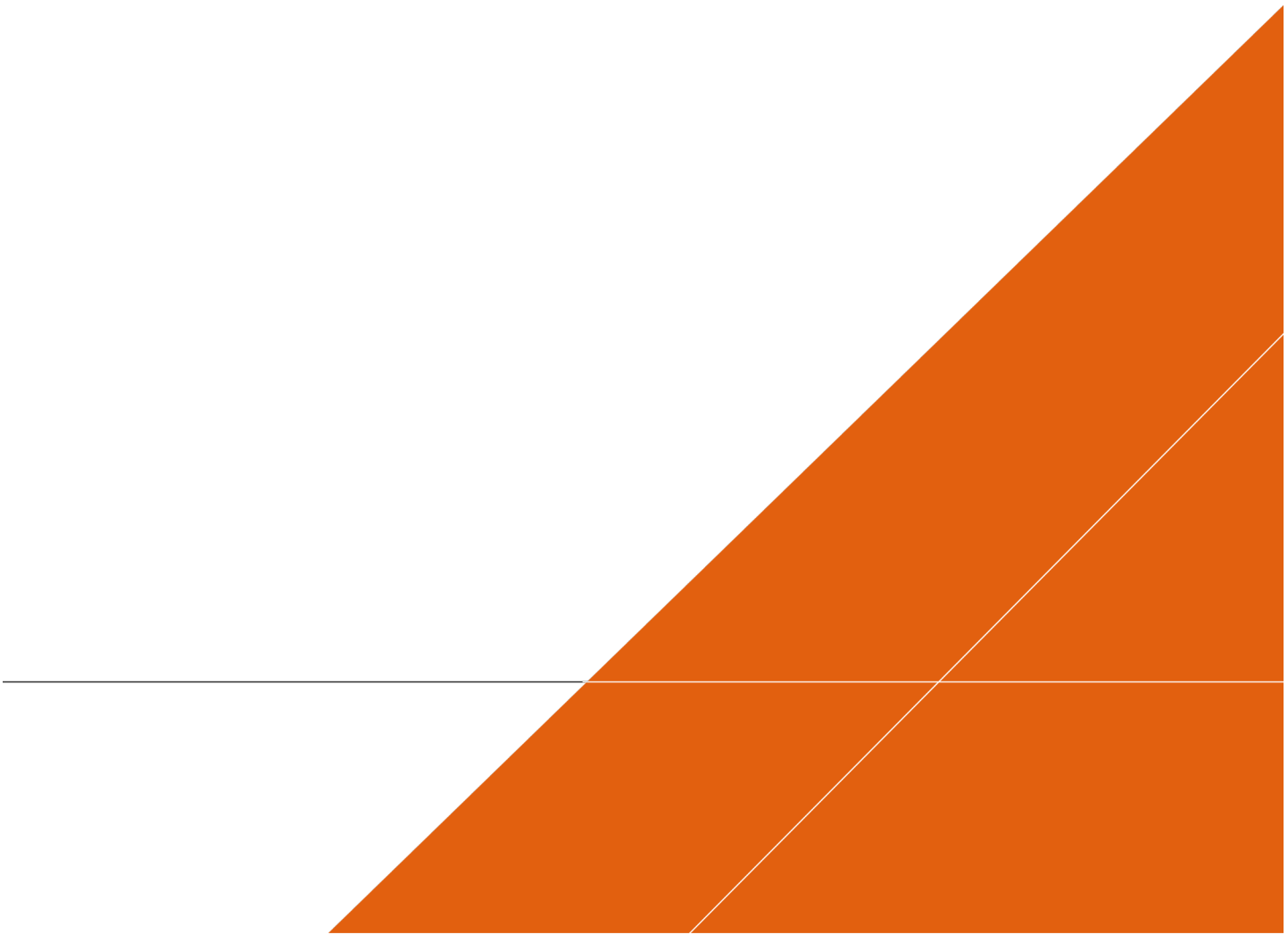
ARCADIS Design & Consultancy for natural and built assets

WALLERAWANG BATTERY ENERGY STORAGE SYSTEM

Land Use Conflict Risk Assessment

02 NOVEMBER 2021



CONTACT

HEATHER TILLEY
Principal Environmental Consultant

T + 61 2 8907 9183
E heather.tilley@arcadis.com

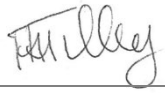
Arcadis
Level 16, 580 George Street
Sydney, NSW, 2000

GREENSPOT

WALLERAWANG BATTERY ENERGY STORAGE SYSTEM

Land Use Conflict Risk Assessment

Subtitle

Author	Sean Fishwick	
Checker	Heather Tilley	
Approver	Heather Tilley	

Report No	01
Date	2/11/2021
Revision Text	2

REVISIONS

Revision	Date	Description	Prepared by	Approved by
A	24/05/2021	Internal Review	SF	HT
1	08/10/2021	Final	SF	HT
2	2/11/2021	Updated to address DPIE Comments	HT	HT

Contents

Tables

Figures

1 INTRODUCTION

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 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) and consequently requires the preparation of an Environmental Impact Statement. Secretary's Environmental Assessment Requirements (SEARs) were issued for the Project on 18 March 2021 and included the requirement to assess:

> *"the compatibility of the development with existing land uses, during construction, operation and after decommissioning, including:*
>
> - *consideration of the zoning provisions applying to the land, including subdivision;*
> - *completion of a Land Use Conflict Risk Assessment in accordance with the Department of Industry's Land Use Conflict Risk Assessment Guide."*

This Land Use Conflict Risk Assessment (LUCRA) has been prepared to identify and manage potential land use conflicts to inform the preparation of the EIS and meet the SEARs.

1.1 Scope of works

The LUCRA has been prepared in accordance with the '*Land Use Conflict Risk Assessment Guide*' (Department of Primary Industries, 2011). The LUCRA aims to:

- Accurately identify and address potential land use conflict issues and risk of occurrence before a new land use proceeds or a dispute arises.
- Objectively assess the effect of a proposed land use on neighbouring land uses
- Increase the understanding of potential land use conflict to inform and complement development control and buffer requirements
- Highlight or recommend strategies to help minimise the potential for land use conflicts to occur and contribute to the negotiation, proposal, implementation and evaluation of separation strategies

In order to achieve these aims the following scope of work has been undertaken:

- Step 1: Gather information
- Step 2: Evaluate the risk level of each activity
- Step 3: Risk Reduction Management strategies
- Step 4: Record LUCRA results

2 GATHER INFORMATION

2.1 Nature of the land use change and development proposed

The Project would involve construction and operation of a large-scale 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 (two hours of storage at maximum discharge rate). The BESS would be located in the north-western corner of the Project Site. The total Project Site area would cover up to 18 hectares (including BESS, switchyard, ancillary development and buffer) and 3.6 hectares for the overhead transmission line corridor, a total of approximately 21.6 hectares (refer to Figure 2-1).

2.2 Nature of the precinct where the land use change and development is proposed

The Project site is located within the Lithgow Local Government Area; about 70 kilometres west of Penrith located in the Central Tablelands and about 115 kilometres west of the Sydney Central Business District (CBD).

The Project site is bounded by the Main Western Railway Line to the north, Castlereagh Highway to the east, and Coxs River and TransGrid Wallerawang 330 kV Substation to the west. Castlereagh Highway is a two-lane 100 km/hr highway that connects Lithgow to Mudgee and the greater western NSW.

The Project site is located 12 kilometres north-west of Lithgow and directly east of the main township of Wallerawang.

The regional context of the Project site and relevant land zonings are shown on Figure 2-2. The Project site is zoned IN3 Heavy Industrial, SP2 Infrastructure and RU1 Primary Production.

The areas surrounding the Project site includes a mix of industrial, buffer areas, rural land uses, some residential, as well as several abandoned open cut mines and operating underground coal mines.

Other development and businesses located near the Project site include:

- Wallerawang Power Station site, owned by Greenspot, located immediately north of the Main Western Railway Line
- Goodearth Landscape and Building Supplies, 600 metres south
- Centennial Coal Springvale Coal Mine site, 750 metres east
- Black Gold Motel, about 1.1 kilometres north-west
- Wallerawang Power Station Ash Repository and associated lands, owned and operated by Generator Property Management Pty Ltd, about 1.2 kilometres north
- Industrial and commercial businesses along Main Street, Wallerawang, about 1.2 kilometres north-west

- Approximately six residential receivers located on Springvale Lane, 150 metres south-east of the Project site at its closest point at the intersection of Castlereagh Highway and the access road to the Project Site.
- A residential area within the suburb of Wallerawang, approximately 650 metres to the south-west of the Project site at its closest point.

Other land use surrounding the Project site includes:

- Mostly cleared, agricultural land to the south and west
- Large lot residential, agricultural and forestry land east of the Castlereagh Highway
- Coxs River and Lake Wallace and surrounds to the west, which is used recreationally for camping and fishing (note there is no private access permitted to the Coxs River).

2.3 Topography, Climate and Natural Features

The Project site is located in a rural setting on the western edge of the Great Dividing Range and is generally flat with some rolling hills. The project site is relatively flat with a slight slope towards the Coxs River in the west.

The climate is warm-temperate, typical of the central west region of NSW with hot summers and mild winters.

2.4 Site History

The Wallerawang Power Station commenced operation in the 1950s (initially consisting of 4 x 30 MW units) and was upgraded in 1961 (additional 2 x 60 MW units) and 1976/1980, when 500 MW units were installed. It is understood that EnergyAustralia and Delta Electricity (former site owners) also undertook a number of internal approvals under Part 5 of the EP&A Act. Wallerawang Power Station was closed by EnergyAustralia in 2014.

Greenspot completed the acquisition of the former Wallerawang Power Station and buffer lands, comprising approximately 450 hectares, from EnergyAustralia in September 2020.

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 the first half of 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 primary objective of site repurposing.

Greenspot believes the rejuvenated site will attract energy and water intensive businesses (e.g. in the industrial, manufacturing and agribusiness sectors), serving to generate sustainable economic activity and helping to create long term employment growth in the Lithgow area and the NSW Central-West region more broadly. The generation of such economic activity will inevitably lead to increased demand for housing and amenity and, in this regard, Greenspot proposes that parts of the site will also lend themselves to commercial, recreational, residential and other complimentary uses. This repurposing will be undertaken as part of the greater Master Plan (Greenspot 2845 Activity Hub) for the site. Greenspot has recognised that providing a stable, reliable and cost-effective energy source for the future redevelopment of the site would contribute to the reduction

in the cost of supplying electricity to consumers who are operating within the 'Greenspot 2845 Activity Hub'.

Due to this, the Proponent is seeking development consent for the construction, operation and maintenance of the BESS.

2.5 Activities for the proposed land use

The Project Site would be solely used for the operation of a BESS. Activities on the site would include construction and operation of the BESS.

Figure 2-1 Local context of the Project Site

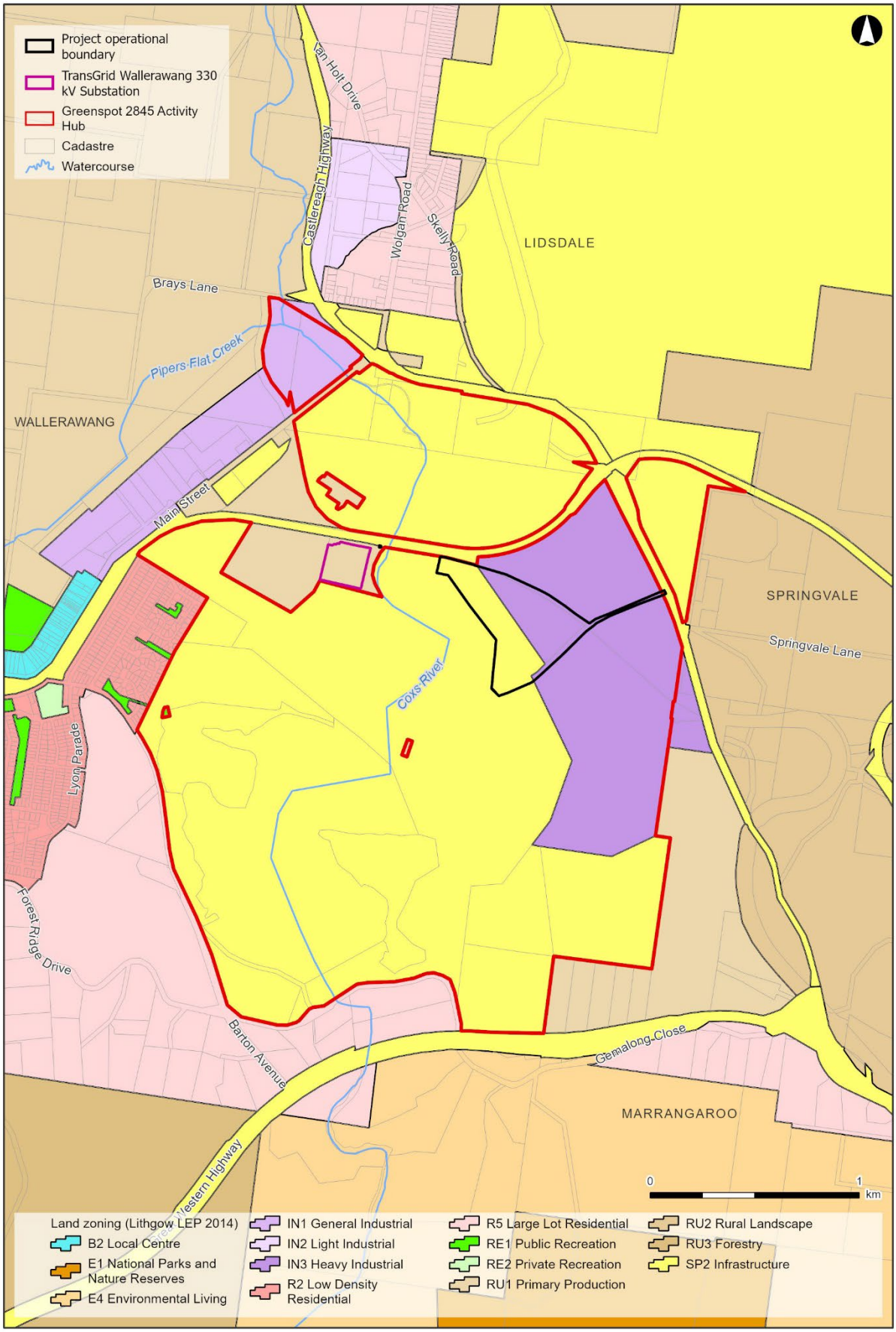


Figure 2-2 Land zoning

3 LAND USE CONFLICT RISK ASSESSMENT

3.1 Risk assessment methodology

The Risk Ranking Matrix shown in Table 3-1 has been used to rank the identified potential land use conflicts. The risk ranking matrix assesses the environmental, public health and amenity impacts according to the:

- probability of occurrence, and
- consequence of the impact.

A description of how probability and consequence have been identified is provided in Table 3-2 and Table 3-3.

Table 3-1 Risk ranking matrix

Probability	A	B	C	D	E
Consequence					
1	25	24	22	19	15
2	23	21	18	14	10
3	20	17	13	9	6
4	16	12	8	5	3
5	11	7	4	2	1

Table 3-2 Probability table

Level	Descriptor	Description
A	Almost certain	Common or repeating occurrence
B	Likely	Known to occur, or 'it has happened'
C	Possible	Could occur, or 'I've heard of it happening'
D	Unlikely	Could occur in some circumstances, but not likely to occur
E	Rare	Practically impossible

Table 3-3 Measure of consequence

Level	Description	Example / Implication
Level 1 Severe	• Severe and/or permanent damage to the environment • Irreversible • Severe impact on the community • Neighbours are in prolonged dispute and legal action involved	• Harm or death to animals, fish, birds or plants • Long term damage to soil or water • Odours so offensive some people are evacuated or leave voluntarily • Many public complaints and serious damage to Council's reputation • Contravenes Protection of the Environment & Operations Act and the conditions of Council's licences and permits. Almost certain prosecution under the POEO Act
Level 2 Major	• Serious and/or long-term impact to the environment • Long-term management implications • Serious impact on the community • Neighbours are in serious dispute	• Water, soil or air impacted, possibly in the long term • Harm to animals, fish or birds or plants • Public complaints. Neighbour disputes occur. Impacts pass quickly • Contravenes the conditions of Council's licences, permits and the POEO Act • Likely prosecution
Level 3 Moderate	• Moderate and/or medium-term impact to the environment and community • Some ongoing management implications • Neighbour disputes occur	• Water, soil or air known to be affected, probably in the short term • No serious harm to animals, fish, birds or plants • Public largely unaware and few complaints to Council • May contravene the conditions of Council's Licences and the POEO Act • Unlikely to result in prosecution
Level 4 Minor	• Minor and/or short-term impact to the environment and community • Can be effectively managed as part of normal operations • Infrequent disputes between neighbours	• Theoretically could affect the environment or people but no impacts noticed • No complaints to Council • Does not affect the legal compliance status of Council
Level 5 Negligible	• No measurable or identifiable impact on the environment • No measurable impact on the community or impact is generally acceptable.	• Very minor impact to the environment and community • Can be effectively managed as part of normal operations • Neighbour disputes unlikely.

3.2 Land use risks

The main land use activities that are likely to generate conflict in this situation are residential development and the surrounding natural environment. The potential for conflict can occur in either direction.

The activities that are most likely to create conflict are outlined in Table 3-4. Each potential conflict is given a risk ranking based on probability (likelihood) and consequence as described above. Risk rankings greater than 10 are regarded as serious and need to be addressed.

Table 3-4 Initial risk evaluation

Activity	Identified Potential Conflict	Risk Ranking
Residential use	Visual impacts to nearby residences or passers by	5
	Noise from operation of BESS	**13**
	Noise and air quality impacts from traffic	2
	Indirect impacts from a combustion event at the BESS	9
	Unauthorised access to operational battery areas including theft and vandalism	9
Coxs River	Runoff from battery area affecting water quality	**13**
Adjacent undeveloped grassland and vegetation	Bushfire prone land impact on the BESS	9
	Fire within the BESS impact on adjacent undeveloped areas	9
Nearby businesses	Visual impacts to visitors to the business	5
	Noise from operation of BESS	4
	Noise and air quality impacts from traffic	2

4 RISK REDUCTION MEASURES

An assessment of potential impacts to adjacent land uses is included within the EIS prepared for the Project. Where potential impacts have been identified, mitigation measures have been proposed. Where the land use risk assessment has identified high risk rankings (i.e. rankings over 10) the risk has been reassessed with the implementation of mitigation measures to determine if further mitigation is required.

4.1 Noise from operation of BESS to residential Land use

The operation of the Project if not appropriately designed and managed has the potential to result in noise impacts to nearby land uses (e.g. residential). An assessment of operational noise has been undertaken by Resonate and is included as Appendix D and Section 9 of the EIS.

A noise 'base case' (Scenario 1) was assessed to identify potential noise impacts and the need for potential design refinements. Based on the predicted noise levels for the base case, design refinements were made to the indicative design to reduce the potential noise impacts to nearby receivers. These refinements included five-meter-high noise barriers on the eastern, northern and southern edges of the battery units and repositioning of the battery units into clusters away from sensitive receivers. Thermal load modelling was also undertaken using temperature data of the surrounding area to understand the cooling requirements for the battery units and to further optimise acoustic predictions.

Incorporating the design refinements a realistic 'worst case' scenario (Scenario 2) was run to assess the impacts to sensitive receivers. The assessment identified a number of exceedances of criteria as detailed in Table 4-1.

Table 4-1 Potential noise impacts under the realistic 'worst case' scenario

Assessment period	Number of exceedances	Level of exceedance
Day	4	1dB to 3dB
	1	4dB
Evening	12	2dB to 5dB
Night	38	1dB to 3dB (east of Project)
	10	1 dB to 6dB (west of Project)

Note that whilst there would be exceedances of the nighttime 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.

The average predicted exceedance for Scenario 2 is 1.5 dB to the west and 2.6 dB to the east. Typically, these exceedances would be considered not perceptible / just perceptible.

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

Most of the exceedances would be not perceptible/ just perceptible. 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.

A third scenario (Scenario 3) using a 20% fan duty was also assessed. Scenario 3 identified 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 Scenario 3 is to demonstrate that practical compliance with Project criteria may be achieved with alternative site layouts and alternative battery solutions. Detailed design would aim to minimise exceedances as much as feasible and further mitigation (e.g. at property treatment) would be considered for residual exceedances.

Mitigation

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'* (NSW EPA, 2017).

4.2 Runoff from BESS affecting water quality in the Coxs River

An assessment of potential water quality impacts has been undertaken by Arcadis and is included in Section 16 and Appendix J of the EIS. Potential impacts from flooding was undertaken by Hydrology and Risk Consulting Pty Ltd and is included in Appendix K of the EIS.

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.

The findings of the assessments are summarised below.

4.2.1 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 has the potential to transport pollutants into the downstream receiving waters resulting in a decrease in the quality of the water. This could also include pollutants (such as oil, hydraulic fluids and fuels) from spills or leaks equipment of substances.

Mitigation

- 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. The conceptual soil and water management plan will include water management devices, such as sediment basins, which could become the operational sediment basins, once construction is complete.

- 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.
- 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.

4.2.2 Flooding

Changes to the shape and nature of the local landform for the Project may result in impacts to the flood regime within the catchment and impact on adjacent land uses.

The existing site flooding conditions have been modelled by HARC as presented in Appendix K of the EIS.

TUFLOW flood modelling was undertaken for the Project to compare the existing and proposed flood conditions. The change in flood levels (afflux) as a result of the Project are shown in Chapter 16 Figures 16-4, 16-5 and 16-6.

The Project site is located adjacent to the Coxs River and Lake Wallace and is noted to be potentially affected by a probable maximum flood (PMF) extent of these waterway/s. The existing flooding conditions for the Project site can be summarised as follows:

- In a 5% AEP scenario, the 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.
- In a 1% AEP scenario, the site would remain unaffected by flooding from Lake Wallace and there would be a slight increase in the width of overland flow from the ephemeral creek within the Project site.
- 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.

The project would provide a ‘pad’ for the proposed battery which would involve filling in the ephemeral natural creek through the centre of the site by moving fill from the south and eastern sides of the site.

For the purposes 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).

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 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 with the Project shows there is minimal incremental impact between the existing and development scenarios for all AEPs (less than 100 mm).

In the PMF there would be additional flooding across the BESS and substation areas of the site with additional sheetflow of approximately 100 mm depth. The sheetflow is a result of the levelling of the BESS area, as the area slowly drains due to the lack of gradient.

Mitigation

Additional assessment would be undertaken during detailed design for the Project to ensure that Project infrastructure is adequality protected during extreme flood events.

4.2.3 Water use

Water use from the Project has the potential to impact on run-off and water availability for nearby land uses. The key demand for onsite 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.

The project would have negligible water requirements during operation. These would be further mitigated by the measures outlined below.

Mitigation

- A water tank would be provided adjacent to the Project site offices to collect rainwater from roof areas and provide a valuable onsite water supply. Given the limited staff presence on the 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 offsite as required.
- The water use requirements for the Project site are minor and are not considered to be a significant impact.

4.3 Risk evaluation

Table 4-2 provides a summary of the risk ratings for and after the mitigation measures have been implemented.

Table 4-2 Risk evaluation following mitigation

Activity	Identified Potential Conflict	Unmitigated Risk Ranking	Mitigated Risk Ranking
Residential use	Noise from operation of BESS	13	5
Coxs River	Runoff from battery area affecting water quality	13	5
Flooding	Flooding of the surrounding properties	13	8

5 CONCLUSIONS AND RECOMMENDATIONS

This LUCRA has identified and assessed several potential sources of land use conflict. The potential for conflict is insignificant in many cases due to one or more mitigating factors including:

- Physical distance to sensitive receptors (i.e. residential development)
- Duration, frequency or intensity of potentially conflicting activities

Subject to the proposed mitigation measures being implemented as described in the EIS, all potential land use conflict activities can be reduced to a low-risk rating (less than 10) and the potential for land use conflicts is unlikely or of minimal consequence.

ARCADIS Design & Consultancy for natural and built assets