

Appendix C

**McCullys Gap Battery Energy Storage
System – Consolidated mitigation
measures**

Table C.1 Consolidated mitigation measures

Impact/issue	Ref	Mitigation measure	Timing
Biodiversity			
Avoiding impacts on biodiversity	BD1	Vegetation clearing will be limited to the minimum necessary to construct the project. The design and location of infrastructure will be further refined to minimise or avoid impacts on native vegetation and fauna habitat as far as practicable.	Design / Pre-construction
Offsetting impacts on native vegetation and threatened species	BD2	Biodiversity offsets will be finalised in accordance with the NSW Biodiversity Offsets Scheme.	Design
General biodiversity impacts and management	BD3	A Biodiversity Management Plan will be prepared and implemented as part of the CEMP. The plan will: – identify biodiversity values within the project site, including native vegetation, fauna habitats and ecologically sensitive features – describe measures to avoid, minimise and manage impacts on biodiversity values, including site-specific controls, procedures and responsibilities – specify induction and training requirements for all personnel prior to commencing site works, ensuring awareness of biodiversity values, protection measures and responsibilities – define fauna management protocols, including pre-clearing surveys and procedures for fauna handling and relocation (see mitigation measures BD4 – BD7) – identify consultation requirements with relevant stakeholders – include a biosecurity management procedure with measures to minimise the potential of biodiversity risks in accordance with the general biosecurity duty under the <i>Biosecurity Act 2015</i> (NSW) (refer also to mitigation measure LS3) and Regional Weed Management Plans – include an unexpected finds procedure – outline fauna monitoring and adaptive management protocols.	Pre-construction / Construction
	BD4	Pre-clearing surveys will be undertaken prior to construction by a suitably qualified ecologist. The surveys and inspections, and any subsequent relocation of species, will be undertaken in accordance with the Biodiversity Management Plan	Construction
	BD5	During pre-clearing surveys, trees in the project area with hollows or other high habitat values located within two metres of the edge of the project area will be marked and avoided where practicable. Tree hollows in hollow-bearing trees within areas to be cleared will be assessed by an ecologist for suitability for salvage and relocation.	Construction

Impact/issue	Ref	Mitigation measure	Timing
	BD6	A fauna handling and relocation protocol for the management of fauna and habitats will be prepared including: – a procedure for the felling of hollow-bearing trees to prevent or minimise mortality of fauna, and the salvage of hollows and logs where practicable. – a procedure for earthworks and understorey vegetation clearing to minimise mortality of the Hunter Valley Delma, and relocation of individuals to areas outside of the project area – supervision by a suitably qualified ecologist during initial vegetation clearing, grubbing and stripping of the top 30 cm of the soil profile, and removal of hollow-bearing trees and surface rock for salvage and installation within the avoidance area – management of any trenches or drill sites to prevent fauna from becoming trapped or injured.	Detailed design / Pre-construction
Impacts on man-made structures	BD7	Pre-clearing survey of human-made structures will be conducted to confirm the presence / absence of active breeding roosts. Demolition of man-made structures will be in accordance with the methodology provided in Table 8.12 of Technical Report 1 (Biodiversity Development Assessment Report).	Detailed design / Pre-construction
Noise and vibration			
Construction noise and vibration management	NV1	A Construction Noise and Vibration Management Plan (CNVMP) will be prepared and implemented as part of the CEMP, including identification of high noise/vibration activities, source and pathway controls, monitoring (as required), notification and complaints handling.	Pre-construction / Construction
Construction noise (source controls)		Feasible and reasonable source controls will be implemented including temporary noise screens where practicable, broadband/smart reversing alarms, residential-class mufflers, maximising offset distances to sensitive receivers and avoiding unnecessary high maximum noise events.	Pre-construction / Construction
Construction noise (administrative controls)	NV2	Administrative controls will be implemented including environmental awareness training, selection of low-noise plant, scheduling noise-intensive works to less sensitive times where practicable, and maintaining equipment to minimise noise emissions.	Pre-construction / Construction
Construction vibration	NV3	Where vibration-intensive activities are planned within screening distances, alternative methods or equipment will be investigated and vibration-intensive activities will be scheduled during less sensitive times where practicable.	Pre-construction / Construction
Cumulative construction noise	NV4	Where cumulative construction noise impacts are likely to affect sensitive receivers, the applicant will, where practicable, seek to engage with other proponents to identify opportunities to minimise cumulative noise impacts.	Construction

Impact/issue	Ref	Mitigation measure	Timing
Landscape and visual			
Visual impacts from connection infrastructure	LV1	Where possible, the number and height of transmission towers or monopoles will be minimised to reduce visual changes.	Design
Visual impacts during construction	LV2	A Landscape and Visual Management Plan will be developed and implemented as part of the CEMP detailing measures to minimise visual contrast and landscape disturbance during construction. The plan will include: – staging construction activities to limit the extent and duration of exposed ground surfaces visible from key sensitive receivers – rehabilitating disturbed areas progressively using endemic species of appropriate form and height to re-establish landscape character and soften views of the project – managing stockpiles, laydown areas and machinery placement to reduce clutter and visual prominence, including maintaining tidy, compact work zones – implementing glare-minimisation measures for construction lighting and ensuring lighting is directed downward and shielded to reduce light spill.	Pre-construction / Construction
Landscaping and vegetation management	LV3	The draft landscape plan provided in Appendix B of Technical Report 3 (Landscape and visual impact assessment) will be further refined with the final location, species selection and extent of planting confirmed during detailed design in consultation with relevant affected landowners. Landscaping and planting will be implemented and maintained in accordance with this plan.	Design / Construction / Operation
Aboriginal heritage			
Avoiding and minimising impacts on Aboriginal heritage	AH1	Design and construction planning will continue to be refined to avoid impacts on identified sites of Aboriginal heritage significance, as far as practicable.	Design / Pre-construction
Managing Aboriginal heritage and minimising impacts during construction	AH2	An Aboriginal Cultural Heritage Management Plan will be prepared and implemented. The plan will include measures to minimise the potential for impacts on Aboriginal heritage and measures to manage impacted sites, including: – a salvage methodology for sites that would be impacted (mitigation measure AH3) – an unexpected finds procedure (mitigation measure AH4) – protocols for long-term management of salvaged Aboriginal sites – cultural awareness training for site workers. The plan will be prepared in consultation with the relevant Registered Aboriginal Parties, DPHI, and Heritage NSW.	Pre-construction / Construction
	AH3	A salvage methodology will be developed in accordance with the recommendations of section 9.2 of Technical Report 4 (Aboriginal Cultural Heritage Assessment Report) for the following sites: – AHIMS site 37-2-5052 (TR/1) – AHIMS site 37-2-6778 (McCullys Gap IF 1).	Pre-construction

Impact/issue	Ref	Mitigation measure	Timing
Unexpected heritage finds and human remains	AH4	An unexpected finds and human skeletal remains procedure will be developed and included into the Aboriginal Cultural Heritage Management Plan to provide a consistent method for managing any unexpected Aboriginal heritage items or human skeletal remains.	Pre-construction
Historic heritage			
Unexpected heritage items	HH1	An unexpected heritage finds procedure will be developed and included in the CEMP to provide a consistent method for managing any unexpected heritage items discovered during construction, including potential historic heritage items or relic and human skeletal remains.	Pre-construction / Construction
Land and soils			
Unexpected contamination	LS1	An unexpected finds protocol will be prepared as part of the CEMP and implemented to manage the identification of unexpected contamination during construction. The unexpected finds protocol would include details for stopping work, engaging a suitably qualified professional to carry out a relevant assessment, and providing recommendations to control risks and proceed with work safely.	Construction
Biosecurity risks	LS2	A Biosecurity Management Procedure will be prepared and implemented as part of the CEMP, to minimise biosecurity risks in accordance with the general biosecurity duty under the <i>Biosecurity Act 2015</i> (NSW) and relevant Regional Weed Management Plans. The Biosecurity Management Procedure will be developed with reference to relevant guidance, including <i>Landholder Biosecurity and Utility Service Providers</i> (Department of Regional NSW, 2022) and <i>Managing Biosecurity Risks in Land Use Planning and Development Guide</i> (Department of Primary Industries, 2020).	Pre-construction / Construction
	LS3	Biosecurity management measures will be implemented during operation to minimise biosecurity risks associated with maintenance activities in accordance with the <i>Biosecurity Act 2015</i> (NSW) and relevant regional weed management plans.	Operation
Transport and traffic			
Managing the potential for traffic, transport, access and parking impacts during construction	T1	Design and construction planning will aim to avoid or minimise traffic, transport and access impacts on the surrounding road network as far as practicable.	Detailed design / Pre-construction
	T2	A Construction Traffic Management Plan (CTMP) will be prepared and implemented as part of the CEMP to manage traffic, transport and access impacts during construction. The CTMP will be prepared in consultation with Muswellbrook Shire Council, Transport for NSW and Australian Rail Track Corporation, as relevant, and will include measures to: – maintain the safe and efficient operation of affected public roads – manage construction vehicle access and movements – implement appropriate traffic control arrangements where required – define a driver code of conduct for construction and haulage vehicles.	Pre-construction / Construction

Impact/issue	Ref	Mitigation measure	Timing
OSOM route planning and permitting	T3	Oversize overmass (OSOM) vehicle movements will be managed in accordance with applicable approvals and permits. Vehicle dimensions and routes will be confirmed prior to OSOM movements and in accordance with the necessary permits. OSOM movements will be undertaken in accordance with the approved CTMP and in consultation with relevant road authorities.	Pre-construction / Construction
Temporary road modifications to facilitate OSOM vehicle movements	T4	Temporary road modifications required to facilitate OSOM vehicle movements (such as gravel placement or temporary signage relocation) will be designed and implemented in consultation with the relevant road owner and reinstated following completion of construction activities, unless otherwise agreed.	Detailed design / Construction
Impacts on local roads	T5	Road condition surveys of Sandy Creek Road will be undertaken prior to and following construction, to the satisfaction of the relevant road authority. Where construction activities on this road result in damage, the road will be reinstated to pre-survey condition, or as otherwise agreed with the road authority.	Construction
Cumulative impacts	T6	Coordination with other relevant projects and proponents will be undertaken during detailed design and construction to manage potential cumulative traffic effects, including consideration of construction timing, shared access routes and traffic management requirements, where reasonably practicable.	Detailed design / Construction
Decommissioning impacts	T7	The Decommissioning Management Plan will include measures to manage traffic and access during decommissioning of the project. The plan will include appropriate traffic control measures in consultation with the relevant road authority, including Muswellbrook Shire Council.	Decommissioning
Water			
Impacts to surface water quality during construction	WQ1	A construction Soil and Water Management Plan (SWMP) will be developed and implemented in accordance with <i>Managing Urban Stormwater: Soils and Construction</i> (Landcom, 2004) including erosion and sediment controls, inspection and maintenance requirements, unexpected finds procedures and trigger action response plans.	Pre-construction / Construction
Flooding risks during construction	WQ2	A construction flood response plan will be developed and implemented detailing options for safe access to and from the site in the event of flooding, including emergency management and evacuation procedures.	Pre-construction / Construction
Impacts to stormwater quality during operation	WQ3	A stormwater treatment system will be designed, constructed and maintained to manage runoff from impervious areas and achieve best-practice pollutant reduction targets for downstream receiving environments.	Design / Operation
Water quality during operation	WQ4	An Operational Environmental Management Plan (OEMP) will be prepared and implemented to manage water quality risks during operation, including hazardous material storage and handling, spill prevention and response, firewater containment and controlled removal where required, maintenance of stormwater treatment measures, water supply arrangements, and wastewater management.	Operation
Flooding risks during operation	WQ5	An operational flood response plan will be developed and implemented detailing options for safe access to and from the site in the event of flooding, including emergency management and evacuation procedures.	Operation
Water supply	WQ6	Water supply for the project will be confirmed prior to construction. If groundwater is to be used, the required Water Access Licence and water supply work approvals will be obtained, and groundwater extraction rates will be monitored and managed to avoid adverse impacts on neighbouring bores, with trigger and response measures defined in the SWMP and OEMP.	Pre-construction / Construction / Operation
Wastewater management	WQ7	On-site wastewater systems will be designed, installed and managed in accordance with relevant NSW guidelines such as <i>Designing and Installing On-site Wastewater Management Systems</i> (WaterNSW, 2026), including inspection, maintenance and contingency arrangements.	Design / Operation

Impact/issue	Ref	Mitigation measure	Timing
Watercourse crossings and riparian corridors	WQ8	The design of works within or adjacent to watercourses will continue to be refined in accordance with <i>Controlled Activities – Guidelines for Riparian Corridors on Waterfront Land</i> (DCCEEW, 2025), and best-practice erosion and sediment control principles, to avoid or minimise impacts within and adjacent to watercourses as far as practicable.	Design
Decommissioning impacts	WQ9	The Decommissioning Management Plan will identify reasonably foreseeable risks relating to watercourses, water resources and water quality and describe how these risks will be addressed during decommissioning.	Decommissioning
Hazard and risk			
Fire safety	HR1	The location of the BESS facility will maintain a separation of at least 3 metres from the project area boundary and confirmed by the BESS designer/supplier through appropriate thermal testing/modelling.	Detailed design
	HR2	The battery energy storage system will be designed, installed and operated in accordance with manufacturers requirements, relevant design codes and electrical standards.	Detailed design / Construction / Operation
Queensland–Hunter Gas Pipeline	HR3	The applicant will continue to engage with the operator of the Queensland–Hunter Gas Pipeline through detailed design in relation to the project.	Detailed design
Construction / decommissioning	HR4	A CEMP and, where required, a Decommissioning Management Plan, will be prepared and implemented to manage construction and decommissioning risks, including traffic management, designated pedestrian areas and bushfire management in accordance with the relevant legislation and regulations.	Construction / Decommissioning
Bushfire			
Asset protection zones	BF1	A temporary 50 m asset protection zone (APZ) will be established and maintained around all temporary habitable structures (e.g. site office) during the construction stage, unless subsequent studies are conducted to demonstrate a smaller APZ would meet the aims and objectives of <i>Planning for Bushfire Protection</i> (NSW RFS, 2019).	Construction
	BF2	A BAL-29 compliant APZ will be maintained around the BESS facility, unless subsequent studies are conducted to demonstrate a smaller APZ would meet the aims and objectives of <i>Planning for Bushfire Protection</i> (NSW RFS, 2019).	Design
Construction requirements	BF3	All buildings will be designed and constructed in accordance with AS 3959:2018 (Sections 3 and 7 – BAL-29) or, where applicable, the NASH Standard (2014, Amendment 1.7.14) <i>National Standard for Steel-Framed Construction in Bushfire Areas</i> , and Section 7.5 of <i>Planning for Bushfire Protection</i> (NSW RFS, 2019).	Design

Impact/issue	Ref	Mitigation measure	Timing
Project fire provisions Vegetation management	BF4	The design of the BESS facility will be finalised in consultation with NSW Rural Fire Service (RFS) to confirm applicable bushfire protection and emergency response requirements in accordance with <i>Planning for Bushfire Protection</i> (NSW RFS, 2019) . The consultation will include: – emergency vehicle access and internal circulation arrangements – perimeter and internal road design and trafficability – firewater storage capacity and supply arrangements – hydrant locations and fire-fighting infrastructure – asset protection measures and other fire safety provisions. The design will be finalised in accordance with the outcomes of consultation with NSW RFS and any conditions or recommendations provided.	Design
	BF5	Vegetation management will be applied in accordance with IPA standards (<i>Planning for Bushfire Protection</i> Section A4.1.1), including maintaining low fuel loads and keeping grass at or below 100 mm in height to ensure radiant heat flux remains below relevant thresholds.	Operation
Bushfire emergency plan and management	BF6	A Bushfire Emergency Management and Operations Plan will be prepared and implemented in accordance with Section 8.3.5 of <i>Planning for Bushfire Protection</i> (NSW RFS, 2019). The plan will identify and apply all relevant bushfire risks and mitigation measures for both construction and operation of the site, including: – measures to prevent or mitigate fire ignition – restrictions on works that will not be carried out during total fire bans – provision and availability of fire-suppression equipment, emergency access, and water supply – requirements for safe storage and maintenance of fuels and other flammable materials – notification to the NSW RFS Fire Control Centre for any works with potential to ignite vegetation during a bushfire danger period, ensuring weather conditions are appropriate – appropriate Bush-fire Emergency Management planning to support preparedness and response. The plan will be provided to NSW RFS for review and comment prior to finalisation.	Construction / Operation / Decommissioning
Social and economic			
Socio-economic impacts, communication and engagement	SE1	A Community and Stakeholder Engagement Plan will be developed and implemented to guide the delivery of communication and engagement, including an approach and mechanisms for engaging with landholders, nearby residents and other relevant stakeholders. The plan will include: – notifications to residents and relevant stakeholders about construction timing, potentially disruptive works, traffic impacts, road closures and project updates – a complaints and enquiries management procedure, including a 24-hour, seven-day-a-week phone line, postal address and email address, published and maintained for the duration of the project lifecycle	Pre-construction / Construction / Operation / Decommissioning

Impact/issue	Ref	Mitigation measure	Timing
		– protocols for responding to and resolving complaints within defined timeframes – the approach to providing information to the community about the project's design, safety systems and operational management.	
Local business participation and employment opportunities	SE2	Measures will be developed and implemented to maximise participation of local and Indigenous residents and businesses in the project, including: – provide information to locals seeking employment or procurement opportunities – appoint a point of contact for procurement, and advertise the contact details on the project website.	Pre-construction / Construction / Operation
Workforce accommodation	SE3	A workforce accommodation strategy will be developed and implemented prior to the commencement of construction to manage the accommodation requirements and potential impacts of non-resident construction workers for the project. The strategy will include: – an updated review of short-term accommodation availability, occupancy rates, seasonal and peak demand periods, and foreseeable cumulative demand within one hour's driving distance of the project area – the anticipated number of non-resident workers requiring accommodation, including the expected timing and duration of peak accommodation demand – identification of preferred accommodation providers, and documented consultation with relevant accommodation providers during preparation of the strategy to confirm that sufficient accommodation capacity is reasonably expected to be available during the relevant construction periods – booking protocols, including how workforce accommodation will be coordinated and lead times for accommodation providers – monitoring of accommodation occupancy rates during construction to identify and respond to any material changes attributable to the project The strategy will be developed in consultation with Muswellbrook Shire Council and relevant local accommodation providers. A record of consultation undertaken, provider responses and the basis on which sufficient accommodation capacity has been demonstrated will be maintained and made available to the Planning Secretary on request. Non-local workforce accommodation will not be sourced from the private rental market.	Pre-construction / Construction
Impacts of non-resident workforce on local communities	SE4	Workforce management measures will be developed and implemented as part of the CEMP to manage the potential impacts of the non-resident construction workforce on local communities.	Pre-construction / Construction
Monitoring and adaptive management	SE5	The CEMP will include provisions for monitoring and adaptive management of social impacts during construction, including monitoring of complaints and community feedback, and reporting on workforce accommodation, local employment and procurement outcomes. Where monitoring identifies the need to adjust mitigation measures, the relevant measures would be updated accordingly.	Pre-construction / Construction

Impact/issue	Ref	Mitigation measure	Timing
Air quality			
Generation of dust emissions	AQ1	A construction dust control protocol will be developed as part of the CEMP and implemented that details management measures, a method for recording dust complaints, and monitoring requirements.	Construction
	AQ2	Dust suppression will be applied as required using water sprays, water extension agents, soil stabilising polymers or other media on: – unpaved work areas subject to traffic or wind – spoil and aggregate stockpiles – during the loading and unloading of dust generating materials – unpaved access tracks.	Construction
Generation of emissions from plant and machinery.	AQ3	All plant and vehicles will be maintained in good condition to minimise ignition risk of fuel or chemicals, spills, and air emissions that may cause nuisance.	Construction
Waste management and resource use			
Generation of excessive spoil	WM1	Earthworks design will be optimised to minimise excess spoil volumes and maximise on-site reuse of excavated material where practicable.	Detailed design
Improper classification and handling of waste	WM2	All waste streams will be classified in accordance with the <i>Waste Classification Guidelines</i> (NSW EPA, 2014) and managed in accordance with the POEO Act and associated regulations. A waste management register will be established and maintained to record waste types, quantities, transport dockets and receiving facilities.	Construction / Operation
Inefficient waste management	WM3	A Construction Waste Management Plan will be prepared and implemented for the project. Circular economy principles and the waste hierarchy will be applied under the <i>Waste Avoidance and Resource Recovery Act 2001</i> . The processes, responsibilities, and measures to manage waste and resource use will be detailed to minimise the potential for impacts during construction.	Construction
Poorly managed operational waste	WM4	An Operational Waste Management Plan will be prepared and implemented prior to operation of the project. Circular economy principles and the waste hierarchy will be applied to manage waste and resource use and minimise the potential for impacts during operation. A waste management register will be maintained to document waste tracking, quantities and lawful disposal or recovery destinations.	Operation
Public waste facilities	WM5	Project waste will not be disposed at public (Council) waste facilities. The Construction Waste Management Plan and Operational Waste Management Plan will identify the receiving waste facility(s) for project waste.	Construction / Operation
Decommissioning waste	WM6	The Decommissioning Management Plan will include measures to manage waste generated during decommissioning of the project. Reuse and recycling opportunities will be investigated for materials such as metals and concrete through local and regional waste facilities.	Decommissioning