were developed to limit public health and nuisance end point impacts on communities living in urban areas and/or in the region of influence of industrial or fugitive air emission sources.

The NSW Environmental Protection Authority (EPA) 2017 document *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* summarises the air quality impact assessment criteria for deposited dust. These are provided in Table 18-2.

Table 18-2 Dust deposition criteria

Averaging Period	Maximum increase in deposited dust level	Maximum total deposited dust level
Annual	2 g/m^2/month	4 g/m^2/month

18.2 Existing environment

18.2.1 Sensitive receivers

The Project Site is located in a rural / industrial setting with the nearest sensitive receivers being:

- Six residential receivers located on Springvale Lane, 150 m south-east of the Project Site at the closest point (Castlereagh Highway intersection), but are located about 500 m from the Project Site at the closest point
- Goodearth Landscape and Building Supplies, 600 metres south

- A residential area within the suburb of Wallerawang, approximately 600 metres to the west of the Project Site at its closest point. A mixture of open grassed space, roads and trees are located between the Project Site and the residential properties.

18.2.2 Emission sources

The Wallerawang area and broader Lithgow LGA is largely characterised by resource extraction (coal) and electricity generation and land uses which have a substantial influence on local and regional air quality. Sources of industrial emissions close to the Project Site include:

- Centennial's Western Coal Services
- Springvale Coal Mine
- Lidsdale Coal siding
- Mount Piper Power Station
- Lithgow Meter Station (gas infrastructure).

The National Pollutant Inventory (NPI) is maintained by the Commonwealth Department of Agriculture Water and the Environment and contains emission estimates for 93 toxic substances around Australia that are important due to their possible effect on human health and the environment. The inventory includes the source and location of these emissions. A review of the NPI was undertaken to identify the types and sources of emissions within the Wallerawang area for the 2019-2020 reporting year.

The search indicated that the existing air quality in Wallerawang is primarily influenced by emissions from coal mining, and industry-specific emitted substances. Twenty-eight substances were identified as being emitted by local heavy industry.

The most common substances include:

- Zinc and compounds
- Mercury & compounds
- Manganese & compounds
- Chromium (III) compounds.

Other emission sources in the locality include service stations, motor vehicles, domestic wood fires, railways, lawn mowing, recreational boating, domestic/commercial solvents and aerosols, windblown dust and bushfires.

18.2.3 Ambient air quality

A review of Air Quality Data Services (DPIE, 2021) was undertaken to identify average particulates ($PM_{2.5}$ and PM_{10}) concentrations since 2017 at Bathurst, which is the closest monitoring station to the Project Site, located approximately 47 kilometres north-west of the Project Site (Figure 18-1).

As shown in Figure 18-1, the PM_{10} and $PM_{2.5}$ concentrations for the period October 2019 to February 2020 were much higher than the other months, and correlate with the summer bushfires which occurred between late 2019 and early 2020 and the intense drought (DPI, 2020).

Monthly PM_{10} concentrations average 19.2 µg/m^3 (below the annual criterion of 25 µg/m^3), while monthly $PM_{2.5}$ concentrations average was 7.9 µg/m^3 (below the annual criterion of 8 µg/m^3). The lower concentrations from February 2020 to February 2021 correlated to the increased rainfall in the area (BoM, 2021).

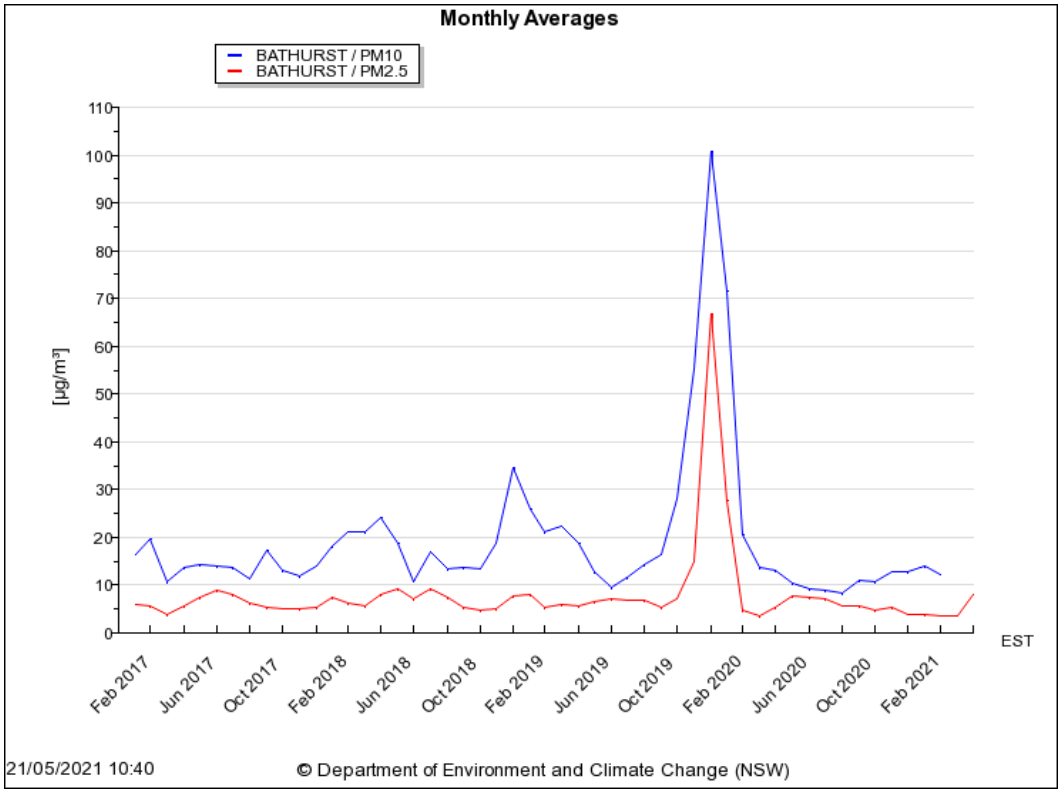


Figure 18-1 Measured PM_{10} and $PM_{2.5}$ concentrations – Bathurst, 2021 (DAWE, 2021)

18.3 Potential impacts

18.3.1 Construction

The most likely impacts to air quality during construction of the Project relate to potential fugitive dust emissions from earthworks and ground disturbance and emissions from construction vehicles, plant and equipment. The construction period would be approximately 12 to 24 months.

Construction activities that may result in the generation of dust and emissions include:

- Earthworks, levelling and removal of vegetation
- Stockpiling of excavated material
- Stockpiling and placement of material for site preparation activities
- Construction of fencing and site access
- Excavations for footings, underground cabling and transmission infrastructure
- Construction of ancillary infrastructure

Given the distance to the nearest sensitive receivers (150 metres from the Project Site at the closest point at the Castlereagh Highway intersection) and the short term and temporary nature of construction works, the Project is not anticipated to have a substantial impact on air quality during construction. Potential impacts during construction will be managed with the implementation of the proposed mitigation measures listed in Section 18.4. Cumulative impacts on air quality have been considered in Section 23.

18.3.2 Operation

Operation of the BESS would not result in any emission of particulates or other pollutants.

Movement of staff vehicles on the access tracks to and through the site during maintenance activities may result in minor particulate and dust emissions. However, during operation, staff movements are estimated to be up to five vehicles per day and would have a negligible impact on local air quality.

18.4 Mitigation measures

Table 18-3 summarises the mitigation measures for managing air quality issues during construction and operation of the Project.

Table 18-3 Air quality mitigation measures

ID	Mitigation Measures
Construction	
AQ1	Reasonable and feasible dust suppression will be implemented during construction activities including the use of water tanks and/or carts, sprinklers, site exit controls (e.g. wheel washing systems and rumble grids) to minimise fugitive dust emissions.
AQ2	Exposed areas or stockpiles will be stabilised and progressive rehabilitation undertaken where feasible
AQ3	All vehicles transporting materials to and from the Project Site will be covered and secured
AQ4	Speed limits (20 km/h) on the site will be established and enforced during construction
AQ5	All plant and equipment will be inspected before it is used on-site and maintained in accordance with manufacturers specifications and would comply with relevant vehicle emission standards, where applicable.
AQ6	All plant and equipment will be switched off when not in use for extended periods
AQ7	An Air Quality Management Plan (AQMP) will be prepared as part of the CEMP
AQ8	Dust and air quality complaints will be managed in accordance with the overarching complaints handling process for the Project. Appropriate corrective actions; if required, will be taken to reduce emissions in a timely manner.
Operation	
No mitigation measures have been identified as it is unlikely there would be any operational air quality impacts.	

19 Climate Change

19.1 Existing environment

A Climate Change Risk Assessment (CCRA) based on the latest available climate science and risk assessment research has been undertaken using the following guidelines:

- *AS/NZS 31000:2018 Risk Management – Principles and Guidelines* (Standards Australia/Standards New Zealand Standard Committee, 2018)
- *AS 5334-2013 Climate change adaptation for settlements and infrastructure – A risk-based approach (Standards Australia, 2013)*
- *Climate Change Impacts and Risk Management – A Guide for Business and Government (Department of the Environment and Heritage, 2006).*

The existing climatic conditions for the Project were identified using data published by the BoM (2020) collected from the Bathurst Stanley Street (Macquarie River) Weather Station (Station Number 063287), about 47 kilometres north-west of the Project, and supplemented by data published by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) (Grose *et al.,* 2015; CSIRO 2016).

Data from this weather station was used as it is the nearest weather station to the Project that included consistently recorded data from 2000 onwards. There are weather stations located closer to the Project Site with less data, however, these were discounted as not enough consistent historical data was available for inclusion in the CCAR.

Climate model projections were identified using data published by CSIRO and accessed through the *Climate Futures Tool* (2016). The *Climate Futures Tool* presents a comprehensive set of projections for a range of climate variables and therefore was considered to be a complete and appropriate data source for use in this assessment.

A summary of the climate change predictions identified by the NSW Government relating to the Central West and Orana region, within which the Project is located includes:

- Increase in maximum and minimum temperatures
- Increase in the number of hot days and a decrease in the number of cold nights
- Decrease in rainfall in spring and winter, and an increase in rainfall in summer and autumn
- More frequent and severe fire weather in summer and spring.

19.2 Potential impacts

19.2.1 Construction

The construction timeframe for the Project is considered relatively short (12-24 months). Potential impacts of climate change are expected to be minimal. Standard risk controls for current climatic conditions have been considered to be appropriate.

19.2.2 Operation

Climate change projections for the operational phase of the Project show the potential for an increase in operational risks, associated mostly with flood and storm related events, which would be considered as part of the design development for the Project.

Direct climate change risks during operation may include:

- Increased frequency and severity of extreme rainfall events, which may exceed the design capacity of the drainage system and lead to flooding of infrastructure (Flooding has been assessed in Section 16 and Appendix K).
- Increased average temperatures and the frequency of heatwaves, which may impact on the integrity of infrastructure.
- Increased severity and frequency of bushfires (Bushfire risk has also been assessed in Section 14 and Appendix H)
- Indirect climate change risks during operation include disruptions to energy supply as a result of higher temperatures leading to excessive demand.

Potential climate risks and impacts for the Project are identified Table 19-1, as well as the indicative risk level to the Project after the implementation of appropriate mitigation measures.

Table 19-1 Climate Change Risk Assessment

Climate change risk	Possible impacts / consequences of climate change risk	Evaluation of risk level after mitigation
Increased frequency and intensity of heavy rainfall	Increased scouring of nearby slopes and embankments, resulting in an increased likelihood of landslips causing damage to project infrastructure	**Low** Detailed design of the Project would consider measures which include reducing the velocity and volume of stormwater flows to reduce the potential for scouring to occur. All disturbed surfaces would be either sealed or landscaped and where required, scour protection would be installed as part of the Project's stormwater and drainage design
Increased average and extreme temperatures	Increased average temperatures, and increased frequency and intensity of extreme heat resulting in accelerated degradation of materials, and requiring more frequent maintenance or replacement	**Moderate** Detailed design would include consideration of materials able to effectively withstand heat.
Increased average and extreme temperatures	Higher ambient temperatures leading to overheating of the Project infrastructure leading to heat damage.	**Moderate** Detailed design would include a safety mechanism and shutdown of the BESS units to prevent overheating on days with increased demand on the system. The BESS and Project infrastructure will be designed in accordance with the relevant Australian Standards. Two 20,000 litre water tanks will be located on-site to manage fire risk.

Climate change risk	Possible impacts / consequences of climate change risk	Evaluation of risk level after mitigation
Increased frequency and severity of bushfires	Increased frequency and severity of bushfires, leading to direct heat and fire damage to Project infrastructure.	**Moderate** The Project has been designed to comply with relevant international and/or Australian standards (e.g. AS 5139) and guidelines. Two 20,000 litre water tanks would also be located on-site to manage fire risk, including bushfire.

19.3 Mitigation measures

Table 19-2 summarises the mitigation measures for managing issues associated with extreme weather events during construction and operation of the Project.

Table 19-2 Climate Change mitigation measures

ID	Mitigation
Design	
CC1	Detailed design of the Project will consider: • Including measures which reduce the velocity and volume of stormwater flows to reduce the potential for scouring to occur • A fire suppression system and appropriate access for fire fighters during bushfires • A safety mechanism to shutdown BESS units during increased temperature days • Materials able to effectively withstand excessive heat.
Construction	
CC2	Management and mitigation measures identified in other EIS chapters and relevant technical papers that are relevant to the management of climate change impacts include: • Chapter 10 (Soils and Contamination), specifically measures to manage impacts associated with stormwater runoff and drainage design of the Project • Chapter 14 and Appendix H (Bushfire Risk Assessment), specifically relating to the management of bushfire risks for the Project. • Chapter 15 and Appendix I (Hazards and Risk) • Chapter 16, Appendix J (Water Quality) and Appendix K (Flooding), specifically measures relating to the mitigation and management of flooding impacts to the Project during operation
Operation	
CC3	Management and mitigation measures identified in the EIS will be relevant for the duration of operation.

20 Waste management

20.1 Likely waste streams for the Project

The construction and operation of the BESS would generate waste from a variety of sources and activities. Waste will be managed where feasible, on the hierarchy of priorities for the efficient use of resources; which is consistent with the objectives of the *Waste Avoidance and Resource Recovery (WARR) Act 2001*. The waste hierarchy is as follows:

- **Avoidance:** Including action to reduce the amount of waste generated by households, industry and all levels of government
- **Resource recovery:** Including re-use, recycling, reprocessing and energy recovery, consistent with the most efficient use of the recovered resources
- **Disposal:** Including management of all disposal options in the most environmentally responsible manner[10].

Types of waste generated for construction and operation of the BESS is presented in Table 20-1. The life of the BESS units is approximately 15-20 years, during this time various components of the BESS may require maintenance and / or replacement.

The Lithium-ion batteries are expected to be returned to the supplier or a suitably licenced processing facility for recycling, re-purposing or appropriate disposal at a licenced facility. These materials will be managed in accordance with the Waste Management Plan which will be prepared as part of the OEMP.

Table 20-1 Estimates of waste streams generated during construction and operation

Waste Type	Description	Proposed management
Construction		
Construction waste	Packaging, timber, drums, waste concrete, scrap metal, plastic wrapping, plasterboard and cables	Removed off-site either return to suppliers and or recycling contractors where feasible
Hazardous and chemical materials	Adhesives, lubricants, waste fuel and oil, engine coolant, batteries, hoses and tyres from the maintenance of construction plant, vehicles and equipment Spill from construction vehicles and equipment	Off-site disposal at an appropriately licenced facility
Excavated material	Including natural rock, soils and clay excavated during earthworks	Cut and fill and reused on-site. Potential acid sulfate soils (PASS) will be managed appropriately in accordance with the measures detailed in Section 10 and the CEMP prepared for construction

[10] https://www.epa.nsw.gov.au/your-environment/recycling-and-reuse/warr-strategy/the-waste-hierarchy

Waste Type	Description	Proposed management
Green waste	Vegetation clearing and grubbing	Disposal off-site at Council green waste facility Mulching and reused on-site (if feasible)
Recyclables from activities at construction compounds and site office(s)	Paper, carboard, plastics, glass, printer cartridges	Recycling contractors
General waste	Foods scraps and other putrescibles which are not recyclable	Off-site disposal at an appropriately licenced facility
Sewage and greywater from washdown activities and staff amenities	On site portable facilities (porta loos)	Off-site disposal at an appropriately licenced facility
Operation		
Battery Units	Lithium-ion batteries and battery components replacement / maintenance	Returned to the supplier for re-purposing or appropriate disposal at a licenced facility
Recyclables from activities at site office	Paper, carboard, plastics, glass, printer cartridges	Recycling contractors
Hazardous and chemical material	Used spill kit consumables	Off-site disposal at an appropriately licenced facility
Sewage and greywater from washdown activities and staff amenities	On site portable facilities (porta loos)	Off-site disposal at an appropriately licenced facility
Stormwater systems	Sediment removed from stormwater treatment devices and stormwater management systems.	Off-site disposal at an appropriately licenced facility if required or reused on-site where feasible.

20.2 Mitigation measures

Table 20-2 summarises the mitigation measures for managing waste during construction and operation of the Project.

Table 20-2 Waste mitigation measures

ID	Mitigation Measure
Construction	
W1	All materials requiring removal from the Project Site will need to be classified in accordance with the NSW EPA (2014) *Waste Classification Guidelines*. This material should only be transported from the Project Site to an appropriately licensed landfill for disposal or to an appropriately licenced recycling facility which is licenced to receive this material.
W2	The resource management hierarchy principles established under the WARR Act of avoid / reduce / reuse / recycle / dispose will be applied were feasible.
W3	A Waste Management Plan will be prepared as part of the CEMP, detailing appropriate procedures for waste management in accordance with the waste management hierarchy.

ID	Mitigation Measure
W4	Wastes will be appropriately transported, stored and handled in accordance with NSW EPA waste classification and in a manner that prevents pollution of the surrounding environment
W5	The handling and management of special wastes will be carried out in accordance with relevant legislation, codes of practice and Australian standards
W6	A Waste Register will be maintained for the duration of construction. The register will detail the type of waste, volume/quantity of waste and recycle/disposal options.
W7	Working areas will be maintained, kept free of rubbish and cleaned up at the end of each working shift.
Operation	
W8	Waste will be managed and disposed of in accordance with the relevant applicable legislation, policies and guidelines, including the WARR Act and the *NSW Waste Avoidance and Resource Recovery Strategy 2014-21* (NSW EPA, 2014).

21 Socio-economic

21.1 Existing environment

The demographic profile of the Lithgow LGA has been compiled from the 2016 ABS Census data (ABS, 2016). The data accessed includes information on population, industry and employment. It should be noted, that with the emergence of COVID-19, there may be a material change in demographics that is yet to be reflected in ABS statistics.

The key socio-economic indicators as provided in 2016 ABS Census data for the Lithgow area are outlined in Table 21-1.

Table 21-1 Socio economic indicators for Lithgow LGA

Aspect	Lithgow LGA (2016)		NSW (2016)	
Population	21,090		7,696,407	
Median Age	45		38	
Employed (full time)	4627	54.8%	2,134,521	59.2%
Employed (part time)	2678	31.7%	1,071,151	29.7%
Unemployed	651	7.7%	225,546	6.3%
Top profession				
Technician and trades sector	1,363	17.5%	429,239	12.7%
Industries of employment				
Coal mining	618	**8.1%**	19,153	0.6%
Aged care residential services	253	3.3%	67,209	2.0%
Supermarket and grocery stores	216	2.8%	74,487	2.2%
Accommodation	215	2.8%	34,450	1.0%
Government	202	2.6%	43,378	1.3%

21.2 Potential impacts

21.2.1 Construction

Potential socio-economic impacts during construction of the Project may include:

- Generation of employment and business opportunities for local residents through the presence of the construction workforce during the construction phase.
- Impacts to amenity of nearby residential receivers (i.e. noise, visual).
- Temporary traffic disruptions to users of the Castlereagh Highway.
- Increased traffic associated with construction of the Project (see Section 8 and Appendix C of this EIS).

- Potential noise related construction impacts associated with the Project, as discussed in Section 9 and Appendix D
- Potential fugitive dust and emissions from construction plant and equipment associated with the Project as discussed in Section 18.

21.2.2 Operation

As discussed in Section 9 and Appendix D of this EIS, there may be a potential for noise related operation impacts associated with operation of the HVAC during hot summers. It is expected however that these periods will be of a relatively short duration.

Operation of the BESS may also result in the following positive socio-economic outcomes:

- Assist with ongoing regional development of the Lithgow community complimentary to the Lithgow Local Strategic Plan (LLSP)
- Provide a reliable and secure source of electricity for the local region
- Facilitate the introduction of a proven technology that has the potential to support renewable energy
- Act as an enabler for the development of the 'Greenspot 2845 Activity Hub'.

21.3 Mitigation measures

Table 21-2 summarises the mitigation measures for managing socio-economic issues during construction and operation of the Project.

Table 21-2 Socio-economic mitigation measures

ID	Mitigation Measure
Construction	
SE1	A Complaints contact number and email will be established for the duration of construction and a community complaints register will be maintained. Any complaints received from the community or other stakeholders will be appropriately investigated and if required, additional measures put in place to minimise further impacts. Feedback to complainants will be provided as soon as possible following the investigation. A complaints management process will be included in the CEMP.
Operation	
SE2	The OEMP will include measures to engage with stakeholders and to manage and respond to feedback received during the operation.

22 Property and Land use

22.1 Existing environment

The Project is located on six lots, five of which are owned by Greenspot and one lot that is owned by TransGrid. The zoning of the Project Site is a combination of IN3 (Heavy Industrial), SP2 (Electricity Generation) and RU1 (Primary Production) (refer to Figure 2-2 in Section 2).

The western portion of the Project Site is a commercial forest which is subject to a Pine Plantation Deed and is managed by Forestry Corporation of NSW. The eastern part of the Project Site is undeveloped grasslands.

Other land use surrounding the Project Site includes:

- Mostly cleared, agricultural land to the south, zoned E4 Environmental Living
- Large lot residential, agricultural and forestry land east of the Castlereagh Highway, zoned RU2 Rural Landscape
- The former Wallerawang Power Station site immediately north, zoned SP2 Infrastructure
- The TransGrid Wallerawang 330 kV Substation, Coxs River and cleared agricultural land to the west, zoned SP2 Infrastructure and RU1 Primary Production respectively
- Wallerawang township is located about 600 metres to the west of the Project Site (at its closest point) and includes residential, business, industrial and recreationally zoned land.

The area surrounding the township of Wallerawang is known for recreational activities (such as fishing and watercraft) and also includes facilities at Lake Wallace recreational area. The township of Wallerawang is also of interest for its historic heritage with the historic St John's Church built on a design by the colonial architect, Edmund Blacket being a point of interest for visitors to the area.

Based on the NSW Landuse mapping 2017, agricultural land in close proximity to the site is mostly used for grazing or farm infrastructure.

22.2 Potential impacts

22.2.1 Construction

Forestry Corporation of NSW plan to remove some of the plantations surrounding the 'Greenspot 2845 Activity Hub' including the trees within the Project Site and trees located west of the Project Site. However, approval for this process (to the extent required) would be undertaken separately to this Project.

A *Land Use Conflict Risk Assessment* has been prepared in accordance with the Department of Industry's *Land Use Conflict Risk Assessment Guide (DPI, 2011)* and is included as Appendix L of this EIS. The assessment identified that potential land use conflicts would be minor and could be managed through the implementation of mitigation measures as outlined in this EIS.

22.2.2 Operation

All operational property and land use impacts are discussed in the impact assessments of the key issues chapters of this EIS.

22.3 Mitigation measures

There are no property and land use mitigation measures required for the Project.

23 Cumulative impact assessment

This section provides an assessment of the potential cumulative impacts of the Project. A summary of the relevant SEARs and where they are addressed in this section is provided in Appendix A.

23.1 Methodology

This cumulative impact assessment considered the cumulative impacts of the Project in the context of existing, approved and proposed developments in the region.

To identify approved and proposed developments in the region a desktop review of publicly available development information was undertaken. The review was undertaken in September 2021 and identified proposed developments within a five-kilometre radius of the Project which have the potential to result in cumulative impacts with the construction and operation of the Project. The desktop review included:

- A search of DPIE's Major Projects planning portal
- A search of the Lithgow Development Application (DA) register.

Publicly available information on these proposals was reviewed to identify the timing, extent and potential impacts and how these may interact with the Project.

A combination of site visits, aerial mapping and internet searches were used to identify existing developments within an approximately five-kilometre radius of the Project.

The key issues that have been considered to determine the potential for cumulative impacts include traffic and transport, noise and vibration, water quality, air quality and amenity.

23.2 Existing environment

The Project is located immediately south of the retired Wallerawang Power Station. In general, the Project is consistent with the function and character of the established land uses across the broader area which include coal mining and industry. As detailed in Section 4, construction would begin as soon as practicable after all regulatory approvals are obtained and would take 12-24 months to complete.

Chapters 8 to 22 detail the existing environments with respect to their key aspects covered in this cumulative assessment.

The search of DPIE's Major Projects planning portal and the Lithgow DA register identified the following developments:

- Great Western Battery (GWB) (State Significant Development (SSD) Application – SSD-12346552).
- Wallerawang Power Station Decommissioning, Demolition and Rehabilitation (DDR) Program (DA015/19) run by the Applicant.

Figure 23-1 details the locations of these surrounding proposed developments in relation the to the Project.

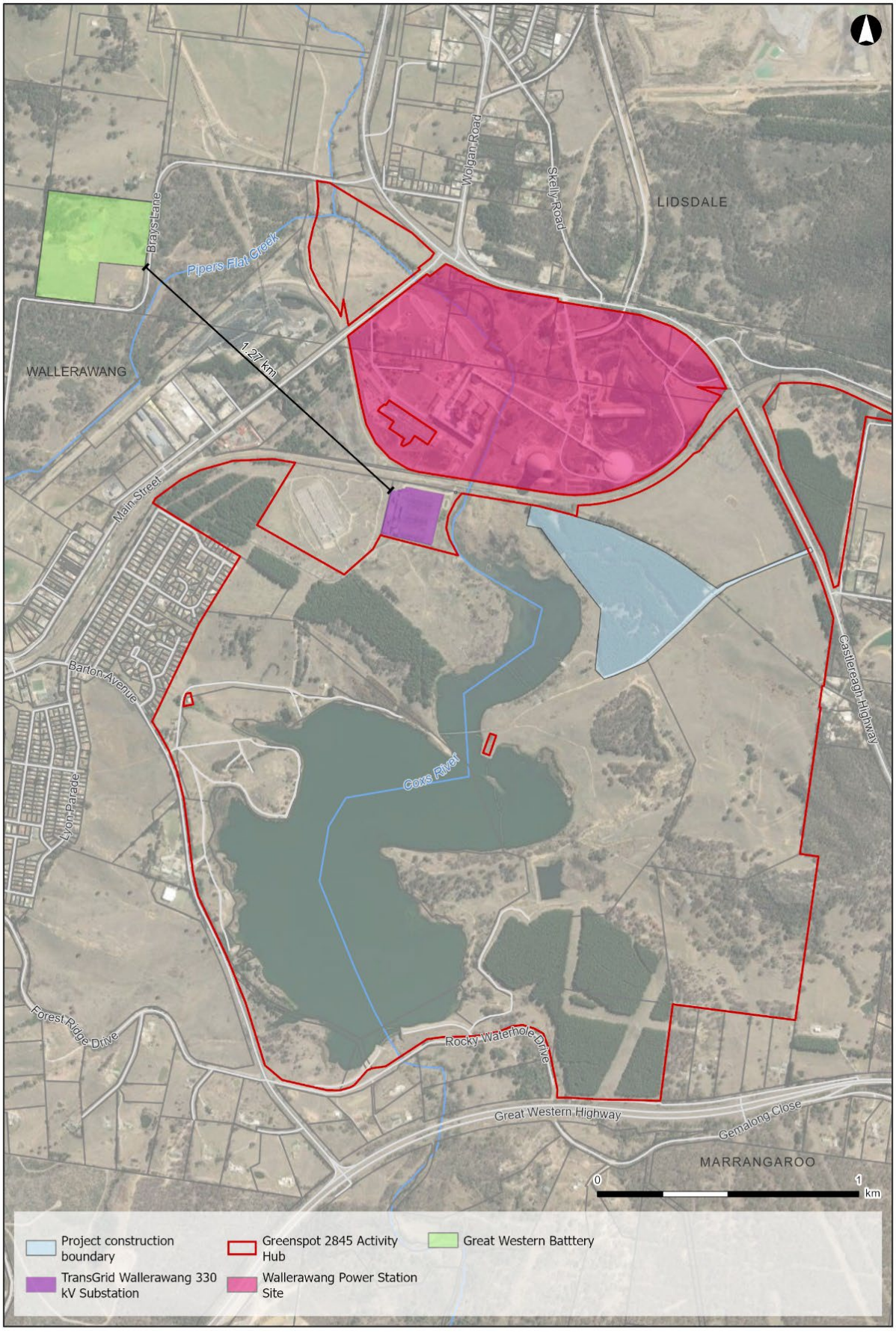


Figure 23-1: Proposed developments surrounding the Project

23.2.1 Great Western Battery (GWB) Proposal

Neoen Australia Pty Ltd is proposing to develop a large-scale BESS at Brays Lane, Wallerawang NSW, approximately 1.2 kilometres north-west of the Project Site. The GWB battery would generate capacity of about 500 MW and storage of up to 1,000 MWh. Approval for the GWB proposal is being sought as State Significant Development under Part 4 of the EP&A Act. A Scoping Report for the GWB proposal was lodged on the DPIE Major Project Portal on 15 December 2020 and the SEARs were issued on 4 February 2021.

The GWB Scoping Report indicates construction of the project would commence in 2022 and the project would be operational by 2023. Based on this, construction of the GWB proposal may potentially coincide with the construction period of the Project. However, it should be noted that there is significant uncertainty in this timeframe as assessment documentation of the GWB has not yet been formally lodged.

23.2.2 Wallerawang Power Station DDR program

Greenspot Wallerawang Pty Ltd is currently undertaking a decommissioning, demolition and rehabilitation (DDR) program at the retired Wallerawang Power Station. This Development Application (DA015/19) was approved by Lithgow City Council in January 2019.

The DDR program includes the salvage, demolition and removal of key infrastructure at the Wallerawang Power Station site. Works commenced in May 2021 and will be undertaken over a period of approximately 18 months through to the end of 2022 including the following stages:

- Stage 1: Dismantling and removal of existing plant and equipment and stripping of electrical systems, fire services and plastic packaging
- Stage 2: Targeted deconstruction of the remaining buildings and infrastructure.

The Wallerawang BESS Project is expected to commence construction in the second or third quarter of 2022. As such, there is a potential for an overlap of up to 6-9 months for the two projects.

23.2.3 Surrounding operations

The Project is located in a well-established mining and industry area that is known to generate background noise and air quality emissions, and also have the potential to impact water quality and amenity.

Surrounding operations include a number of coal mines and coal fired power stations such as:

- Wallerawang Power Station, now decommissioned and owned by Greenspot, located immediately north of the Project Site
- Springvale Coal Mine, operated by Centennial Coal, 750 metres east
- Wallerawang Power Station – Ash Repository and associated lands, owned and operated by Generator Property Management Pty Ltd, 1.2 kilometres north
- Wallerawang Quarry, operated by SiteGoal Pty Ltd, 2.6 kilometres south-east
- Mount Piper Power Station, operated by EnergyAustralia Pty Ltd, five kilometres north-west.
- Angus Place Colliery which has been on care and maintenance since early 2015 is located 5.5 kilometres north and is operated by Centennial Coal.

Other surrounding businesses located near the Project Site include:

- Goodearth Landscape and Building Supplies, 600 metres south
- Black Gold Motel, 1.1 kilometres north-west
- Industrial and commercial businesses along Main Street, Wallerawang, 1.2 kilometres north-west.

These existing background levels incorporating impacts from existing operations at nearby facilities have been taken into consideration for each of the key assessment areas within the EIS including traffic and transport, noise and vibration, air quality and visual amenity. As such, the operational assessments presented in the EIS can be considered to represent a 'cumulative' assessment of the Project with existing surrounding operations.

23.3 Potential impacts

Cumulative impacts result from successive, incremental, or combined effects of an activity or project when added to other past, current, planned, or reasonably anticipated future impacts (DPIE, 2017). The extent to which another development or activity could interact with the construction and/or operation of the Project would be dependent on its scale, location and/or timing of construction.

The following information has been used for this cumulative impact assessment

- GWB Scoping Report (AECOM, 2020). Limited publicly available information is available for the GWB proposal
- Wallerawang Power Station DDR program included:
  - Wallerawang Power Station Demolition Statement of Environment Effects (Aurecon, 2018)
  - Noise and Vibration Management Plan
  - Traffic Management Pan.

23.3.1 Construction

Construction of the Project is expected to take 12 to 24 months to complete. This is considered to be a relatively short-term impact and cumulative impacts are not expected to be significant, given the location and scale of the Project. Table 23-1 details the cumulative impact assessment during construction.

Only cumulative impacts associated with the demolition phase (Stage 2) of the DDR program have been considered in Table 23-1. All impacts are considered to be relatively minor given the relatively small scale of the developments and the short-term nature of construction for the two surrounding proposed developments and the Project. The construction mitigation measures considered in Sections 8 to 22 are considered to be adequate to mitigate the cumulative impacts detailed below.

Table 23-1: Cumulative impact assessment

Issue	Cumulative impacts
Traffic	The GWB proposal and DDR program may generate construction traffic which includes heavy and light vehicles delivering construction and other material and components, and the removal of demolished material out of the DDR program. These vehicle movements have the potential to result in a cumulative traffic impact when combined with vehicles generated by construction of the Project. As described in Section 4 construction traffic movements for the Project are anticipated to comprise of up to 100 two-way light vehicle movements per day associated with workers coming to site, 20 two-way heavy vehicle movements per day, associated with transport of equipment, and materials including batteries and 36 OSOM movements over the construction period for deliveries of the large Project components. The GWB Scoping Reporting states that a quantitative assessment is not considered necessary as potential impacts would be limited to the construction phase and that vehicle volumes associated with construction of the Project are likely to be relatively low. In addition to this, the GWB is

Issue	Cumulative impacts
	located 1.2 km north-west of the Project and would likely use different construction routes to access the Great Western Highway (e.g. Barton Avenue). For the DDR, most traffic movements would be associated with transporting demolition waste to a licensed disposal facility (by private haul road which would have no impact on any other project) or transporting ferrous and non-ferrous scrap metal to domestic or international markets. As the Project would only overlap with the DDR for up to six months, the potential cumulative impacts with the Project are anticipated to be minor and short term. No numbers of construction vehicles for these developments were available. However, given the relatively small number of movements for the Project and the short-term nature of construction on these projects, cumulative construction traffic impacts are expected to be minor.
Noise	Noise generated during the construction phase of the GWB would be associated with the construction of built elements. This would include the movement of materials, equipment and personnel to and from the sites, as well as the operation of machinery. Noise generated during the construction phase of the DDR would be associated with demolition of built elements. This would include the movement of materials, equipment and personnel to and from the sites, as well as the operation of machinery. Additionally blasting associated with the DDR program may result in minor cumulative noise and vibration impacts, however these will be infrequent. The review of the documentation associated with the DA for the DDR Program and the relevant management plans, identified that based on the worst-case scenario during demolition, the predicted noise levels from the DDR project will comply with the noise criteria during the standard construction hours. For the Project, predicted noise levels at receivers have been considered generally low in the context of typical construction noise, however given the low existing background noise immediately surrounding the various sites, the construction and demolition activities may have the potential to generate noise that would be audible at a local level and may exceed noise management levels in the absence of mitigation. A CNVMP would be prepared as part of the CEMP the Project that identifies feasible and reasonable approaches to reduce noise and vibration impacts during construction. Given the separation of the Project from the GWB project and the short-term nature of construction impacts, significant cumulative noise impact from the simultaneous construction of these projects is not anticipated. Similarly, given the small overlap and the short-term nature of construction works for the DDR program, more than a minor cumulative noise impact for simultaneous construction of these projects is not anticipated.
Water Quality	The DDR program has the potential to cause water quality impacts that directly pollute the Coxs River which runs through the middle of the site. This risk would be increased during demolition of structures that cross the river. Impacts could be the result of spills and leaks, which may contain chemicals, heavy metal, debris, oil and grease or petroleum hydrocarbon. There is potential for increased sediment loads into Coxs River from dust blown off-site. The SEE states that all storm water at the site is captured and treated in the site's existing storm water management system, and erosion and sediment controls would be established where there is a risk of demolition waste being washed into the storm water system. The GWB proposal also has the potential to cause water quality impacts that directly pollute Pipers Flat Creek (a tributary of the Coxs River) if not appropriately managed. Impacts could be the result of spills and leaks, which may contain chemicals, heavy metal, debris, oil and grease or petroleum hydrocarbon. There is also potential for increased sediment loads into Coxs River from dust blown off-site. Whilst limited information is available on the project, given the State Significant Development status of the proposal it would typically be subject to standard

Issue	Cumulative impacts
	construction management requirements including the development of an erosion and sedimentation control plan to manage potential impacts. Bulk earthworks and vegetation clearing activities during construction of the Project, if not managed properly, could result in increased mobilisation of soil and increased surface water runoff (e.g. sediment laden "dirty" water) into the downstream receiving waters of the Coxs River. To manage the potential water quality impacts during construction an erosion and sedimentation control plan would be prepared in accordance with the guidelines in *Managing Urban Stormwater: Soils and Construction* (Landcom 2004). The controls identified within the plan would be established prior to the commencement of construction of the Project to protect the receiving waters and to manage sediment laden runoff. Provided the appropriate measures have been implemented for the GWB proposal, the DDR program and the Project, cumulative construction water quality impacts are not expected.
Air quality	The GWB proposal and DDR program may result in fugitive dust emissions from earthworks and ground disturbance and emissions from construction vehicles, plant and equipment. Local impacts may be dependent on prevailing weather conditions at the time of certain construction activities, but these can be managed appropriately with air quality mitigation measures outlined in the CEMPs for each of the developments. Given the short term and temporary nature of construction works for the Project and the minor air quality impacts associated with the GWB proposal and the DDR program, cumulative construction air quality impacts are expected to be minor.
Amenity	The SEE for the DDR program states that the demolition works would likely generate minor, temporary adverse effects on the existing landscape setting, although any impacts would be consistent with any existing operations associated with the industrial nature of the site. The DDR program however is expected to have a positive long-term visual effect on the township of Wallerawang and surrounding area. The Scoping Report for the GWB proposal indicates that the construction activities would be short term and temporary. Amenity impacts may occur as a result of construction with machinery and cranes potentially obscuring views in the Wallerawang area. These impacts would be relatively minor and short-term. As such, cumulative construction amenity impacts are expected to be minor.

23.3.2 Operation

Existing background levels incorporating impacts from existing operations at nearby facilities have been taken into consideration for each of the key assessment areas within the EIS including traffic and transport, noise and vibration, air quality and visual amenity. As such, the operational assessments presented in the EIS can be considered to represent a 'cumulative' assessment of the Project with existing surrounding operations.

The operation of the Project and that of the GWB proposal would generally be consistent with the visual built form and visual character of the broader power generation area and are not anticipated to result in substantial visual impacts to the surrounding receivers.

During operation, noise would be generated by electrical plant associated, inverters, transformers and the operation of the heating and cooling system (HVAC). There is a potential for the nearest receivers to the Project to be impacted by operational noise occasionally when the HVAC is in operation, however they are unlikely to impacted by cumulative noise from the operation of the GWB as they are located about 3.5 kilometres south-east of the location of the GWB proposal.

The DDR program is expected to complete before the operation of the Project commences.

23.4 Mitigation measures

Across the issues assessed for cumulative impacts, no substantial additional impacts or exceedances of criteria have been identified. As such, the mitigation measures identified for the Project would effectively mitigate any cumulative impacts identified within this section.

24 Compilation of mitigation measures

The EIS for the Project has identified a range of environmental impacts and recommended management and mitigation measures to avoid, remedy or mitigate these impacts (Sections 8-23). Table 24-1 provides a compilation of the mitigation measures.

This section presents a summary of the measures that Greenspot is committed to implementing either prior to construction, during construction or during operation. These draft mitigation measures may be revised in response to public submissions to the EIS and/or design changes.

The final Compilation of Mitigation Measures will form part of a post submissions response to Greenspot. It is envisaged that these mitigation measures will form the basis for Conditions of Approval which would be provided for the Project, subject to successful approval.

Table 24-1 provides a compilation of the mitigation measures. In some instances, greater detail as to how those measures would be implemented is provided in Sections 8-23.

Table 24-1 Draft compilation of mitigation measures

ID	Mitigation	Timing
Traffic and access		
TA1	A visual pavement condition assessment of Castlereagh Highway will be undertaken prior to construction and post final stage of construction activities. Following completion of construction, the pavement condition of the Castlereagh Highway will be returned to the same or better, than that identified during the initial visual pavement condition assessment.	Construction
TA2	A reduction in speed limit on the Castlereagh Highway (in the vicinity of the Project) during construction from 100 km/h to 80 km/h.	Construction
TA3	Advanced truck turning signage during construction will be installed to warn road users that heavy vehicles may be turning in and out of the Project Site access.	Construction
TA4	All temporary road works at the Project Site access road, including diversion and signage, will be constructed in accordance with relevant road design and road sign manuals.	Construction
TA5	Construction activities and vehicle movements will be minimised where reasonable and during background peak hours.	Construction
TA6	A Construction Traffic Management Plan (CTMP) will be developed prior to construction as part of the Construction Environmental Management Plan (CEMP) for the Project. The CTMP will include details on: • Road safety measures including speed restrictions, driver fatigue, in-vehicle communications, signage, demarcations, maintenance, safety checks, and interaction with public transport, transport of hazardous and dangerous goods and emergency response and disaster management. • Details of a travel demand management (TDM) campaign to inform the public on works and their effect on network operations • Hours of work and deliveries, staff transport and staff parking • A process for ongoing consultation with relevant authorities • A process for developing specific traffic management plans for special events developed in conjunction with the relevant stakeholders	Construction

ID	Mitigation	Timing
	• A process for managing OSOM deliveries • Secondary alternative construction route activities for use in the event of the primary route is blocked off by an emergency • Signage that would be established within and surrounding the Project site	
TA7	An Operational Traffic Management Plan (OTMP) will be developed as part of the OEMP for the Project.	Operation
Noise and vibration		
NV1	Detailed design will aim to ensure compliance with the Project specific noise criteria. If and where required, this will include adjustments to the choice of equipment, refinements to the facility layout, or mitigation that does not introduce additional environmental impact. If full compliance is unable to be achieved in detailed design optimisation, management measure NV8 will apply.	Detailed design
NV2	The community consultation developed and implemented for the Project would include a procedure for notifying noise-sensitive receivers about the works and their expected duration.	Pre-construction and construction
NV3	Prepare and implement a Construction Noise and Vibration Management Plan (CNVMP) as part of the CEMP that identifies feasible and reasonable approaches to reduce noise and vibration impacts during construction of the Project.	Pre-construction
NV4	Implement a 24-hour hotline and complaints management procedure for noise and other construction related complaints	Pre-construction and construction
NV5	Works will be programmed to occur during standard working hours only. These hours are: • 7 am to 6 pm, Monday to Friday • 8 am to 1 pm, Saturday • No work on Sundays or public holidays. If works must occur out of hours for justified reasons (e.g. worker safety or reduction of impact on traffic), preference should be given to day and/or evening time works (i.e. between 7 am and 10 pm). Out of Hours works would be separately assessed with appropriate noise mitigation and community consultation implemented as necessary based on the level of predicted impact.	Construction
NV6	Worksite induction training and 'toolbox talks' will include education for workers on noise issues related to the site (e.g. workers will be advised to avoid shouting or whistling on-site near sensitive receivers).	Construction
NV7	The OEMP will include measures and processes for managing noise resulting from the operation of the Project, including a process for managing complaints.	Operation
NV8	If compliance with the project specific noise criteria is unable to be achieved through detailed design, the facility will be operated with limitations on fan duty to ensure full compliance.	Operation
Soil and contamination		
SC1	A detailed Erosion and Sediment Control Plan (ESCP) as part of the CEMP, in accordance with *Managing Urban Stormwater – Soils and Construction, Volume 2D* (Landcom, 2004).	Construction

ID	Mitigation	Timing
SC2	An Unexpected Finds Protocol will be included in the CEMP to manage any disturbance of material that is odorous, stained or containing anthropogenic materials, in the event these are encountered during construction	Construction
SC4	The OEMP prepared for the Project will include measures to manage any spills that occur during operation.	Operation
Biodiversity		
B1	A Construction Flora and Fauna Management Plan (CFFMP) would be prepared. Clearing of native vegetation and threatened species habitat within the Project Site would not occur until the CFFMP is approved. This CFFMP would include the following: • Plans showing areas to be cleared and areas to be protected, including exclusion zones, protected habitat features and revegetation areas • Pre-clearing survey requirements • Procedures for unexpected threatened species finds and fauna handling • Protocols to manage weeds and pathogens.	Construction
B2	Pre-clearing surveys would be undertaken to identify any breeding or nesting activities by native fauna in hollow-bearing trees and native vegetation. No breeding attempts or active nests should be disrupted, as far as practical.	Construction
B3	Site inductions for construction staff will include a briefing on the potential presence of threatened species and their habitat adjacent to the development site, their significance and locations and extents of no-go zones.	Construction
B4	Clearance of native vegetation would be minimised as far as is practicable.	Construction
B5	The limits of vegetation clearing would be marked on plans and on-site with signed fencing so that clearing activities are constrained to approved areas only.	Construction
B6	A two-stage approach to clearing will be undertaken which will include the following steps • Remove non-hollow-bearing trees at least 48 hours before habitat trees are removed • Hollow-bearing trees are to be knocked with an excavator bucket or other machinery to encourage fauna to evacuate the tree immediately prior to felling • Felled trees must be left for a short period of time on the ground to give any fauna trapped in the trees an opportunity to escape before further processing of the trees • Felled hollow-bearing trees must be inspected by an ecologist as soon as possible (no longer than two hours after felling).	Construction
B7	A pre-start-up check for sheltering native fauna of all infrastructure, plant and equipment and/or during relocation of stored construction materials would be undertaken.	Construction
B8	If any pits/trenches are to remain open overnight adjacent to native vegetation, they would be securely covered, if possible. Alternatively, fauna ramps (logs or wooden planks) would be installed to provide an escape for trapped fauna.	Construction

ID	Mitigation	Timing
B9	Appropriate sediment and erosion controls would be installed prior to the commencement of earthworks and construction, around the impact area, to reduce run-off into adjoining vegetation and downstream to the Coxs River and Lake Wallace.	Construction
B10	Where possible, earthworks would be undertaken during dry weather conditions. Clearing of vegetation should be avoided during overland flow events.	Construction
Aboriginal heritage		
AH1	No ground disturbing activities are to take place within a 5 m buffer of the marked PAD boundaries of Wallerawang BESS AFT + PAD 01 (AHIMS ID# 45-1-2844) and Wallerawang BESS IF + PAD 02 (AHIMS ID# 45-1-2843).	Construction
AH2	The boundary of Wallerawang BESS AFT + PAD 01 (AHIMS ID# 45-1-2844) and Wallerawang BESS IF+ PAD 02 (AHIMS ID# 45-1-2843) will be demarcated as an environmentally sensitive zone during construction phases and future use of the site.	Construction
AH3	In the unlikely event that human remains are discovered during the development, all work will cease in the immediate vicinity. The discovery will be reported to Enviroline, Heritage NSW, the local police and the RAPs. Further assessment will be undertaken to determine if the remains were Aboriginal or non-Aboriginal.	Construction
AH4	Further archaeological assessment will be required if the Project activity extends beyond the construction footprint. This will include consultation with the RAPs and may include further assessment of impacts and mitigation measures and archaeological subsurface investigation.	Construction
AH5	Construction teams and operations staff will receive cultural training to ensure they understand the cultural values of these sites and their connection to the surrounding landscape and the Local Wiradjuri Aboriginal community that continue to care for country.	Construction
AH6	If unexpected heritage items are identified during construction, operation and maintenance, the Unexpected Finds Protocol (included in the CEMP and the OEMP) will be followed in line with the *NSW National Parks and Wildlife Act 1974*.	Throughout
Non-Aboriginal heritage		
NAH1	An archival recording of the railway embankment and culvert should be completed both before and after the proposed works.	Pre-Construction / Post-Construction
NAH2	In the event of an unexpected archaeological/heritage item find during construction, works within the area should cease and a suitably qualified heritage professional be engaged to assess the significance and management of the finds.	Construction
NAH3	Construction works are unlikely to cause secondary impacts on the culvert through vibrational impacts, a structural engineer may be consulted to consider how vibration risks to the culvert can be minimised and avoided.	Construction
NAH4	It is possible that unexpected heritage items may be identified during operation and maintenance works. In this case, the Unexpected Finds Protocol (included in the OEMP) will be followed.	Operation

ID	Mitigation	Timing
Bushfire		
BR1	At the commencement of the development, and for the life of the development the curtilage surrounding the proposed BESS shall be managed as an Inner Protection Area (IPA) and Asset Protection Zone (APZ) in all directions for a distance of at least 100 m and otherwise to the boundary of the proposed BESS facility footprint whichever is the greater distance.	Construction / Operation
BR2	The curtilage surrounding the proposed Wallerawang Switchyard, the 330 kV overhead transmission line corridor and associated structures, and the office and carpark shall be managed as an IPA and APZ from the proposed buildings in all directions for a distance of at least 20 m.	Operation
BR3	Water supply will comply with the relevant requirement of Planning for Bushfire Protection 2019 Table 7.4a.	Operation
BR4	A static water supply of two 20,000 litre water tanks will be made available for fire suppression activities, with multiple tanks being provided as required.	Operation
BR5	A connection for firefighting purposes is to be located within the IPA or non-hazard side and away from the structure	Operation
BR6	Property access road will be two-wheel drive, all weather roads, with a minimum 4 m carriageway width	Construction / Operation
BR7	Suitable access for a Category 1 fire appliances will be available to within 4 m of the static water supply	Construction / Operation
BR8	Access to the site will comply with the relevant requirements of the PBP 2019 (Tables 7.4a and 5.3b)	Construction / Operation
BR9	Vegetation within the overhead transmission line corridor will be managed in accordance with the ISSC3 *ISSC3 Guideline for Management Vegetation near Power Lines (November 2016)*	Operation
BR10	A Bushfire Management Plan will be prepared as part of the CEMP and the OEMP	Construction / Operation
BR11	An Emergency Evacuation Plan will be prepared as part of the CEMP and the OEMP	Construction / Operation
Hazard and risk		
H&R1	Equipment and systems will be designed and tested to comply with relevant international and/or Australian standards (e.g. AS 5139) and guidelines.	Design
H&R2	All staff working on-site will undertake a site induction/substation training (i.e. high voltage areas) appropriate to the work activities.	Operation
H&R3	Installation and maintenance activities will be undertaken by trained personnel and by reputable contractors	Operation
H&R4	All Decisive Voltage Classification (DVC) will be followed, and equipment marked accordingly.	Operation
H&R5	An electrical switch-in and switch-out and BMS fault detection and safety shut-off protocol will be developed	Operation
H&R6	Warning signs (e.g. electrical hazards, arc flash) will be installed on-site (as required)	Operation

ID	Mitigation	Timing
H&R7	Earthing will be installed as per manufacturer and standards requirements	Operation
H&R8	Appropriate PPE for flash hazard within the arc flash boundary will be used by all staff working in this environment. Conductive items will not be worn while working on or near energised or live conductive parts (e.g. rings, jewellery).	Operation
H&R9	Rescue kits (i.e. insulated hooks) will be available on-site	Operation
H&R10	An Emergency Response Plan will be prepared as part of the OEMP, which will include firefighting assistance (FRNSW & RFS) from nearby fire stations (i.e. Wallerawang, Lithgow, Lithgow West)	Operation
H&R11	The Operation Environmental Management Plan (OEMP) prepared for the Project will include procedures and measures for managing accidental spills during operation.	Operation
H&R12	The site will be fenced off with appropriate security measures (e.g. locked gates, CCTV) and will also include hazard/danger signage.	Operation
Water quality and flooding		
WQF1	Prepare and implement a Soil and Water Management Plan and Erosion and Sediment Control Plans as part of the CEMP and in accordance with *Managing Urban Stormwater – Soils and Construction, Volume 2D* (Landcom, 2004).	Pre-Construction / Construction
WQF2	The OEMP, for the Project will include a management, maintenance and cleaning schedule to ensure that stormwater management system devices are regularly inspected and maintained.	Operation
Visual amenity		
V2	The design of the proposed BESS facility will consider the use of materials that integrate with the surrounding landscape.	Operation
V3	Cut off and direct light fittings (or similar technologies) would be used where appropriate to minimise glare and light spill onto private property.	Operation
V4	Reflective and glare materials and surfaces will be minimised, where possible.	Operation
V5	A Landscape Plan will help to integrate the project into the surrounding landscape.	Construction and Operation
Air quality		
AQ1	Reasonable and feasible dust suppression will be implemented during construction activities including the use of water tanks and/or carts, sprinklers, site exit controls (e.g. wheel washing systems and rumble grids) to minimise fugitive dust emissions.	Construction
AQ2	Exposed areas or stockpiles will be stabilised and progressive rehabilitation undertaken where feasible	Construction
AQ3	All vehicles transporting materials to and from the Project Site will be covered and secured	Construction
AQ4	Speed limits (20 km/h) on the site will be established and enforced during construction	Construction
AQ5	All plant and equipment will be inspected before it is used on-site and maintained in accordance with manufacturers specifications and would comply with relevant vehicle emission standards, where applicable.	Construction

ID	Mitigation	Timing
AQ6	All plant and equipment will be switched off when not in use for extended periods	Construction
AQ7	An Air Quality Management Plan (AQMP) will be prepared as part of the Construction Environmental Management Plan (CEMP) to minimise the potential air quality issues associated with the construction activities	Construction
AQ8	Dust and air quality complaints will be managed in accordance with the overarching complaints handling process for the Project. Appropriate corrective actions; if required, will be taken to reduce emissions in a timely manner.	Construction
Waste management		
W1	All materials requiring removal from the Project Site will need to be classified in accordance with the NSW EPA (2014) *Waste Classification Guidelines*. This material should only be transported from the Project Site to an appropriately licensed landfill for disposal or to an appropriately licenced recycling facility which is licenced to receive this material.	Construction
W2	The resource management hierarchy principles established under the WARR Act of avoid / reduce / reuse / recycle / dispose will be applied were feasible.	Construction
W3	A Waste Management Plan will be prepared as part of the CEMP, detailing appropriate procedures for waste management in accordance with the waste management hierarchy.	Construction
W4	Wastes will be appropriately transported, stored and handled in accordance with NSW EPA waste classification and in a manner that prevents pollution of the surrounding environment	Construction
W5	The handling and management of special wastes will be carried out in accordance with relevant legislation, codes of practice and Australian standards	Construction
W6	A Waste Register will be maintained for the duration of construction. The register will detail the type of waste, volume/quantity of waste and recycle/disposal option.	Construction
W7	Working areas will be maintained, kept free of rubbish and cleaned up at the end of each working shift.	Construction
W8	Waste will be managed and disposed of in accordance with the relevant applicable legislation, policies and guidelines, including the WARR Act and the *NSW Waste Avoidance and Resource Recovery Strategy 2014-21* (NSW EPA, 2014).	Operation
W9	Waste will be managed and disposed of in accordance with the relevant applicable legislation, policies and guidelines, including the WARR Act and the *NSW Waste Avoidance and Resource Recovery Strategy 2014-21* (NSW EPA, 2014).	Operation
Climate change		
CC1	Detailed design of the Project would consider: • Including measures which reduce the velocity and volume of stormwater flows to reduce the potential for scouring to occur • A fire suppression system and appropriate access for fire fighters during bushfires • A safety mechanism to shutdown BESS units during increased temperature days • Materials able to effectively withstand excessive heat.	Design

ID	Mitigation	Timing
CC2	Management and mitigation measures identified in other EIS chapters and relevant technical papers that are relevant to the management of climate change impacts include: • Chapter 10 (Soils and contamination), specifically measures to manage impacts associated with stormwater runoff and drainage design of the Project • Chapter 14 and Appendix H (Bushfire Risk Assessment), specifically relating to the management of bushfire risks for the Project. • Chapter 15 and Appendix I (Hazards and Risk) Chapter 16, Appendix J (water quality) and Appendix K (flooding), specifically measures relating to the mitigation and management of flooding impacts to the Project during operation	Construction
CC3	Management and mitigation measures identified in the EIS will be relevant for the duration of operation.	Operation
Socio-economic		
SE1	A Complaints contact number and email will be established for the duration of construction and a community complaints register will be maintained. Any complaints received from the community or other stakeholders will be appropriately investigated and if required, additional measures put in place to minimise further impacts. Feedback to complainants will be provided as soon as possible following the investigation. A complaints management process will be included in the CEMP.	Construction
SE2	The OEMP will include measures to engage with stakeholders and to manage and respond to feedback received during the operation.	Construction

25 Ecologically sustainable development

As required under the SEARs and the EP&A Regulation (Schedule 2, Clause 7), the following section outlines how the Project is consistent with the principles of ecologically sustainable development.

25.1 Existing environment

Australia's *National Strategy for Ecologically Sustainable Development*[11] *(1992)* defines ecologically sustainable development as 'using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future can be increased'.

In NSW, the commitment to the concept of environmental sustainability is expressed in current legislation. It is an objective of the EP&A Act 1979 (section 1.3 (b)) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment, through the implementation of the four principles of ecologically sustainable development. The four principles of ecologically sustainable development are defined in clause 7(4) of Schedule 2 of the EP&A Regulation 2000. They are:

- **Precautionary principle:** namely, that if there are threats of serious or irreversible environmental damage, lack of scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:
  - Careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment

An assessment of the risk-weighted consequences of various options.

- **Inter-generational equality:** namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations
- **Conservation of biological and ecological integrity:** namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration
- **Improved valuation, pricing and incentive mechanisms**: namely, that environmental factors should be included in the valuation of assets and services, such as:
  - Polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement
  - The users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste
  - Environmental goals, having been established, should be pursued in the most cost-effective way, by establishing incentive structures, including market mechanisms that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.

[11] https://webarchive.nla.gov.au/awa/20130905024205/http://www.environment.gov.au/about/esd/publications/strategy/index.html

An assessment of the Project's consistency with the principles of ecologically sustainable development has been undertaken, it evaluates how those principles have been considered and incorporated into the design, construction and operation of the Project.

25.2 Assessment of Project consistency

25.2.1 The precautionary principle

The precautionary principle deals with certainty in decision making. It provides that if there are risks of serious or irreversible environmental damage associated with a proposed development, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

The precautionary principle approach has been applied throughout the development of the Project and in the preparation of all technical studies associated with the Project. The main intent is to minimise any potential environmental impacts. This included identifying opportunities to avoid and minimise potential impacts to the surrounding environment and sensitive residential receivers. This is described in Section 3 (Project justification, need and alternatives).

This EIS details the evaluation of environmental impacts associated with the Project and was prepared by adopting a conservative approach which included assessing worst-case impacts and scenarios. It has been undertaken using the best available technical information and has adopted best practice environmental standards, goals and measures to minimise environmental risks. The environmental assessment has been undertaken in collaboration with key stakeholders and relevant statutory and agency requirements.

The risk of serious or irreversible environmental damage is the fundamental rationale for implementing the precautionary principle. Environmental risks associated with the Project were identified during the development of the EIS. Appropriate mitigation measures have been identified to ensure the minimum environmental impacts during design, construction and operation of the Project and that no such impact results or serious or irreversible environmental damage. See Section 7 (environmental risk assessment) for more information.

Technical specialist studies that were undertaken to provide detailed information to assist with the assessment and development of the Project included:

- Traffic and Transport (Section 8 and Appendix C)
- Noise and Vibration (Section 9 and Appendix D)
- Soil Contamination (Section 10)
- Biodiversity (Section 11 and Appendix E)
- Aboriginal Heritage (Section 12 and Appendix F)
- Non-Aboriginal Heritage (Section 13 and Appendix G)
- Bushfire (Section 14 and Appendix H)
- Hazards and Risk (Section 15 and Appendix I)
- Water Quality and Flooding (Section 16, Appendix J and Appendix K).

The specialist studies identified that through the implementation of mitigation measures, the potential impacts of the Project will be appropriately managed. As a result, the Project would not cause serious and irreversible environmental damage. Mitigations measures are summarised in Section 24.

25.2.2 Inter-generational equity

Inter-generational equity refers to the premise that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations. The Project has been considered in terms of intergenerational equity through the management of potential environmental impacts discussed throughout this EIS.

As detailed in Section 3, NSW is undergoing an energy sector transformation which will change how energy is generated and used throughout the State. The need to increase the generation of renewable energy as some of the State's largest coal-fired power stations begin to close has been identified. The Project provides benefits to both existing and future generations through the provision of large-scale battery storage which is expected to contribute to the ability of the electricity grid to accommodate renewable energy sources (particularly wind and solar).

The mitigation measures provided in Section 24 of this EIS, in particular those relating to traffic and transport, biodiversity, heritage, noise and vibration and air quality are reflective of the commitment of Greenspot (as the Proponent) to ensuring that the Project does not adversely affect quality of the environment for future generations.

25.2.3 Conservation of biological diversity and ecological integrity

This ecologically sustainable development principle stipulates that biological diversity and ecological integrity should be a fundamental consideration when assessing the impacts of a Project.

Three plant community types were identified within the study area of the BDAR. Of the total 7.67 hectares, 1.92 hectares would be impacted during construction. None of these PCTs are associated with any threatened ecological communities (TEC) under the *Biodiversity Conservation (BC) Act 2016* or *Environment Protection and Biodiversity Conservation (EPBC) Act 1999*.

Two threatened flora species listed as vulnerable under the BC Act and EPBC Act and nine threatened fauna species listed as vulnerable under the BC Act were recorded within the study area during targeted surveys. Two species are also listed as vulnerable under the EPBC Act. Significant impact criteria assessments under the EPBC Act concluded that the Project is unlikely to have a significant impact on any listed threatened species.

Mitigation measures are proposed that would minimise adverse impacts on ecological values. These include preparation of a Flora and Fauna Management Plan, appropriate sediment and erosion controls, avoiding and minimising removal of vegetation where practicable, site inductions, exclusion fencing, pre-clearance surveys and appropriate weed and hygiene protocols. Future offset requirements would be determined using the Biodiversity Offsets Scheme following detailed design.

Section 11 of the EIS provides an assessment of the potential impacts of the Project on biodiversity and Section 24 summarises all the mitigation measures to be implemented during construction and operation of the Project.

25.2.4 Improved valuation, pricing and incentive mechanisms

This principle requires that costs to the environment are incorporated or internalised in terms of the overall project costs, ensuring that decision making considers the environmental impacts. As a result, this EIS has, where possible, avoided or minimised environmental impacts and identified mitigation measures for areas where adverse environmental impacts may occur as part of this Project.

Burning of fossil fuels like coal and oil has increased the concentration of atmospheric carbon dioxide which is known to contribute to climate change. Climate change impacts could potentially impose a significant financial burden on governments and taxpayers through rising health care costs, destruction of property, increased food prices, and more. The social cost of carbon is a measure of the economic harm from those impacts, expressed as the dollar value of the total damages from emitting one tonne of carbon dioxide into the atmosphere.

The construction of the Project will facilitate the increased uptake of renewable energy projects, which it is expected will ultimately replace fossil fuels in energy generation. Economic benefits will be achieved through minimising emissions of carbon dioxide into the atmosphere.

25.3 Conclusion

Each ecologically sustainable development principle has been considered and incorporated in the development of Project. With appropriate mitigation measures as identified throughout this EIS undertaking the Project in the manner proposed is consistent with the principles of ecologically sustainable development.

26 Justification and conclusion

26.1 Project justification

26.1.1 Project objectives

The key objectives of the Project include the following:

- Improve the security, resilience and sustainability of NSW's electricity grid
- Deliver a Project that would serve as a significant enabler for the 'Greenspot 2845 Activity Hub'
- Minimise adverse impacts on the environment and community during construction and operation
- Provide an ongoing and consistent power supply (as part of a larger network) for the Lithgow community and Central West and Orana Region
- Providing critical energy storage and related services to facilitate the greater introduction of renewables into the electricity network to meet NSW's household and industry demand for energy.

26.1.2 Need for the Project

Over the last 10-15 years, there has been a steady increase in the number of renewable projects which have come online and are generating electricity for use in the National Electricity Market (NEM), while more of the older traditional coal fired power stations have been retired and decommissioned. This transition from thermal generation to renewable generation is expected to continue into the future. To support this transition, energy storage will be required to support the intermittent nature of generating electricity from renewable energy sources and to provide a reliable and secure source of electricity to consumers and the local population.

The Federal, State and Local Governments have put in place a number of plans, strategies and roadmaps, to progress and optimise consumer benefits through a transition of the energy market. These include:

- *2020 Integrated System Plan for the National Electricity Market* (2020 ISP) (Australian Energy Market Operator (AEMO), 2020)
- *NSW Transmission Infrastructure Strategy* (DPIE, 2018) (the Transmission Infrastructure Strategy)
- *NSW Government's Electricity Strategy* (DPIE,2019 (the Electricity Strategy)
- *NSW Electricity Infrastructure Roadmap* (DPIE, 2020) (Electricity Infrastructure Roadmap)
- *NSW Climate Change Policy Framework* (NSW Office of Environment and Heritage (OEH), 2016)
- *Central West and Orana Regional Plan 2036*
- Draft *Lithgow 2040 Local Strategic Planning Statement (LSPS)*.

Wind and solar generation are variable in their output and need to be complemented with firm and flexible technologies such as hydro, batteries, bioenergy, concentrated solar power, demand management and gas-fired generators. When variable generators are unable to satisfy demand, other technologies which can provide electricity on demand, dispatchable firm generation (i.e. gas and battery storage) is able to meet electricity demand, provided there is sufficient firm generation capacity.

Without the development and operation of short and long-term dispatch infrastructure to support increasing investment in renewable energy into Renewable Energy Zones (REZs), there is the potential for

a future deficit in capacity and consequently the reliability of the NSW power supply system is exposed. In a worst-case scenario, this can lead to load shedding or blackout events.

The Project involves the development of a large-scale BESS. BESS facilities, such as that proposed by the Project, would provide enabling infrastructure to protect the ongoing reliability of electricity supply during the expansion of the renewable energy industry in NSW (particularly in the Central-West Orana REZ, which is considered a critical element of the transformation of the NSW energy sector). In addition, the Project has the potential to serve as a significant enabler for the 'Greenspot 2845 Activity Hub'.

26.1.3 Site suitability

The Proponent completed a site selection exercise for the Project, both within land owned as part of the Wallerawang Power Station acquisition completed in 2020 and of the surrounding land. After identifying that land for the Project within the Greenspot site was preferred over any of the surrounding land, two potential sites were considered for the Project. The Project Site was considered as the preferred location for the BESS facility, due to the following key factors:

- The Project Site is in close proximity to the existing TransGrid Wallerawang 330kV substation in a location where no third-party easements or access across private property (expect for arrangements with TransGrid in respect of the substation) would be required; and
- The compatibility of the Project with the preferred site's existing land use zoning and permissibility.

In addition, there is an existing access along the south of the Project Site which connects directly to the Castlereagh Highway.

The Project Site has been refined since the submission of the Scoping Report as a result of design development, consultation with key stakeholders and to reduce the environmental impact. A summary of the key changes and justification is as follows:

- The forestry area will contain the BESS facility and Project Site switchyard.
- The proposed overhead transmission line path between Wallerawang substation and the Project Site has been altered to accommodate the 60 metre corridor.
- The construction and operational footprints have been reshaped to avoid impacts to areas of potential Aboriginal heritage significance and an item of non-Aboriginal heritage
- The cleared area to the east of the Project Site will not be used for operation and has been excluded from the operational footprint
- The entry and exit to the Project Site remains the same, as well as using two internal access tracks to access the Project Site switchyard and BESS facility.

26.2 Conclusion

Greenspot is seeking to establish a market leading Battery Energy Storage System (BESS), to be known as the 'Wallerawang 9 Battery', located at the site of the old Wallerawang Power Station at Wallerawang, NSW. The Project is for the construction, operation and maintenance of a BESS which will be up to 500 MW and would provide up to 1,000 MWh of battery storage capacity, or up to two hours of storage duration. Key features of the Project include:

- Large-scale BESS including battery enclosures, inverters and transformers.
- 33/330 kV switchyard.

- Overhead transmission line connection between the BESS and the nearby TransGrid Wallerawang 330 kV Substation.
- Ancillary elements including site access from the Castlereagh Highway, internal access roads and parking, site office and amenities, stormwater and fire management infrastructure, utilities, signage, fencing, security systems and landscaping.

Construction is expected to commence in Quarter 2 of 2022 and will continue for approximately 12-24 months.

Environmental investigations were undertaken during the preparation of the EIS to assess the potential environmental impacts of the Project. This included assessment of the key environmental issues identified as being Traffic and Transport, Noise and Vibration, Soils and Contamination, Biodiversity, Aboriginal Heritage, Non-Aboriginal Heritage, Bushfire Risk, Hazards and Risk, Water Quality, Flooding and Water Use and Visual Amenity.

The EIS concludes that many of the potential impacts identified would be effectively managed through Project design. To manage other impacts, and in some cases eliminate them completely, a number of mitigation and management measures would be implemented as outlined in Section 24.

The EIS includes an assessment of the permissibility of the Proposal under relevant EPIs and legislation (Section 5). The Project is permissible with consent and is 'state significant development' (SSD) under Part 4, Division 4.7 of the EP&A Act.

In conclusion the Proposal has been assessed in accordance with the EP&A Act and the SEARs. The Project satisfies the requirements of the SEARs (Appendix A) and is consistent with the principles of ecologically sustainable development (Section 25). The potential environmental, social and economic impacts, both direct and cumulative, have been identified and thoroughly assessed as part of this EIS. The assessment concluded that no significant environmental impacts have been identified as a result of the Project. It is considered that any potential impacts can be satisfactorily mitigated through a range of measures that have been identified within the EIS. In addition, the Project has been assessed against, and has been found to be consistent with, the priorities and targets adopted in relevant published and draft State plans, as well as Government policies and strategies.

The Project is considered critical in supporting the NSW Government's electricity strategy for a reliable, affordable and sustainable electricity future that supports a growing economy. Overall, the EIS concludes that the Project is in the public interest and approval is recommended.

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Appendices

APPENDIX A CONSOLIDATED SEARS COMPLIANCE TABLE

Secretary's Environmental Assessment Requirements (SEARS)

The SEARs and where these requirements are addressed in this Environmental Impact Statement are outlined below.

Secretary's Environmental Assessment Requirements	Where addressed
General Requirements	
The Environmental Impact Statement (EIS) for the development must comply with the requirements in Schedule 2 of the Environmental Planning and Assessment Regulation 2000 (the Regulation).	Throughout the EIS Statement of Validity Appendix B EP&A Regulations Checklist
In particular, the EIS must include:	N/A
• A stand-alone executive summary	Executive Summary
• A full description of the development, including:	N/A
– Details of construction, operation and decommissioning	Section 4 Project description
– A site plan showing all infrastructure and facilities (including any infrastructure that would be required for the development, but the subject of a separate approvals process)	Section 2 Project site description
– A detailed constraints map identifying the key environmental and other land use constraints that have informed the final design of the development.	Section 4 Project description Figure ES-3, Figure 5-1, Figure 11-1, Figure 11-2
• 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 other proposed or approved energy facilities, rural residential development and subdivision potential)	Section 3 Project justification, need and alternatives Section 5 Statutory planning approvals
• An assessment of the likely impacts of the development on the environment, focusing on the specific issues identified below, including:	N/A
– A description of the existing environment likely to be affected by the development	Sections 8 through to 23
– 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	Sections 8 through to 23 Section 23 Cumulative impact assessment
– 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)	Sections 8 through to 23 Section 24 Compilation of mitigation measures
– A description of the measures that would be implemented to monitor and report on the environmental performance of the development	Sections 8 through to 23 Section 24 Compilation of mitigation measures

Secretary's Environmental Assessment Requirements	Where addressed
• A consolidated summary of all the proposed environmental management and monitoring measures, identifying all the commitments in the EIS	Section 24 Compilation of mitigation measures
• The reasons why the development should be approved having regard to:	N/A
– Relevant matters for consideration under the *Environmental Planning and Assessment Act 1979*, including the objects of the Act and how the principles of ecologically sustainable development have been incorporated in the design, construction and ongoing operations of the development	Section 25 Ecologically sustainable 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 the consequences of not carrying out the development.	Section 2 Project site description
– A detailed consideration of the capability of the project to contribute to the security and reliability of the electricity system in the National Electricity Market, having regard to local system conditions and the Department's guidance on the matter	Section 3.2 Project need and strategic justification
• A detailed evaluation of the merits of the project as a whole.	Section 3 Project justification, need and alternatives
• The EIS must also be accompanied by a report from a suitably qualified person providing: – A detailed calculation of the capital investment value (CIV) (as defined in clause 3 of the Regulation) of the proposal, including details of all assumptions and components from which the CIV calculation is derived – Certification that the information provided is accurate at the date of preparation.	Section 4 Project description CIV Report provided separately
• The development application must be accompanied by the consent in writing of the owner/s of the land (as required in clause 49(1)(b) of the Regulation).	Consent from Greenspot Consent from TransGrid
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), the Biodiversity Assessment Method (BAM) and documented in a Biodiversity Development Assessment Report (BDAR), unless BCD and DPIE determine the proposed development is not likely to have any significant impacts on biodiversity values	Section 11 Biodiversity Appendix E Biodiversity Development Assessment Report (BDAR)
• The BDAR must document the application of the avoid, minimise and offset framework including assessing all direct, indirect and prescribed impacts in accordance with the BAM	Appendix E Biodiversity Development Assessment Report (BDAR)
• 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; and	Section 11.3 Appendix E Biodiversity Development Assessment Report (BDAR)

Secretary's Environmental Assessment Requirements	Where addressed
• If an offset is required, details of the measures proposed to address the offset obligation.	Section 11.3.5 Appendix E Biodiversity Development Assessment Report (BDAR)
Heritage	
• An assessment of the likely Aboriginal and historic heritage (cultural and archaeological) impacts of the development and consultation with the local Aboriginal community in accordance with the Aboriginal Cultural Heritage Consultation Requirements for Proponents.	Section 12 Aboriginal heritage Appendix F Aboriginal Cultural Heritage Assessment (ACHA) Report
Land	
• An assessment of the potential impacts of the development on existing land uses on the site and adjacent land, including:	Section 22 Property and Land use
– A consideration of flood prone land, Crown lands, forestry, mining, quarries, mineral or petroleum rights	Section 22 Property and Land use Section 2 Project site description Section 16 Water quality, flooding
– A soil survey to determine the soil characteristics and consider the potential for erosion to occur	Section 10 Soils and contamination
– A site contamination assessment in accordance with the *Managing Land Contamination Planning Guidelines: SEPP 55 – Remediation of Land* (DUAP, 1998)	Section 10 Soils and contamination
– A cumulative impact assessment of nearby developments.	Section 23 Cumulative impact assessment
• An assessment of the compatibility of the development with existing land uses, during construction, operation and after decommissioning, including:	Section 2 Project site description Section 5 Statutory planning approvals
– Consideration of the zoning provisions applying to the land, including subdivision	Section 5 Statutory planning approvals Section 22 Property and Land use Appendix L Land Use Conflict Risk Assessment
– Completion of a Land Use Conflict Risk Assessment in accordance with the Department of Industry's *Land Use Conflict Risk Assessment Guide*.	Appendix L Land Use Conflict Risk Assessment
Visual	
• A detailed assessment of the likely visual impacts (including any glare, reflectivity and night lighting) of all components of the project (including transmission lines, substations and any other ancillary infrastructure) on surrounding residences and key locations, scenic or significant vistas, air traffic and road corridors in the public domain and provide details of measures to mitigate and/or manage potential impacts (including a draft	Section 17 Visual amenity

Secretary's Environmental Assessment Requirements	Where addressed
landscaping plan for on-site perimeter planting, with evidence it has been developed in consultation with affected landowners).	
Noise	
• An assessment of the construction noise impacts 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), cumulative noise impacts (considering other developments in the area), and a draft noise management plan if the assessment shows construction noise is likely to exceed applicable criteria	Section 9 Noise and vibration
Transport	
• An assessment of the peak and average traffic generation, including over-dimensional vehicles and construction worker transportation	Section 8 Traffic and transport Appendix C Traffic and Transport Assessment
• An assessment of the likely transport impacts to the site access route (including, but not limited to, Castlereagh Highway), site access point(s), any Crown land, particularly in relation to the capacity and condition of the roads, road safety and intersection performance	Section 8 Traffic and transport Appendix C Traffic and Transport Assessment
• A cumulative impact assessment of traffic from nearby developments	Section 8 Traffic and transport Section 23 Cumulative impact assessment
• Provide details of measures to mitigate and / or manage potential impacts including a schedule of all required road upgrades (including resulting from heavy vehicle and over mass / over dimensional traffic haulage routes), road maintenance contributions, and any other traffic control measures, developed in consultation with the relevant road authority	Section 8Traffic and transport Appendix C Traffic and Transport Assessment
Water	
• An assessment of the likely impacts of the development (including flooding) on surface water and groundwater resources traversing the site and surrounding watercourses, drainage channels, wetlands, riparian land, farm dams, groundwater dependent ecosystems and acid sulfate soils, related infrastructure, adjacent licensed water users and basic landholder rights, and measures proposed to monitor, reduce and mitigate these impacts	Section 16 Water quality, flooding Appendix J Water Quality Assessment Appendix K Flooding Impact Assessment
• Details of water requirements and supply arrangements for construction and operation	Section 16 Water quality, flooding Appendix J Water Quality Assessment
• An assessment of the potential impacts of the development on the Sydney drinking water catchment, including consideration of Water NSW's current recommended practices and standards, stormwater quality modelling (MUSIC), and weather the development can be constructed and operated to have a neutral or beneficial effect on water quality consistent with the provisions of *State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011;*	Section 16 Water quality, flooding Appendix J Water Quality Assessment

Secretary's Environmental Assessment Requirements	Where addressed
• 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).*	Section 16 Water quality, flooding Appendix J Water Quality Assessment
Hazards	
• An assessment of potential hazards and risks including but not limited to bushfires, 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	Section 15.5 Assessment against ICNIRP Appendix I Preliminary Hazard Assessment
• A Preliminary Hazard Analysis prepared in accordance with *Hazardous Industry Planning Advisory Paper No. 6 – Guideline for Hazard Analysis* (DoP, 2011) and *Multi-Level Risk Assessment* (DoP, 2011).	Section 15 Hazards and risk Appendix I Preliminary Hazard Assessment
Socio-economic	
• Including an assessment of the likely impacts on the local community, any demands on Council infrastructure and a consideration of the construction workforce accommodation	Section 8 through to 23 Section 21 Socio-economic Section 22 Property and Land use Appendix L Land Use Conflict Risk Assessment
Waste	
• Identify, quantify and classify the likely waste stream to be generated during construction and operation, and describe the measures to be implemented to manage, reuse, recycle and safely dispose of this waste.	Section 20 Waste management
Consultation	
• During the preparation of the EIS, you should consult with relevant local, State or Commonwealth Government authorities, infrastructure and service providers, community groups, affected landowners and any exploration licence and/or mineral title holders.	Section 6 Consultation
• In particular, you must undertake detailed consultation with affected landowners surrounding the development and Lithgow City Council.	Section 6 Consultation
• The EIS must 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, a short explanation should be provided.	Section 6 Consultation

Our ref: DOC21/134184
Senders ref: SSD-14540514

Mr Karl Okorn
Team Leader Environmental Assessments
Energy Resource Assessment
karl.okorn@planning.nsw.gov.au

Dear Karl,

Wallerawang Battery Energy Storage System – SSD-14540514

I refer to your email dated 19 February 2021 seeking input into the Department of Planning, Industry and Environment Secretary's Environmental Assessment Requirements (SEARs) for the preparation of an Environmental Impact Statement (EIS) for the Wallerawang Battery Energy Storage System (SSD-14540514).

The Biodiversity, Conservation and Science Directorate (BCS) understands that the project would involve the construction, operation and maintenance of a large-scale Battery Energy Storage System, including battery enclosures, inverters and transformers of approximately 500 Megawatts that would provide between 500 to 1,000 Megawatt hours of battery storage capacity. It will require up to 10 hectares of land within the project site. The project will be located at the former Wallerawang Power Station which was retired in 2014.

BCS has considered your request and provides SEARs for the proposed development in **Attachments A** and **B**.

BCS recommends the EIS needs to appropriately address the following:

1. Biodiversity and offsetting
2. Water and soils
3. Flooding

Please note the following;

The Biodiversity Assessment Method 2020 came into effect on 22 October 2020. There are transitional arrangements in place to minimise the impacts that amendments to the BAM may have on proponents and landholders. **Attachment A** provides details of the transitional arrangements.

If you have any questions about this advice, please contact Helen Knight, Conservation Assessment Data Officer, via helen.knight@environment.nsw.gov.au or (02) 6883 5327

Yours sincerely,

Renee Shepherd
Acting Senior Team Leader Planning North West
Biodiversity, Conservation and Science Directorate

24 February 2021

Attachment A - Environmental Assessment Requirements
Attachment B - Guidance Material

Standard Environmental Assessment Requirements

OEH	Office of Environment and Heritage (now Biodiversity, Conservation and Science Directorate)
BCS	Biodiversity, Conservation and Science Directorate of the NSW Department of Planning, Industry and Environment, formerly OEH
The Department	NSW Department of Planning, Industry and Environment
NPWS	National Parks and Wildlife Service

Transitional arrangements for the *Biodiversity Assessment Method 2020*

Clause 6.31 of the *Biodiversity Conservation Regulation 2017* provides that when the BAM is amended, a BAR may be prepared based on the prior version of the BAM for the following designated periods;

- 12 months for a BDAR in respect of SSD/SSI or standard biocertification,
- 12 months or longer if approved by the Minister for a BDAR in respect of strategic biocertification,
- 6 months for BARs in respect of all other development or stewardship applications

A BAR prepared under these arrangements must state that it has been prepared based on the prior version.

This means that from 22 October 2020 until the end of the relevant designated transition period a BAR may be prepared using **either** the BAM 2017 **or** the BAM 2020, but not a combination of both.

If an Accredited Assessor has commenced preparing a BAR in accordance with the BAM 2017, it is recommended that they discuss the transition options with the proponent/landholder. If opting to continue using the BAM 2017, the BAR must be prepared within the relevant designated period and must include a statement that it has been prepared based on the BAM 2017. In addition, because BOAMs has been updated to reflect the BAM 2020 settings, an assessor continuing to prepare a BAR under the BAM 2017 should consult the Release Notes (attached) to ensure the correct BAM-C settings are applied.

Where an assessor proposes to apply BAM 2017 to a scattered tree (formerly paddock tree) or small area streamlined assessment, the assessor must contact BAM Support for guidance on how to use the BAM Calculator to apply the transitional arrangements. However, if the applicant or assessor proposes to apply BAM 2017 to a BSSAR, the applicant or assessor must contact the Biodiversity Conservation Trust to discuss use of this option.

Biodiversity

1. Biodiversity impacts related to the proposed project are to be assessed in accordance with Section 7.9 of the Biodiversity Conservation Act 2017 the Biodiversity Assessment Method and documented in a Biodiversity Development Assessment Report (BDAR).

The BDAR must include information in the form detailed in the *Biodiversity Conservation Act 2016* (s6.12), *Biodiversity Conservation Regulation 2017* (s6.8) and Biodiversity Assessment Method, unless the Department determine that the proposed development is not likely to have any significant impacts on biodiversity values.

2. The BDAR must document the application of the avoid, minimise and offset framework including assessing all direct, indirect and prescribed impacts in accordance with the Biodiversity Assessment Method.
3. The BDAR must include details of the measures proposed to address the offset obligation as follows;
   - The total number and classes of biodiversity credits required to be retired for the development/project;
   - The number and classes of like-for-like biodiversity credits proposed to be retired;
   - The number and classes of biodiversity credits proposed to be retired in accordance with the variation rules;
   - Any proposal to fund a biodiversity conservation action;
   - Any proposal to conduct ecological rehabilitation (if a mining project);
   - Any proposal to make a payment to the Biodiversity Conservation Fund.

   If seeking approval to use the variation rules, the BDAR must contain details of the reasonable steps that have been taken to obtain requisite like-for-like biodiversity credits.
4. The BDAR must be submitted with all spatial data associated with the survey and assessment as per Appendix 11 of the BAM.
5. The BDAR must be prepared by a person accredited in accordance with the Accreditation Scheme for the Application of the Biodiversity Assessment Method Order 2017 under s6.10 of the *Biodiversity Conservation Act 2016*.

Water and soils

6. The EIS must map the following features relevant to water and soils including:
   a. Acid sulfate soils (Class 1, 2, 3 or 4 on the Acid Sulfate Soil Planning Map).
   b. Rivers, streams, wetlands, estuaries (as described in s4.2 of the Biodiversity Assessment Method).
   c. Wetlands as described in s4.2 of the Biodiversity Assessment Method.
   d. Groundwater.
   e. Groundwater dependent ecosystems.
   f. Proposed intake and discharge locations.
7. The EIS must describe background conditions for any water resource likely to be affected by the project, including:
   a. Existing surface and groundwater.

b. Hydrology, including volume, frequency and quality of discharges at proposed intake and discharge locations.
c. Water Quality Objectives (as endorsed by the NSW Government http://www.environment.nsw.gov.au/ieo/index.htm) including groundwater as appropriate that represent the community's uses and values for the receiving waters.
d. Indicators and trigger values/criteria for the environmental values identified at (c) in accordance with the ANZECC (2000) Guidelines for Fresh and Marine Water Quality and/or local objectives, criteria or targets endorsed by the NSW Government.
e. *Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions*

8. The EIS must assess the impacts of the project on water quality, including:
   a. The nature and degree of impact on receiving waters for both surface and groundwater, demonstrating how the project protects the Water Quality Objectives where they are currently being achieved, and contributes towards achievement of the Water Quality Objectives over time where they are currently not being achieved. This should include an assessment of the mitigating effects of proposed stormwater and wastewater management during and after construction.
   b. Identification of proposed monitoring of water quality.

9. The EIS must assess the impact of the project on hydrology, including:
   a. Water balance including quantity, quality and source.
   b. Effects to downstream rivers, wetlands, estuaries, marine waters and floodplain areas.
   c. Effects to downstream water-dependent fauna and flora including groundwater dependent ecosystems.
   d. Impacts to natural processes and functions within rivers, wetlands, estuaries and floodplains that affect river system and landscape health such as nutrient flow, aquatic connectivity and access to habitat for spawning and refuge (e.g. river benches).
   e. Changes to environmental water availability, both regulated/licensed and unregulated/rules-based sources of such water.
   f. Mitigating effects of proposed stormwater and wastewater management during and after construction on hydrological attributes such as volumes, flow rates, management methods and re-use options.
   g. Identification of proposed monitoring of hydrological attributes.

Flooding

10. The EIS must map the following features relevant to flooding as described in the Floodplain Development Manual 2005 (NSW Government 2005) including:

a. Flood prone land.
b. Flood planning area, the area below the flood planning level.
c. Hydraulic categorisation (floodways and flood storage areas).
d. Flood hazard

11. The EIS must describe flood assessment and modelling undertaken in determining the design flood levels for events, including a minimum of the 5% Annual Exceedance Probability (AEP), 1% AEP, flood levels and the probable maximum flood, or an equivalent extreme event.

12. The EIS must model the effect of the proposed project (including fill) on the flood behaviour under the following scenarios:
    a. Current flood behaviour for a range of design events as identified in 14 above. This includes the 0.5% and 0.2% AEP year flood events as proxies for assessing sensitivity to an increase in rainfall intensity of flood producing rainfall events due to climate change.

13. Modelling in the EIS must consider and document:
    a. Existing council flood studies in the area and examine consistency to the flood behaviour documented in these studies.
    b. The impact on existing flood behaviour for a full range of flood events including up to the probable maximum flood, or an equivalent extreme flood.
    c. Impacts of the development on flood behaviour resulting in detrimental changes in potential flood affection of other developments or land. This may include redirection of flow, flow velocities, flood levels, hazard categories and hydraulic categories.
    d. Relevant provisions of the NSW Floodplain Development Manual 2005.

14. The EIS must assess the impacts on the proposed project on flood behaviour, including:
    a. Whether there will be detrimental increases in the potential flood affectation of other properties, assets and infrastructure.
    b. Consistency with Council floodplain risk management plans.
    c. Consistency with any Rural Floodplain Management Plans.
    d. Compatibility with the flood hazard of the land.
    e. Compatibility with the hydraulic functions of flow conveyance in floodways and storage in flood storage areas of the land.
    f. Whether there will be adverse effect to beneficial inundation of the floodplain environment, on, adjacent to or downstream of the site.
    g. Whether there will be direct or indirect increase in erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses.
    h. Any impacts the development may have upon existing community emergency management arrangements for flooding. These matters are to be discussed with the NSW SES and Council.

i. Whether the proposal incorporates specific measures to manage risk to life from flood. These matters are to be discussed with the NSW SES and Council.
j. Emergency management, evacuation and access, and contingency measures for the development considering the full range or flood risk (based upon the probable maximum flood or an equivalent extreme flood event). These matters are to be discussed with and have the support of Council and the NSW SES.
k. Any impacts the development may have on the social and economic costs to the community as consequence of flooding.

Guidance Material

Title	Web address
Relevant Legislation	
Biodiversity Conservation Act 2016	https://www.legislation.nsw.gov.au/view/html/inforce/current/act-2016-063
Commonwealth Environment Protection and Biodiversity Conservation Act 1999	https://www.legislation.gov.au/Details/C2014C00140/Download
Environmental Planning and Assessment Act 1979	https://www.legislation.nsw.gov.au/view/html/inforce/current/act-1979-203
Fisheries Management Act 1994	https://www.legislation.nsw.gov.au/view/html/inforce/current/act-1994-038
National Parks and Wildlife Act 1974	https://www.legislation.nsw.gov.au/view/html/inforce/current/act-1974-080
Protection of the Environment Operations Act 1997	https://www.legislation.nsw.gov.au/view/html/inforce/current/act-1997-156
Water Management Act 2000	https://www.legislation.nsw.gov.au/view/html/inforce/current/act-2000-092
Wilderness Act 1987	https://www.legislation.nsw.gov.au/view/html/inforce/current/act-1987-196
Biodiversity	
Biodiversity Assessment Method (OEH, 2020)	https://www.environment.nsw.gov.au/research-and-publications/publications-search/biodiversity-assessment-method-2020
BAM 2020 Operational Manual Stage 1	https://www.environment.nsw.gov.au/research-and-publications/publications-search/biodiversity-assessment-manual-2020-operational-manual-stage-1
BAM Operational Manual Stage 2	https://www.environment.nsw.gov.au/research-and-publications/publications-search/biodiversity-assessment-method-operational-manual-stage-2
BAM 2020 Operational Manual Stage 3	https://www.environment.nsw.gov.au/research-and-publications/publications-search/biodiversity-assessment-method-operational-manual-stage-3
BAM Calculator User Guide	https://www.environment.nsw.gov.au/research-and-publications/publications-search/biodiversity-assessment-method-user-guide
Serious and irreversible impacts of development on biodiversity	https://www.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/biodiversity-offsets-scheme/serious-and-irreversible-impacts
Practice Note - Guidance for assessors and decision makers in applying modified benchmarks to assessments of vegetation integrity: Biodiversity Assessment Method	https://www.environment.nsw.gov.au/research-and-publications/publications-search/guidance-assessors-decision-makers-applying-modified-benchmarks-to-assessments-vegetation-integrity
Guidance and Criteria to assist a decision maker to determine a serious and irreversible impact (OEH, 2017)	https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/guidance-

Title	Web address
	decision-makers-determine-serious-irreversible-impact-190511.pdf
Accreditation Scheme for Application of the Biodiversity Assessment Method Order 2017	https://www.legislation.nsw.gov.au/view/pdf/asmade/sl-2017-471
Ancillary rules: Biodiversity conservation actions	https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/ancillary-rules-biodiversity-conservation-actions-170496.pdf
Ancillary rules: Reasonable steps to seek like-for-like biodiversity credits for the purpose of applying the variation rules	https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/ancillary-rules-reasonable-steps-like-for-like-biodiversity-credits-170498.pdf
Ancillary rules: Impacts on threatened species and ecological communities excluded from application of variation rules	https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Biodiversity/ancillary-rules-impacts-on-threatened-entities-excluded-from-variation-170497.pdf?la=en&hash=C38840BFF49F012433532DF72E3D90C741E4DAC1
The Department's Threatened Species Website	https://www.environment.nsw.gov.au/topics/animals-and-plants/threatened-species
NSW BioNet (Atlas of NSW Wildlife)	www.bionet.nsw.gov.au/
Surveying Threatened Plants and their Habitats - NSW Survey Guide For The Biodiversity Assessment Method (DPIE 2020).	https://www.environment.nsw.gov.au/research-and-publications/publications-search/surveying-threatened-plants-and-their-habitats-survey-guide-for-the-biodiversity-assessment-method
Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities - November 2004	https://www.environment.nsw.gov.au/surveys/BiodiversitySurveyGuidelinesDraft.htm
Threatened species survey and assessment guidelines: field survey methods for fauna – amphibians	https://www.environment.nsw.gov.au/research-and-publications/publications-search/threatened-species-field-survey-methods-for-fauna-amphibians
NSW Survey Guide for Threatened Frogs	https://www.environment.nsw.gov.au/research-and-publications/publications-search/nsw-survey-guide-for-threatened-frogs
Surveying 'species credit' threatened bats and their habitats – NSW survey guide for the Biodiversity Assessment Method	https://www.environment.nsw.gov.au/research-and-publications/publications-search/species-credit-threatened-bats-nsw-survey-guide-for-biodiversity-assessment-method
Bat calls of NSW - region-based guide to the echolocation calls of Microchiropteran bats	https://www.environment.nsw.gov.au/surveys/Batcalls.htm
Community Biodiversity Survey Manual	https://www.environment.nsw.gov.au/surveys/CommunityBiodiversitySurveyManual.htm
BioNet Vegetation Classification - NSW Plant Community Type (PCT) database	www.environment.nsw.gov.au/research/Vegetationinformationsystem.htm
The Departments Data Portal (access to online spatial data)	http://data.environment.nsw.gov.au/
Fisheries NSW policies and guidelines	https://www.dpi.nsw.gov.au/fishing/habitat/publications/pubs/fish-habitat-conservation

Title	Web address
List of national parks	https://www.nationalparks.nsw.gov.au/conservation-and-heritage/national-parks
Revocation, recategorisation and road adjustment policy (OEH, 2012)	http://www.environment.nsw.gov.au/policies/RevocationOfLandPolicy.htm
Guidelines for consent and planning authorities for Developments adjacent to National Parks and Wildlife Service Land (NPWS, 2020)	https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Parks-reserves-and-protected-areas/Development-guidelines/developments-adjacent-npws-lands-200362.pdf
Water and Soils	
Acid sulphate soils	
Acid Sulfate Soils Planning Maps via Data.NSW	https://data.nsw.gov.au/data/dataset/acid-sulphate-soils-ass-planning-maps
Acid Sulfate Soils Manual (Stone et al. 1998)	https://www.environment.nsw.gov.au/resources/epa/Acid-Sulfate-Manual-1998.pdf
Acid Sulfate Soils Laboratory Methods Guidelines (Ahern et al. 2004)	http://www.environment.nsw.gov.au/resources/soils/acid-sulfate-soils-laboratory-methods-guidelines.pdf This replaces Chapter 4 of the Acid Sulfate Soils Manual above.
Flooding	
Floodplain development manual	http://www.environment.nsw.gov.au/floodplains/manual.htm
Floodplain Risk Management Guidelines	http://www.environment.nsw.gov.au/topics/water/coasts-and-floodplains/floodplains/floodplain-guidelines
NSW Climate Impact Profile	http://climatechange.environment.nsw.gov.au/
Climate Change Impacts and Risk Management	https://www.environment.gov.au/climate-change/adaptation/publications/climate-change-impact-risk-management
Water	
Water Quality Objectives	http://www.environment.nsw.gov.au/ieo/index.htm
ANZECC & ARMCANZ (2000) Water Quality Guidelines	https://www.waterquality.gov.au/anz-guidelines/resources/previous-guidelines/anzecc-armcanz-2000
Applying Goals for Ambient Water Quality Guidance for Operations Officers – Mixing Zones	http://deccnet/water/resources/AWQGuidance7.pdf
Approved Methods for the Sampling and Analysis of Water Pollutant in NSW (2004)	http://www.environment.nsw.gov.au/resources/legislation/approvedmethods-water.pdf

Karl Okorn

From: Lachlan Sims <Lachlan.Sims@lithgow.nsw.gov.au>
Sent: Tuesday, 2 March 2021 1:32 PM
To: Karl Okorn
Subject: RE: State Significant Development - Wallerawang BESS (SSD-14540514)

Dear Karl,

Thank you for the opportunity to review and provide input into the SEARs for the Wallerawang BESS (SSD-14540514).

We have reviewed the key elements of the scoping report and identified matters for consideration in the draft SEARs and raises no objections.

We look forward to the opportunity to provide further input and comment in response to the public exhibition of the EIS and as part of any community consultation for this project in due course.

Please contact me if I can provide any further information or assistance.

Yours faithfully,

Lachlan Sims | Team Leader Development
Economic Development & Environment | Lithgow City Council
Phone: (02) 6354 9999 | Fax: (02) 6351 4259

#RESPOND 1868977
#ECMBODY

From: Karl Okorn <karl.okorn@planning.nsw.gov.au>
Sent: Friday, 19 February 2021 1:33 PM
To: Lithgow City Council <council@lithgow.nsw.gov.au>
Cc: Lachlan Sims <Lachlan.Sims@lithgow.nsw.gov.au>
Subject: State Significant Development - Wallerawang BESS (SSD-14540514)

Good afternoon,

The Department of Planning, Industry and Environment has received a request for Secretary's Environmental Assessment Requirements (SEARs) for the Wallerawang BESS (SSD-14540514). The proposed development is a State Significant Development under the Environmental Planning and Assessment Act and has been proposed within the Lithgow City Council local government area.

It is requested that Council please provide input into the SEARs for the proposal including details of any key issues

and assessment requirements by **4 March 2021**.

If you have any enquiries, please contact me on (02) 9995 5207 or at karl.okorn@planning.nsw.gov.au

Please find attached Scoping Report and draft SEARs.

Thank you,

Karl Okorn
Team Leader
Energy Assessments |Department of Planning, Industry and Environment
T 02 9995 5207 | **E** karl.okorn@planning.nsw.gov.au

Level 16, 4PSQ, 12 Darcy Street, Parramatta, NSW, 2150 | Locked Bag 5022

Our Vision: Together, we create thriving environments, communities and economies.

The Department of Planning, Industry and Environment acknowledges that it stands on Aboriginal land. We acknowledge the traditional custodians of the land and we show our respect for elders past, present and emerging through thoughtful and collaborative approaches to our work, seeking to demonstrate our ongoing commitment to providing places in which Aboriginal people are included socially, culturally and economically.

PAC Details | Engagement Details | Audit

Response History

Public Authority Response

Wednesday, 24 February 2021 7:45:37 AM AEDT

Notes:

Crown Lands requests that the development include mitigation measures to protect water quality for the Coxs River Crown waterway.

NSW GOVERNMENT | Department of Primary Industries

OUT21/2467

Mr Karl Okorn
Department of Planning, Industry and Environment

C/Planning Portal

Dear Mr Okorn

Environmental Assessment Requirements– SSD14540514- Wallerawang Battery Energy Storage System.

Thank you for your correspondence dated 19 February 2021 requesting Environmental Assessment Requirements (EARs) for the above proposal.

The NSW Department of Primary Industries (NSW DPI) Agriculture is committed to the protection and growth of agricultural industries, and the land and resources upon which these industries depend. Important issues are the potential impact on limited agricultural resources and the ability to rehabilitate the land to enable continued agricultural investment.

We have reviewed the draft SEARs in relation to DPI Agriculture recommended EARs, in associating with the Scoping Report supplied. The following additional comments are made in relation to the draft SEARs:

Develop a weed management plan that also considerers the landscaping and finishing part of the proposal construction, and its ongoing site management. This should form part of the development of mitigation and management measures for land use and property (noted on page 72 of the scoping report – Proposed Environment impact Statement Scope for other environmental issues).

The rest of the draft sears satisfy our general recommendations especially in light of the location and size of this development, and the surrounding landuses.

Should you require clarification on any of the information contained in this response, please contact myself on 68811250 or by email at landuse.ag@dpi.nsw.gov.au

Yours sincerely

Mary Kovac

Mary Kovac
Agricultural Land Use Planning Officer
26 February 2021

NSW Department of Primary Industries - Agriculture
Locked Bag 21, Orange NSW 2800 | 161 Kite St, Orange NSW 2800
Email: landuse.ag@dpi.nsw.gov.au | www.dpi.nsw.gov.au | ABN: 19 948 325 463

PAC Details | Engagement Details | Audit

Response History

Public Authority Response — **Friday, 19 February 2021 1:39:36 PM AEDT**

Notes:

DPI Fisheries do not have any key issues or assessment requirements for this development.

DOC21/122997

Karl Okorn
Planning and Assessment Division
Department of Planning, Industry and Environment
Locked Bag 5022
PARRAMATTA NSW 2124
Email: Karl.okorn@planning.nsw.gov.au

Attention: Karl Okorn

No Comment to Draft SEARs – Wallerawang Battery Energy Storage System

Dear Sir

Thank you for the request for advice from Public Authority Consultation (PAE-14800987), requesting input from the NSW Environment Protection Authority (EPA) on the Draft SEARS for the proposed Wallerawang Battery Energy Storage System at Lithgow (Application SSD-14540514)

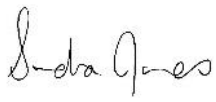
The proposal is for:

The construction and operation of a large-scale Battery Energy Storage System and associated access and infrastructure.

The EPA has no comments on the draft SEARS and consider that all relevant matters have been addressed.

If you have any questions about this request, please contact Dr Sandie Jones on 6333800 or via email at EPA.Southopsregional@epa.nsw.gov.au.

Yours sincerely



Dr Sandie Jones
Manager – Regional South Operations
Regulatory Operations Regional

Hazards

In reviewing the scoping report, it is understood that the Wallerawang BESS, (SSD 14540514) the is a stand-alone a battery energy storage system (BESS) capable of delivering up to 500 MW peak capacity. Given that this capacity exceeds 30 MW, we request a PHA be submitted, in-line with prior SSDs. It is understood from scoping report, Section 6.13.3, that a PHA will be submitted with the EIS.

We have verified that the SSD is not located in the vicinity of high-pressure gas or dangerous goods pipelines.

As such, we recommend the following SEARs for this SSD:

Hazards and Risks – The EIS must include a preliminary hazard analysis (PHA) prepared in accordance with the Department's Hazardous Industry Planning Advisory Paper No. 6, 'Hazard Analysis' (HIPAP 6) and Multi-Level Risk Assessment (MLRA).

In preparing the PHA, we expect the Applicant to consider recent developments in research and standards for BESS, ensuring that fire risks from these BESS have been appropriately considered in designing the SSD. Of particular note (not exhaustive) are:

- NFPA 855;
- AS 5139;
- IEC 62897;
- UL 9540;
- UL 9540A;
- FM Global DS 5-33; and
- FM Global's Development of Sprinkler Protection Guidance for Lithium Ion Based Energy Storage Systems.

Where certain aspects of the scope or requirements from the above publications may not align exactly, reasonable best practice should be considered in the designing the BESS while taking into account the principles from these publications. As such, the PHA should be prepared by a suitable specialist, ensuring appropriate technical judgement is taken in view of the above publications or reasonable best practice. Of particular importance is verification that the proposed BESS capacity would be able to fit within the land area designated for the BESS while taking into account separation distances between:

- BESS sub-units (racks, modules, enclosures, etc.) ensuring that a fire from a sub-unit do not propagate to neighbouring sub-units; and
- the overall BESS and other on-site or off-site receptors, ensuring fire safety.

Our ref: DOC21/118401

Karl Okorn
Team Leader Environmental Assessments
Department of Planning, Industry & Environment
12 Darcy Street
PARRAMATTA NSW 2150

By email: karl.okorn@planning.nsw.gov.au

Dear Mr Okorn

Request for Secretary's Environmental Assessment Requirements (SEARS) for Wallerawang Battery Energy Storage System (SSD 14540514)

Thank you for your referral dated 19 February 2021 inviting SEARS input from the Heritage Council of NSW on the above State Significant Development proposal.

The proposed SSD site is in the vicinity of State Heritage Register item *Wallerawang rail bridges over Cox's River* (SHR no. 01064).

Accordingly, it is recommended that the draft SEARs outlined below are adopted:

Heritage and archaeology

a) A Statement of Heritage Impact (SOHI) prepared by a suitably qualified heritage consultant in accordance with the guidelines in the NSW Heritage Manual. The SOHI is to address the impacts of the proposal on the heritage significance of the site and adjacent areas and is to identify the following:
   - all heritage items (state and local) within the vicinity of the site including built heritage, landscapes and archaeology, detailed mapping of these items, and assessment of why the items and site(s) are of heritage significance;
   - compliance with the relevant Conservation Management Plan;
   - the impacts of the proposal on heritage item(s) including visual impacts;
   - the attempts to avoid and/or mitigate the impact on the heritage significance or cultural heritage values of the site and the surrounding heritage items; and
   - justification for any changes to the heritage fabric or landscape elements including any options analysis.

b) If the SOHI identifies impact on potential historical and/or maritime archaeology, an historical and/or maritime archaeological assessment should be prepared by a suitably qualified archaeologist in accordance with the guidelines *Archaeological Assessment* (1996) and *Assessing Significance for Historical Archaeological Sites and Relics* (2009). This assessment should identify what relics, if any, are likely to be present, assess their significance and consider the impacts from the proposal on this potential archaeological resource. Where harm is likely to occur, it is recommended that the significance of the relics be considered in determining an appropriate mitigation strategy. If harm cannot be

avoided in whole or part, an appropriate Research Design and Excavation Methodology should also be prepared to guide any proposed excavations or salvage programme.

As the site contains a local heritage item, and other local items are in the vicinity, advice should be sought from the relevant local council.

If you have any questions about this correspondence, please contact please contact Tim Olliver, Senior Heritage Assessment Officer, at Heritage NSW, on (02) 4927 3203 or Timothy.Olliver@environment.nsw.gov.au.

Yours sincerely

Katrina Stankowski
Senior Team Leader, Regional Heritage Assessments North
Heritage NSW, Department of Premier and Cabinet
As Delegate of the Heritage Council of NSW
26 February 2021

Regional NSW

Karl Okorn

Team Leader Environmental Assessments

Energy Resource Assessments

Dept of Planning, Industry and Environment

4 Parramatta Square, NSW 2150

Submitted via Planning Portal

Our ref: DOC21/147951

Your ref: Wallerawang BESS - SEARs

4 March 2021

Subject: Wallerawang Battery Energy Storage System – SSD 14540514 – SEARs requirements.

Thank you for the opportunity to provide advice on the above matter. This is a response from the NSW Department of Regional NSW – Mining, Exploration and Geoscience (MEG) – Geological Survey of NSW (GSNSW).

MEG is responsible for providing strategic advice relating to the current and potential future uses of land in NSW pursuant to the *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* and the *Environmental Planning & Assessment Act 1979*. Our role is to ensure that proposals do not unnecessarily preclude access to known resources or exploration for future resource discovery and extraction. MEG will also assess the application with respect to biodiversity offset considerations.

MEG has reviewed the Scoping Report (dated 18 Feb 2021) and advise there are currently no mineral or energy exploration titles (or applications) over the subject site described in Figure 1-2. However, we note a small northern portion of the greater 'Greenspot 2845 Energy Hub' overlaps Mining Lease 1303 held by Centennial Springvale Pty Ltd, who have consent to mine through to 2034. MEG acknowledge Centennial Springvale form part of the community and stakeholder engagement list.

MEG notes that a Biodiversity Assessment Report (BDAR) would accompany the EIS. Accordingly, should biodiversity offsets become considered, MEG would appreciate the opportunity for early consultation in relation to the proposed location of any biodiversity offset areas, or any supplementary biodiversity measures to ensure there is no consequent reduction in access to prospective land for mineral exploration, or potential for sterilisation of mineral or extractive resources.

Queries regarding the above information should be directed to the MEG - Land Use team at landuse.minerals@geoscience.nsw.gov.au.

Yours sincerely,

Steven Palmer

Manager, Land Use Assessment

Geological Survey of NSW – Mining, Exploration and Geoscience.

4 March 2021

SF2021/004875; WST21/0002/02

The Manager
Resource Assessments
Department of Planning, Industry & Environment
GPO Box 39 SYDNEY NSW 2001

Attn: Karl Okorn

Dear Mr Okorn

SSD-14540514: 'The Wallerawang 9 Battery'- Battery Energy Storage System

Thank you for your referral of SSD14540514 via the NSW Major Projects Portal dated 19 February 2021 requesting input to SEARs for 'The Wallerawang 9 Battery'- Battery Energy Storage System (BESS) from Transport for NSW (TfNSW).

Transport for NSW (TfNSW) understands the proposed development will involve:

- The construction, operation and maintenance of a 500MW Battery Energy Storage System at the former Wallerawang Power Station.
- Connections between the BESS and the Wallerawang 330kV substation
- Delivery, installation and electrical fit-out for the Project, including battery enclosures, invertors transformers and associated cabling and infrastructure.
- Provision of access from an unnamed dirt road located adjacent to the south of the project site that intersects with Castlereagh Highway (HW18). The Main Western Railway Line runs directly north of the Project Site.

TfNSW requests the Environmental Impact Statement be supported by a Traffic Impact Assessment prepared by a suitably qualified person in accordance with the *Austroads Guide to Traffic Management Part 12*, Roads and Maritime's *Supplements to Austroads* and the *RTA Guide to Traffic Generating Developments*. The TIA is to address the following.

- Project schedule:
  - Hours and days of work, number of shifts and start and end times.
  - Phases and stages of the project, (construction, operation, decommissioning).
- Traffic volumes:
  - Existing background traffic.
  - Project-related traffic for each phase or stage of the project.
  - Projected cumulative traffic at commencement of operation, and a 10-year horizon post-commencement.
- Traffic characteristics:
  - Number and ratio of heavy vehicles to light vehicles.
  - Peak times for existing traffic.
  - Peak times for project-related traffic including commuter periods.
  - Proposed hours for transportation and haulage.
  - Interactions between existing and project-related traffic.
  - A description of all over size and over mass vehicles and materials to be transported.

Transport for NSW
51-55 Currajong Street PARKES NSW 2870 | PO Box 334 PARKES NSW 2870 DX20256
P 6861 1449 | **W** development.western@rms.nsw.gov.au | ABN 18 804 239 602

- The origins, destinations and routes for:
  - Commuter (employee and contractor) light and pool vehicles.
  - Heavy (haulage) vehicles.
  - Over size and over mass vehicles.
- The impact of traffic generation on the public road network and any improvements/measures employed to ensure traffic efficiency and road safety during construction, operation and decommissioning of the project.
- Proposed road facilities, access and intersection treatments are to be identified and be in accordance with *Austroads Guide to Road Design* including provision of *Safe Intersection Sight Distance (SISD).*
- Local climate conditions that may affect road safety during the life of the project (e.g. fog, wet weather, fog, icy road conditions).
- Impact on public transport (public and school bus routes).
- Identification and assessment of potential impacts of the project, such as blasting, lighting, visual, noise, dust and drainage on the function and integrity of all affected public roads.
- Controls for transport and use of any dangerous goods in accordance with *State Environmental Planning Policy No. 33 – Hazardous and Offensive Development*, the *Australian Dangerous Goods Code* and *Australian Standard 4452 Storage and Handling of Toxic Substances.*
- A Traffic Management Plan (TMP) following approval of the EIS, in consultation with relevant Councils and TfNSW. The TMP must identify strategies to manage the impacts of project related traffic, including any community consultation measures for peak haulage periods.
- Driver Code of Conduct for haulage operations to include, but not be limited to:
  - Safety initiatives for haulage through residential areas and/or school zones.
  - An induction process for vehicle operators and regular toolbox meetings.
  - A public complaint resolution and disciplinary procedure.

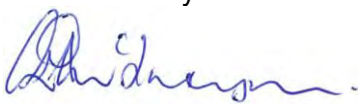
With regard to impacts on the railway corridor and asset:

- Assessment of the impact (both construction and operation) to the operational rail corridors of Bowenfels to Wallerawang and the Wallerawang Colliery lines in accordance with the heads of consideration under the relevant railway provisions of the *State Environmental Planning Policy (Infrastructure) 2007* (ISEPP) and *Development near Rail Corridors and Busy Roads – Interim Guideline 2008*, including the following but not limited to the following documents:
- A Geotechnical Investigation Report that based on actual boreholes and includes:
  - Analysis of the potential impact of demolition, excavation and operation of the development on the rail corridor and rail infrastructure.
  - Demolition and excavation induced vibration impacts on the rail corridor and rail infrastructure.
  - Potential loadings of the development on the rail corridor and rail infrastructure.
- Structural drawings and Report which demonstrates:
  - The foundation design and associated works has taken into appropriate consideration of the rail infrastructure and assets to enable verification of compliance to TfNSW requirements.
  - Any deformation induced by bulk excavation will not have adverse impacts on the rail corridor, rail infrastructure or rail easements.
  - Plan and cross sectional drawings showing the rail corridor, sub soil profile, proposed basement and/or foundation excavation and structure design of the development's sub-ground support adjacent to the rail corridor. All

measurements contained within the cross sectional drawings must be verified by a registered surveyor.
    - Drainage details (no drainage into the rail corridor).
- A suite of survey plans that shows:
    - rail corridor and rail infrastructure (including easements).
    - detail of traffic routes for construction as well as operation;
    - An assessment of all level crossing along the haulage routes for both construction and operation traffic generated by the project including an assessment against/using:
        - ALCAM
        - *Austroads Guides*, *Australian Standard 1742.7*.
        - *Railway Crossing Safety Series 2011, Plan: Establishing a Railway Crossing Safety Management Plan* (Roads and Traffic Authority 2011).
        - Safe Systems.
- Consultation with TfNSW and its managing agent of the Country Regional Network to obtain an access agreement for transmission lines that require access/crossing the rail corridor lands or over the air space of the rail corridor. Third Party Access application shall be submitted to John Holland Rail for approval in the event that a transmission line connection requiring access to the air space of the rail corridor.
- Details of the stormwater management infrastructure which may have impacts on the rail corridor land and rail infrastructure including culverts.

Please provide a copy of the SEARs to TfNSW at the same time they are issued to the proponent. If you wish to discuss this matter further, please contact Alexandra Power, Development Assessment Officer on (02) 6861 1449.

Yours faithfully



Andrew McIntyre
A/Manager Development Services- West

Transport for NSW
51-55 Currajong Street PARKES NSW 2870 | PO Box 334 PARKES NSW 2870 DX20256
P 6861 1449 | **W** development.western@rms.nsw.gov.au | ABN 18 804 239 602

Karl Okorn

From: Lauren Player <Lauren.Player@transgrid.com.au> on behalf of Easements&Development <Easements&Development@transgrid.com.au>
Sent: Thursday, 25 February 2021 6:00 PM
To: Karl Okorn
Cc: Easements&Development
Subject: 2021-106 - State Significant Development - Wallerawang BESS (SSD-14540514)

Hi Karl,

TG REF: **2021-106**

RE: **State Significant Development – Wallerawang BESS (SSD-14540514)**

Thank you for referring to TransGrid for review.
Please be advised TransGrid is in consultation with the customer and has no further comments at this stage.

Kind regards,

Lauren Player
Development Assessment Officer | Network Planning and Operations
_____
TransGrid | 200 Old Wallgrove Road, Wallgrove, NSW, 2766
T: (02) 9620 0297
E: Lauren.Player@transgrid.com.au **W:** www.transgrid.com.au

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From: Karl Okorn
Sent: Friday, 19 February 2021 1:37 PM
To:
Subject: State Significant Development - Wallerawang BESS (SSD-14540514)

Good afternoon,

The Department of Planning, Industry and Environment has received a request for Secretary's Environmental Assessment Requirements (SEARs) for the Wallerawang BESS (SSD-14540514). The proposed development is a State Significant Development under the Environmental Planning and Assessment Act and has been proposed within the Lithgow City Council local government area.

It is requested that Council please provide input into the SEARs for the proposal including details of any key issues and assessment requirements by **4 March 2021**.

If you have any enquiries, please contact me on (02) 9995 5207 or at karl.okorn@planning.nsw.gov.au

Please find attached Scoping Report and draft SEARs.

Thank you,

Karl Okorn
Team Leader
Energy Assessments |Department of Planning, Industry and Environment
T 02 9995 5207 | **E** karl.okorn@planning.nsw.gov.au

Level 16, 4PSQ, 12 Darcy Street, Parramatta, NSW, 2150 | Locked Bag 5022

Our Vision: Together, we create thriving environments, communities and economies.

The Department of Planning, Industry and Environment acknowledges that it stands on Aboriginal land. We acknowledge the traditional custodians of the land and we show our respect for elders past, present and emerging through thoughtful and collaborative approaches to our work, seeking to demonstrate our ongoing commitment to providing places in which Aboriginal people are included socially, culturally and economically.

OUT21/2061

Karl Okorn
Planning and Assessment Group
NSW Department of Planning, Industry and Environment

karl.okorn@planning.nsw.gov.au

Dear Mr Okorn

Wallerawang Battery Energy Storage System (SSD-14540514)
Comment on the Secretary's Environmental Assessment Requirements (SEARs)

I refer to your email of 19 February 2021 to the Department of Planning, Industry and Environment (DPIE) Water and the Natural Resources Access Regulator (NRAR) about the above matter.

The following recommendations are provided by DPIE Water and NRAR.

The SEARS should include:

- The identification of an adequate and secure water supply for the life of the project. This includes confirmation that water can be sourced from an appropriately authorised and reliable supply. This is also to include an assessment of the current market depth where water entitlement is required to be purchased.
- A detailed and consolidated site water balance.
- Assessment of impacts on surface and ground water sources (both quality and quantity), related infrastructure, adjacent licensed water users, basic landholder rights, watercourses, riparian land, and groundwater dependent ecosystems, and measures proposed to reduce and mitigate these impacts.
- Proposed surface and groundwater monitoring activities and methodologies.
- Consideration of relevant legislation, policies and guidelines, including the NSW Aquifer Interference Policy (2012), the Guidelines for Controlled Activities on Waterfront Land (2018) and the relevant Water Sharing Plans (available at https://www.industry.nsw.gov.au/water).

Any further referrals to DPIE Water & NRAR can be sent by email to: landuse.enquiries@dpie.nsw.gov.au.

Yours sincerely

Alistair Drew
Project Officer, Assessments
Water – Knowledge Office
23 February 2021

PO Box 398, Parramatta NSW 2124
Level 14, 169 Macquarie Street
Parramatta NSW 2150
www.waternsw.com.au
ABN 21 147 934 787

3 March 2021

Contact: *Juri Jung*
Telephone: *(02) 9865 2503*
Our ref: *D2021/20659*

Karl Okorn
Team Leader
Energy Assessments
Department of Planning, Industry and Environment
Locked Bag 5022
PARRAMATTA NSW 2124

Water NSW response to Request for Input into SEARs – Wallerawang 9 Battery Project

Water NSW appreciates the opportunity to provide input into the Secretary's Environmental Assessment Requirements (SEARs) for the proposed Wallerawang 9 Battery Project.

Water NSW has reviewed the Scoping Report prepared by Arcadis (dated 18 February 2021) and has the following comments and recommendations for inclusion in the Environmental Impact Statement (EIS).

As the development is located within the Sydney Drinking Water Catchment, clauses 9(1), 9(2) and 10(1) of the *State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011* (the SEPP) apply. The EIS must specifically address each of these clauses, in particular a clear description and justification as to how the development would achieve a Neutral or Beneficial Effect (NorBE) on water quality.

<u>Recommendations for EIS</u>

The full description of the development and existing environment should also include those aspects which have the potential to impact on the quality and quantity of surface water on, or downstream of, the project site. This should include:

- the full project site layout and concept design including battery storage buildings, access roads and carparks, transmission line routes, and staff amenity building
- a Water Cycle Management Study (WCMS) detailing:
    - mitigation or minimisation measures for potential water quality impacts throughout project design and route, site selection and construction stage
    - stormwater quality modelling using MUSIC software showing a comparison of pre- and post-development scenarios on water quality parameters (including an electronic copy of the MUSIC file in .sqz file) in accordance with Water NSW's current recommended practices, and
    - Concept Stormwater Drainage Plans that are consistent with MUSIC Stormwater Quality Modelling
- a Site and Soil investigation for On-Site Wastewater System if any on-site wastewater management system is proposed (including in the Construction Phase) or hydraulic capacity of existing sewerage infrastructure if connecting to reticulated sewerage system, and

- a Conceptual Soil and Water Management Plan(s) for the Construction Phase of the project.

Water NSW requests to remain as a stakeholder in any further consultation on this project and looks forward to reviewing the forthcoming Environmental Impact Statement.

If you wish to discuss further, please contact Juri Jung via email at environmental.assessments@waternsw.com.au

Yours sincerely

CLAY PRESHAW
Manager Catchment Protection

APPENDIX B EP&A REGULATIONS CHECKLIST

Environmental Planning and Assessment Regulation 2000 checklist

Requirement	Where addressed
6. Form of the environmental impact statement	
(a) the name, address and professional qualifications of the person by whom the statement is prepared	Statement of Validity
(b) the name and address of the responsible person	Statement of Validity
(c) the address of the land: (i) in respect of which the development application s to be made, or (ii) on which the activity or infrastructure to which the statement relates is to be carried out	Statement of Validity
(d) a description of the development, activity or infrastructure to which the statement relates,	Statement of Validity
(e) an assessment by the person by whom the statement is prepared of the environmental impact of the development, activity or infrastructure to which the statement relates, dealing with the matters referred to in this Schedule,	Statement of Validity
(f) a declaration by the person by whom the statement is prepared to the effect that: (i) the statement has been prepared in accordance with this Schedule, and (ii) the statement contains all available information that is relevant to the environmental assessment of the development, activity or infrastructure which the statement relates, and (iii) that the information contained in the statement is neither false nor misleading	Statement of Validity
7. Content of the environmental impact statement	
(1) An environmental impact statement must also include each of the following:	
(a) a summary of the environmental impact statement	Executive Summary Page xiv
(b) a statement of the objectives of the development, activity or infrastructure,	Section 1
(c) an analysis of any feasible alternatives to the carrying out of the development, activity or infrastructure, having regard to its objectives, including the consequences of not carrying out the development, activity or infrastructure,	Section 3
(d) an analysis of the development, activity or infrastructure, including: (i) a full description of the development, activity or infrastructure, and	Section 4
(ii) a general description of the environment likely to be affected by the development, activity or infrastructure, together with a detailed description of those aspects of the environment that are likely to be significantly affected, and	Executive Summary Sections 8 to 22 Appendix C to Appendix L

Requirement	Where addressed
(iii) the likely impact on the environment of the development, activity or infrastructure, and	Executive Summary Sections 8 to 22 Appendix C to Appendix L
(iv) a full description of the measures proposed to mitigate any adverse effects of the development, activity or infrastructure on the environment, and	Sections 8 to 22 Appendix C to Appendix L Section 24
(v) a list of any approvals that must be obtained under any other Act or law before the development, activity or infrastructure may lawfully be carried out,	Section 5
(e) a compilation (in a single section of the environmental impact statement) of the measures referred to in item (d) (iv),	Section 24
(f) the reasons justifying the carrying out of the development, activity or infrastructure in the manner proposed, having regard to biophysical, economic and social considerations, including the principles of ecologically sustainable development set out in subclause (4).	Section 26
(2) Subclause (1) is subject to the environmental assessment requirements that relate to the environmental impact statement.	Secretary's Environmental Assessment Requirements are addressed throughout the Environmental Impact Statement Appendix A Consolidated SEARs Compliance Table
(3) Not applicable	Not applicable
(4) The principles of ecologically sustainable development	Section 25

APPENDIX C TRAFFIC AND TRANSPORT ASSESSMENT

APPENDIX D NOISE AND VIBRATION IMPACT ASSESSMENT

APPENDIX E BIODIVERSITY DEVELOPMENT ASSESSMENT REPORT (BDAR)

APPENDIX F ABORIGINAL CULTURAL HERITAGE ASSESSMENT (ACHA) REPORT

APPENDIX G STATEMENT OF HERITAGE IMPACT (SOHI)

APPENDIX H BUSHFIRE RISK ASSESSMENT

APPENDIX I PRELIMINARY HAZARD ASSESSMENT

APPENDIX J WATER QUALITY ASSESSMENT

APPENDIX K FLOODING IMPACT ASSESSMENT

APPENDIX L LAND USE CONFLICT RISK ASSESSMENT

Arcadis Australia Pacific Pty Ltd
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