Biodiversity Management Plan - Stage 2 works

Liddell future land use and enabling works project

Prepared for AGL Macquarie Pty Ltd (AGLM)

May 2026

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1 Introduction

1.1 Purpose of this document

This Biodiversity Management Plan (BMP) has been prepared to satisfy Schedule 2 Condition B32 of the development consent for "Stage 2" (refer to Section 1.2 of this BMP) of the Liddell Future Land Use & Enabling Works Project (SSD-24937520, the development). The development is associated with the closure of the Liddell Power Station (LPS), located off the New England Highway in Muswellbrook.

Biodiversity impacts of the development were assessed in the Liddell Future Land Use & Enabling Works Project Biodiversity Development Assessment Report (Kleinfeder 2024), hereafter referred to as the BDAR. Given its scale, the development will be completed in three stages, with three separate BMPs. The stages are described in Table 1.1.

Table 1.1 Project construction stages

Construction stage	Description of works	Relevant BMP
1	• Demolition of LPS and redundant infrastructure • Demolition of HVGTs and transmission infrastructure • Construction and use of asbestos disposal facility containment cells, including access road • Construction and use of a borrow bit, access road and water management controls • Rock crushing for rehabilitation works • Re-routing of Tinkers Creek water supply pipeline to the Ash Dam Pipeline corridor for dust suppression and rehabilitation	Liddell Future Land Use & Enabling Works Project Biodiversity Management Plan (Kleinfelder 2025)
2	• Rehabilitation works on the Skimmer Dam • Drainage and Access Works – Liddell Ash Dam and Levee Reprofiling • Surface Water and Seepage Management – West the of LAL and Seepage Ponds • Drainage, Access, and Liner Works Supporting Reprofiling of the LAL at Seepage Pond 1	**This BMP**
3	• Remediation, recontouring and final landform and rehabilitation works • Preparation for an ongoing industrial land use • Rehabilitation of the borrow pit and asbestos disposal facility • Additional extraction works at the Borrow Pit • Maintenance works on the ash retaining structures	To be documented in a future Stage 3 BMP. The Rehabilitation Management Plan will address CPHR's comments regarding the requirements for full rehabilitation works in accordance with DOC25/375239-2.

This BMP has been prepared in accordance with the Environmental Management Plan Review Checklist in Environmental Management Plan Guidelines for Construction Edition 4 (NSW Government 2020) and the development consent conditions for SSD 24937520.

1.2 Stage 2 works description

The Stage 2 works are shown on Figure 1.1 and described in Table 1.2.

Table 1.2 Stage 2 works description

Stage 2 works component	Description
Rehabilitation works on the Skimmer Dam	• The rehabilitation of the Skimmer Dam will include the investigation and management of accumulated sediments, undertaken in accordance with Conditions C1–C13 of the Development Consent. Where required, sediment management may be incorporated into a Remedial Action Plan (RAP) prepared under Condition C8. • To enable these works, a temporary diversion of approximately 240 ha of natural catchment may be required. This diversion will allow the Skimmer Dam to be dewatered via the spillway to Lake Liddell, creating suitable conditions for the controlled removal of sediments and emergent vegetation (e.g. reeds). • Following completion of rehabilitation, the Skimmer Dam will be reinstated to operational status, with its functionality restored in accordance with its original design intent and relevant environmental and engineering standards until it can be decommissioned following completion of LAD rehabilitation works.
Drainage and access works – Liddell Ash Dam and Levee Reprofiling	• Capping of the LAD commenced in 2015, with final capping, landform and rehabilitation works currently ongoing. Water management within the approved LAD project boundary (DA 1/2011) is governed by the Liddell Power Station Ash Dam Water Management Plan (AGL-HSE-TMP-003.2). • The Stage 2 Works includes the reprofiling the Liddell Ash Levee (LAL) to meet closure design requirements, which specify a stable 1V:4H batter. This regrading will improve long-term slope stability, enhance safety, and facilitate ongoing maintenance. • The drainage and access works addressed in this Stage 2 WMP are limited to areas outside the existing LAD approval boundary, extending from the toe of the levee westwards to the boundary of the current Development Consent area. • Reprofiling will be undertaken progressively using benching techniques to control stormwater runoff during construction. As the regraded slopes will increase the contributing catchment area to adjacent seepage ponds, a suite of erosion and stabilisation measures will be implemented, including: • Progressive vegetative stabilisation to establish ground cover and reduce surface erosion. • Application of erosion control mats (e.g. jute or coir blankets) to protect exposed surfaces during vegetation establishment. • Installation of diversion drains and level spreaders to manage and distribute surface water flow. *Note: Works within the existing LAD footprint are already approved under DA 1/2011 and are not covered by this Stage 2 WMP.*
Surface water and seepage management – west of the LAL and seepage ponds	The Stage 2 WMP (AECOM, 2026) outlines current operational practices for managing seepage and surface water runoff in the area west of the LAL, including Seepage Ponds 2, 3, 4, and 5. Key surface water and seepage management activities include: • Seepage collection at the toe of the LAL, where permanent pumps are installed at each Seepage Pond to return water to the LAD surface or Decant Pond. • Capture and containment of surface water runoff from the limited western catchment which now primarily discharges to Seepage Ponds 2 through 5 due to mine void modifications that have altered historical drainage patterns**. Figure 1-2** depicts these catchment boundaries and flow pathways. • Implementation of water management principles consistent with the Blue Book requirements, ensuring adequate containment and return of seepage and stormwater runoff. Investigation and management of sediment will be conducted in accordance with conditions C1 to C13 of the consent.

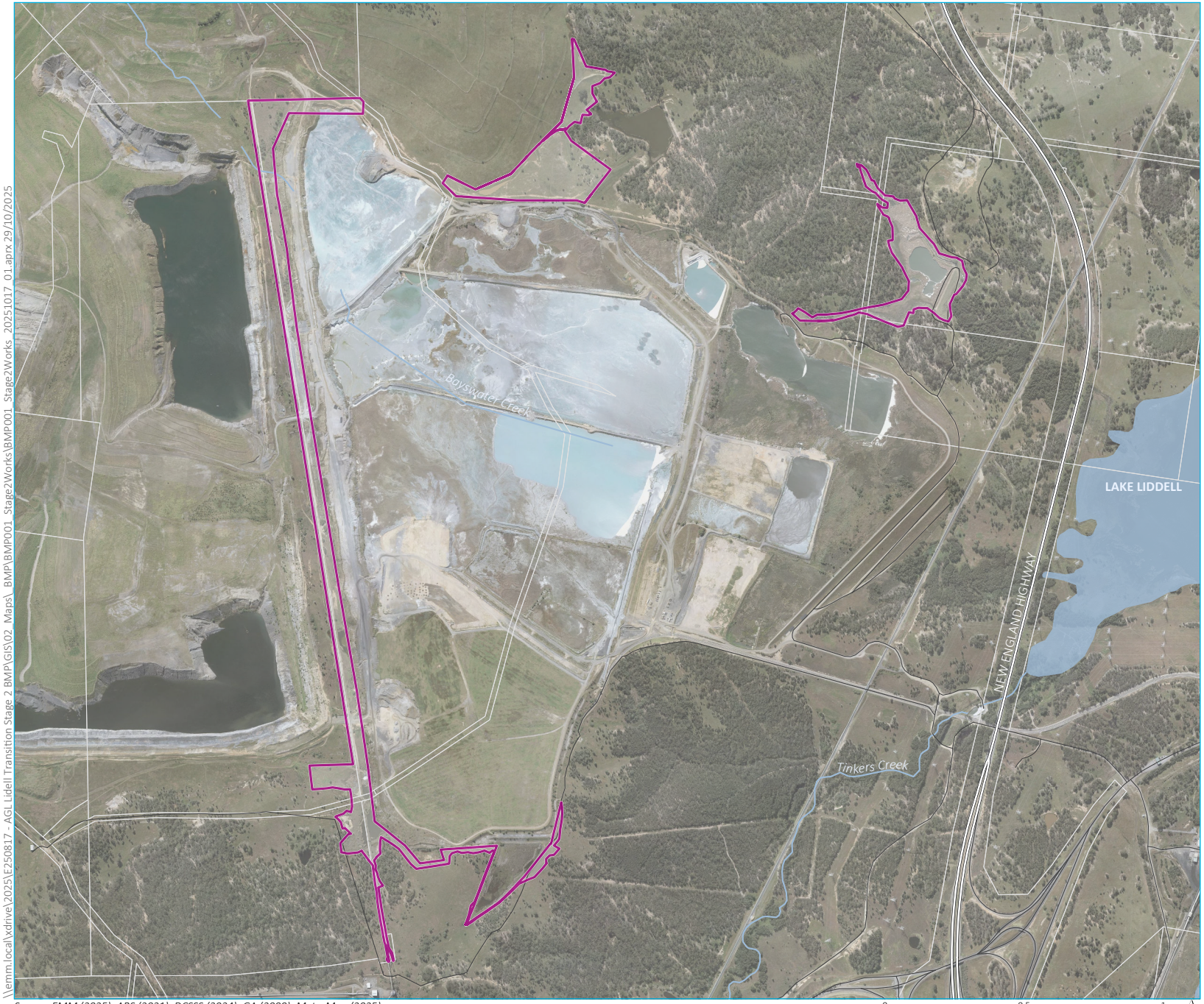
Stage 2 works component	Description
Drainage, access and liner works supporting reprofiling of the LAL at Seepage Pond 1	1. Seepage Pond 1 receives runoff from 105.8 ha of natural catchment. Water retained in Seepage Pond 1 is transferred via pumps to the LAD. The Stage 2 Works include stabilisation of the LAL toe and installation of a liner to prevent water ingress from Seepage Pond 1 to the LAD, ensuring structural integrity and improved containment performance. 2. The investigation and management of sediment will be undertaken in accordance with Conditions C1 through C13 of the Development Consent, with any required sediment management incorporated into a RAP (Condition C8). These works will be delivered in accordance with the Development Consent, Environment Protection Licence (EPL 2122), and other Stage 2 management plans including this plan.

1.3 Objectives

The overall objective of this BMP is to protect biodiversity values within and proximal to the Stage 2 works, in accordance with the consent conditions. Accordingly, objectives for the BMP are to:

- avoid and minimise vegetation clearing and disturbance
- minimise fauna impacts and manage fauna recovery
- avoid impacts to hollow-dependent species
- minimise the use of pesticides and herbicides
- maximise the salvage of vegetative and soil resources
- control weeds, feral pests and pathogens
- provide procedures for unexpected threatened species finds
- stabilise soils until rehabilitation works commence in Stage 3.

AGLM are committed to protecting biodiversity values within and proximal to the Stage 2 works and will implement the management measures in this BMP for the duration of Stage 2 works.





KEY

- Stage 2 boundary

Existing environment

- Major road
- Minor road
- Named watercourse
- Named waterbody
- Cadastral boundary

INSET KEY

- Major road
- NPWS reserve
- State forest

Source: EMM (2025); ABS (2021); DCSSS (2024); GA (2009); MetroMap (2025)

0 0.5 1 km

GDA2020 MGA Zone 56

N

Stage 2 works

AGL Liddell Transition
Biodiversity Management Plan
Figure 1.1

EMM
creating opportunities

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2 NSW approval requirements

2.1 Conditions of approval

The BMP has been prepared to fulfil the requirements of Schedule 2, Condition A1 and Schedule 2 Part B 32 of SSD-24937520 approval.

The conditions of SSD-24937520 relevant to this BMP and where they have been addressed is provided in Table 2.1.

Table 2.1 Conditions of approval reference table

Consent condition	Condition requirement	Demonstration of how the plan addresses condition requirements
A1	In addition to meeting the specific performance measures and criteria established under this consent, all reasonable and feasible measures must be implemented to prevent, and if prevention is not reasonable and feasible, minimise, any material harm to the environment that may result from preliminary works, construction or any other part of the development including, any rehabilitation required under this consent.	This BMP is designed to cover all phases of the Liddell Transition Stage 2 development. The BMP follows the impact mitigation hierarchy outlined in the BDAR (Kleinfeder 2024) and contains all reasonable and feasible measures to avoid and minimise biodiversity impacts.
B32	A biodiversity management plan must be prepared for the development. The plan must:	
(a)	be submitted to the Planning Secretary for approval prior to the commencement of construction	This BMP will be provided to the Department of Planning, Housing and Infrastructure (DPHI) for written approval from the Planning Secretary before AGLM commences any disturbance works associated with the Stage 2 project.
(b)	be prepared:	
	(i) by a suitably qualified and experienced person/s whose appointment has been endorsed by the Planning Secretary	The Planning Secretary's endorsement of the BMP authors is provided in Appendix A.
	(ii) in consultation with the Conservation, Heritage, and Regulation Group (CPHR)	Consultation with CPHR is scheduled to occur pre-lodgement of this BMP to DPHI for review.
	(iii) in accordance with the Biodiversity Assessment Method and be consistent with the avoid and minimise commitments in the Biodiversity Development Assessment Report for the development (dated 22 October 2024)	The BDAR commits to the avoidance of native vegetation impacts, and avoidance to Brush-tailed Phascogale, Hunter Valley Delma, Pine Donkey Orchid and Squirrel Glider. Impacts will be avoided to these entities outside the Stage 2 boundary using the measures specified in Section 5.
	(iv) with reference to any relevant biodiversity management plan guidance material provided by CPHR	Previous comments provided by CPHR on the Liddell Future Works and Enabling Project Biodiversity Management Plan Stage 1 have been considered in the preparation of this Stage 2 BMP.
(c)	support the enhancement and composition of any threatened ecological community found within the approved development area including, the Central Hunter Grey Box – Ironbark Woodland	Weed control measures for avoidance areas are provided in Section 5.7. Section 5.6 provides measures to improve native vegetation quality.
(d)	implement measures to minimise the use of pesticides and herbicides within the approved development area	Measures are provided in Section 5.4 .

Consent condition	Condition requirement	Demonstration of how the plan addresses condition requirements
(e)	support the integrity of habitat for insectivorous bat and amphibian species	Measures are provided in Section 5.2 for the protection of these taxa.
(f)	incorporate salt tolerant species as part of the saline discharge rehabilitation works associated with the Liddell Ash Dam as outlined in the Statement of Environmental Effects prepared by Coffey Environments and dated 18 July 2011	Temporary stabilisation will occur during Stage 2 to stabilise soils until rehabilitation works in Stage 3 (Section 5.8). Rehabilitation will be undertaken as part of Stage 3 works (Table 1.1). Accordingly, salt-tolerant species will be incorporated into the rehabilitation measures, to be detailed in the Stage 3 BMP and revision of the Land Closure and Rehabilitation Plan.
(g)	include a description of measures and timeframes that would be implemented to:	
	(i) minimise clearing and avoiding unnecessary disturbance of vegetation by the development	Measures are documented in Section 5.1.
	(ii) minimise impacts on fauna, and implementing fauna recovery and management protocols	Measures are documented in Section 5.2.
	(iii) maximise the salvage of vegetative and soil resources within the approved disturbance area for beneficial reuse in the enhancement of rehabilitation of the approved development area	Measures are documented in Section 5.3.
	(iv) control weeds, feral pests, and pathogens	Measures are documented in Section 5.6.
	(v) manage any incidental threatened species discovered in the approved development area during construction, operation, upgrading or decommissioning of the development, including a protocol to identify the avoid and/or minimise and/or offset options to be implemented if additional threatened species are discovered within the approved development area	Measures are documented in Section 5.7.
	(vi) retain, rehabilitate or restore vegetation connectivity and provide habitat for threatened species such as the squirrel glider	As the works for Stage 2 chiefly relate to dam dewatering and rehabilitation is planned to be undertaken during Stage 3 (Table 1.1), the measures in this Stage 2 BMP have focused on retention of habitat connectivity, by restricting works to the Stage 2 footprint and protecting adjacent retained native vegetation. Rehabilitation measures, including those that rehabilitate and restore connectivity for threatened species such as the Squirrel Glider, will be detailed in the Stage 3 BMP and revision of the Land Closure and Rehabilitation Plan.
B33	Construction must not commence until the biodiversity management plan is approved by the Planning Secretary	Stage 2 works would commence following approval of this plan by the Planning Secretary.
B34	The biodiversity management plan, as approved by the Planning Secretary, must be implemented for the development	This plan would be implemented for the duration of the Stage 2 works.
B38	A rehabilitation management plan must be prepared for the approved development area, excluding the Liddell Ash Dam. The plan must:	Rehabilitation will be undertaken as part of Stage 3 works (Table 1.1). Accordingly, these rehabilitation measures will be detailed in the Stage 3 BMP and the Rehabilitation Management Plan, which is yet to be developed.

Consent condition	Condition requirement	Demonstration of how the plan addresses condition requirements
	(c) describe how rehabilitation will be integrated with other development activities occurring concurrently with rehabilitation;	Section 5.8 outlines measures for soil stabilisation until such time that the final rehabilitation is undertaken as part of the Stage 3 works (Table 1.1).
	(g) describe how the rehabilitation measures would be integrated with: (i) the measures in the biodiversity management plan referred to in condition B32; (ii) the management of contaminated land required by conditions C1 to C13; and (iii) the Liddell Ash Dam Closure and Rehabilitation Plan required by condition C30.	Section 5.8 outlines measures for soil stabilisation until such time that the final rehabilitation is undertaken as part of the Stage 3 works (Table 1.1). The Stage 3 BMP will address condition B38g.
D4	Within seven days of becoming aware of a non-compliance, the Applicant must notify the Department of the non-compliance. The notification must: (a) be in writing; (b) submitted via the NSW planning portal (Major Projects); (c) identify the development (including the development application number and name); (d) set out the condition of this consent that the development is non-compliant with; (e) why it does not comply; (f) the reasons for the non-compliance (if known); and (g) what actions have been undertaken, or will be undertaken; and when, to address the non-compliance.	Section 3.4.2
D5	The Applicant must notify the Department within 24 hours of becoming aware of an incident. The notification must be made via the NSW planning portal (Major Projects) and address details of the incident including: (a) date, time and location; (b) a brief description of what occurred and why it has been classified as an incident; (c) a description of what immediate steps were taken in relation to the incident; and (d) identifying a contact person for further communication regarding the incident.	Section 3.4.2
D6	The Applicant must provide the Department with a subsequent incident report in accordance with Appendix 6 (Incident Notification and Reporting Requirements).	Section 3.4.2

Consent condition	Condition requirement	Demonstration of how the plan addresses condition requirements
D7	Within three months of the following events: (a) the submission of an incident report under conditions D5 or D6; (b) the submission of a compliance report under condition D3; (c) the submission of an Independent Environmental Audit under condition D1; (d) the approval of any modification of the conditions of this consent (unless the conditions require otherwise); or (e) notification of a change in the development phase under condition A10; (f) Surrender of existing consents and approvals under condition A12.	Section 3.6

2.2 Statement of commitments

Biodiversity-related commitments were made in both the Liddell Future Land Use and Enabling Project BDAR (Kleinfeder 2024), the Liddell Future Land Use and Enabling Project Environmental Impact Statement (GHD 2023), and subsequent Amendment Report (GHD 2024). Table 2.2 lists the commitments and where they are addressed in this BMP.

Table 2.2 Statement of commitments

Aspect	EIS commitment reference	EIS commitment	BDAR commitment	Section where commitments are addressed in this BMP
Clearing of vegetation	BIO1	1. Avoid and minimise clearing impacts to native vegetation where possible.	1. Avoid and minimise clearing impacts to native vegetation where possible.	Section 5.1
		2. Clearly delineate the boundaries of the project footprint to prevent any unnecessary clearing beyond its extent.	2. No clearing will occur outside the approved project and disturbance boundaries identified in this report.	Section 5.1
			3. Where possible, the clearing works will be scheduled to avoid the breeding seasons of identified threatened species and fauna that may breed on site.	Section 5.2
			4. Clearing will cease when temperatures exceed 35°C	Section 5.2
			5. Clearly delineate the boundaries of the project footprint to prevent any unnecessary clearing beyond its extent.	Section 5.1
		3. Ensure vehicle and equipment parking areas and stockpile areas are identified and positioned to avoid areas containing ecological value.	6. Ensure vehicle and equipment parking areas and stockpile areas are identified and positioned to avoid areas containing ecological value.	Section 5.1
		4. Appropriate signage such as 'no go zone' or 'environmental protection area' should be installed.	7. Appropriate signage such as 'no go zone' or 'environmental protection area' should be installed.	Section 5.1
		5. Identify and communicate the location of any 'no go zones' in site inductions.	8. Identify and communicate the location of any 'no go zones' in site inductions.	Section 3.3
Removal of hollow-bearing trees / habitat trees, resulting in	BIO2	1. Limit removal of trees to that required within the project footprint where possible.	-	Section 5.1
		2. A pre-clearing protocol will be implemented during clearing works, as follows:	A pre-clearing protocol will be implemented during clearing works, as follows:	Section 5.2

Aspect	EIS commitment reference	EIS commitment	BDAR commitment	Section where commitments are addressed in this BMP
fauna injury and mortality		o Pre-clearance surveys will be undertaken to determine if any inhabiting fauna are present and to identify habitat features such as dens, roosts, or animal breeding places (nests, hollows, woody debris etc.).	1. Pre-clearance surveys will be undertaken within 48 hours of works to determine if any inhabiting fauna are present and to identify habitat features such as dens, roosts, or animal breeding places (nests, hollows, woody debris etc.).	Section 5.2
		3. A suitably qualified and trained fauna spotter catcher will be present during all vegetation clearing to capture, assess, and relocate displaced fauna (injured fauna to be taken to a veterinarian for further assessment).	2. A suitably qualified and trained fauna spotter catcher will be present during all native vegetation clearing to capture, assess, and relocate displaced fauna (injured fauna to be taken to a veterinarian for further assessment).	Section 5.2
		4. Appropriate exclusion fencing around any trees and woodland that are to be retained within the project Area should be erected, considering allowance for Tree Protection Zones in accordance with AS4970 (Standards Australia, 2009)	3. Appropriate exclusion fencing around any trees and woodland that are to be retained within the Project Area should be erected, considering allowance for Tree Protection Zones in accordance with AS4970 (Standards Australia, 2009).	No trees will be retained in the Stage 2 development area. The Stage 2 boundary will be fenced (Section 5.1) to avoid inadvertent vegetation clearing.
		-	4. Pre-clearance surveys will include the inspection of bat roost habitat features (hollows, cracks, exfoliating bark etc.) using flexible endoscopes or other suitable equipment as well as searches of habitat features on the ground (e.g., fallen timber, rock piles, burrows, riparian fringing vegetation) to detect any threatened reptiles or amphibians present.	Section 5.2
			5. Aquatic areas within active work sites will be fenced with frog fences to prevent access by reptiles and amphibians.	Section 5.2
Removal of hollow-bearing trees / habitat trees, resulting in fauna injury and mortality	BIO2		6. The first round of clearing ('underscrubbing', the removal of most vegetation except habitat and hollow-bearing trees) will take place in two stages and be supervised by fauna spotter/catchers (except for areas of exotic grasslands). In stage one, bulldozers will maintain a raised blade (25–50mm above the ground). After stage one, a short time will be given for displaced fauna to be spotted and removed for relocation if necessary. In stage two, bulldozers will remove topsoil and adjust the soil contour as necessary.	Section 5.2

Aspect	EIS commitment reference	EIS commitment	BDAR commitment	Section where commitments are addressed in this BMP
			7. Suitable local animal rescue providers will be identified prior to works commencing. They will be notified when clearing will occur and confirmation will be sought that they have the resources to take injured wildlife at these times.	Section 5.2
			8. Felled trees will be positioned as far as possible (i.e., depending on the arrangement of hollows) with hollows facing upwards or towards the horizon in the direction of escape towards refuge for at least one night following felling.	Section 5.3
			9. Clearing will be conducted sequentially towards areas of refuge to avoid the creation of islands of remnant vegetation within the impact site.	Section 5.2
			10. All fauna spotter/catchers will be appropriately equipped to capture, handle and release small to medium sized mammals, reptiles, amphibians and birds (e.g., calico catch bags, leather gloves, plastic tubs, transport cages etc.).	Section 5.2
			11. In areas where dispersal into neighbouring intact habitat is blocked (e.g., in the central and eastern parts of the project area), location-specific plans for the capture and relocation of fauna should be prepared and implemented as required. These may include the installation of barriers to direct fauna to safer areas, trapping and relocation prior to clearing or any other appropriate measures to prevent fauna from being harmed due to being cornered or dispersed into unsuitable areas of the site (e.g., the vicinity of the power plant, areas bounded by roads etc.).	Not relevant to Stage 2 development given gradual clearing and connection with adjacent habitats.
Removal of hollow-bearing trees / habitat trees, resulting in fauna injury and mortality	BIO2		12. Tree hollows from trees cleared for the project should be relocated and installed in suitable mature trees as close to their original location as possible.	Section 5.3
			13. If existing tree hollows cannot be successfully relocated (e.g., they are damaged during clearing), artificial nest boxes should be installed in appropriate habitat at a 4:1 ratio to those lost.	Section 5.3

Aspect	EIS commitment reference	EIS commitment	BDAR commitment	Section where commitments are addressed in this BMP
			14. The locations selected for relocated hollows will be provided to BCD prior to works commencing.	Potential nest box host trees are identified on Figure 4.3.
			15. A plan and report documenting the installation, maintenance and monitoring of relocated hollows and nest boxes will be provided to BCD.	Section 5.3
Impacts to surface and Groundwater quality and quantity due to sediment runoff and/or runoff into adjacent watercourses	BIO3	-	1. Impacts of this nature will be managed according to the project Water Management Plan.	To be managed in accordance with Chapter 8 of the EMS
		1. Source controls such as sediment fences, mulching and jute matting will be utilised where appropriate.	2. Source controls such as sediment fences, mulching and jute matting will be utilised where appropriate.	To be managed in accordance with Chapter 8 of the EMS
		2. Site-based vehicles will carry spill kits. Dedicated refuelling and storage places will be constructed away from watercourses/wetland areas (>50 m).	3. Site-based vehicles will carry spill kits. Dedicated refuelling and storage places will be constructed away from watercourses/wetland areas (>50m).	To be managed in accordance with Chapter 8 of the EMS
		3. Erosion and sediment control will be required for the development generally in accordance with Managing Urban Stormwater: Soils and Construction (Landcom, 2004) prior to commencement of construction.	4. Erosion and sediment control will be required for the development in accordance with Managing Urban Stormwater: Soils and Construction (Landcom, 2004) prior to commencement of construction.	To be managed in accordance with Chapter 8 of the EMS
		4. Limit the use of pesticides in the project footprint where possible to avoid contamination of nearby watercourses/wetland areas	5. Limit the use of pesticides in the project footprint where possible to avoid contamination of nearby watercourses/wetland areas.	Section 5.4
Vehicle collision with fauna	BIO4	1. Speed limits within the Development Site should be limited to 40 km/hr. This limit should be clearly signed at all entry points to site.	1. Speed limits within the Development Site should be limited to 40 km/hr. This limit should be clearly signed at all entry points to site.	Section 5.2

Aspect	EIS commitment reference	EIS commitment	BDAR commitment	Section where commitments are addressed in this BMP
Transfer of weeds and pathogens to and from site	BIO5	1. Vehicles and construction plant must be cleaned appropriately before arrival on site to help prevent the spread of the fungal pathogens Phytophthora cinnamomi and Myrtle Rust (*Puccinia psidii*).	1. Measures to protect biodiversity from *Phytophthora cinnamomi*, myrtle rust, amphibian chytrid fungus and invasive plants will be implanted as per DPIE's (2020) 'Hygiene Guidelines'. These include: - An initial assessment of the presence of high-risk biota presence and pathogen risk - Determination of the need for basic or strict hygiene measures - Implementation of appropriate plant cleaning measures	Section 5.6.3
		2. As most of the site contains exotic species, including some high-threat weeds, excavated topsoil from areas with high threat weed infestations must be stockpiled appropriately to limit the risk of transferring invasive species into surrounding vegetation. High-threat weed infestations should be mapped during pre-clearance surveys.	2. As most of the site contains exotic species, including some high-threat weeds, excavated topsoil from areas with high-threat weed infestations must be stockpiled appropriately to limit the risk of transferring invasive species into surrounding vegetation. High-threat weed infestations should be mapped during pre-clearance surveys.	Section 5.6.1
		-	3. Management of invasive plants and high-threat weeds will be undertaken by appropriately qualified people.	Section 5.6.1
		3. Measures to mitigate impacts on flora and fauna from noise, vibration, waste, light and air pollution such as: - Enforce 'carry-in, carry-out' policy regarding rubbish and waste materials generated on-site during construction to avoid waste materials entering adjacent vegetation. - Restriction of public access and associated impacts from domestic pets, waste dumping and damage to adjoining vegetation must be enforced pre, during and post construction.	4. Measures to mitigate impacts on flora and fauna from noise, vibration, waste, light and air pollution such as: - Enforce 'carry-in, carry-out' policy regarding rubbish and waste materials generated on-site during construction to avoid waste materials entering adjacent vegetation. - Restriction of public access and associated impacts from domestic pets, waste dumping and damage to adjoining vegetation must be enforced pre, during and post construction.	To be managed in accordance with Chapter 8 of the EMS
Noise, vibration, lighting, waste and air pollution	BIO6	-	Fence sensitive areas to delineate 'no go' zones.	Section 5.1

Aspect	EIS commitment reference	EIS commitment	BDAR commitment	Section where commitments are addressed in this BMP
impacts to adjacent sensitive habitat areas			Levels of lighting that will accompany the access road will be reduced to a minimal level to reduce any adverse effects upon the essential behavioural patterns of light- sensitive fauna.	To be managed in accordance with Chapter 8 of the EMS
			Lighting should comply with Australian Standard AS4282 (INT) 1997 – Control of Obtrusive Effects of Outdoor Lighting.	To be managed in accordance with Chapter 8 of the EMS
			Noise minimisation practices in accordance with DPHI recommendations.	To be managed in accordance with Chapter 8 of the EMS
			Dust control measures such as covering loads where required; amending operations under excessive wind conditions including ceasing operations if required; use of water tankers as required, to control dust; rehabilitation through vegetation of surfaces to be left unsealed; or other dust removal measures.	To be managed in accordance with Chapter 8 of the EMS
Hunter Valley Delma protection	BIO7	1. Detailed design will ensure that impacts to habitat for the Hunter Valley Delma (*Delma vescolineata*) / Striped Legless Lizard (Delma impar) are minimised to the fullest extent practical.		Development will be restricted to the approved Stage 2 boundary.
Pine Donkey Orchid protection	-	-	1. Individuals beyond the area of direct impacts will be protected from potential stock impacts by the installation of exclusion fencing. This area will also be considered a no-go area to those personnel not authorised and briefed to work in proximity to the Pine Donkey Orchids for management or monitoring activities.	Not relevant to the Stage 2 works, as no known Pine Donkey Orchids are present, and the development boundary will be fenced.
			2. The population identified in the BDAR shall be resurveyed during subsequent flowering periods and if necessary, the no-go area will be expanded.	Not relevant to the Stage 2 works, as no known Pine Donkey Orchids are present within the footprint of the Stage 2 works, and the development boundary will be fenced to exclude areas that are not approved for disturbance.

Aspect	EIS commitment reference	EIS commitment	BDAR commitment	Section where commitments are addressed in this BMP
Impacts to bats via tree clearing and demolition of roosts in buildings and other man-made structures	-	-	1. A plan to manage impacts to microbats will be developed in consultation with the BCD and incorporated into the project BMP.	Measures to manage microbats potentially roosting in hollow-bearing trees are detailed in the Habitat Relocation Management Plan in Appendix B and Microbat Management Plan in Appendix C.
Impacts to threatened species and ecological communities not identified, assessed and/or relocated prior to works commencing	-	-	1. Project staff will be briefed on threatened species known and likely to occur in the project area during site inductions.	Section 3.3
			2. An Unexpected Finds Procedure has been developed to manage these impacts.	Section 5.7

2.3 Author endorsement and agency consultation

The authors of this Stage 2 BMP have been endorsed by the Planning Secretary (Appendix A). The Stage 2 BMP will be provided to DPHI to seek written approval from the Planning Secretary before AGLM commences any disturbance works associated with the Stage 2 project.

3 Biodiversity management framework

3.1 Roles and responsibilities

Roles and responsibilities, relevant to this Stage 2 BMP are outlined in Table 3.1.

Table 3.1 Roles and responsibilities

Role	Responsibilities
Key AGLM personnel	
General Manager - Transition	• Managerial authority and responsibility for all environmental matters • Management of Liddell Transition Team • Regular review of environmental programs including the establishment of environmental objectives and targets • Monitoring and improving environmental performance • Timely renewal of operating licenses • Compliance with all license conditions and regulatory reporting requirements • Manage maintenance of plant and equipment
Site Manager Liddell Transition	• Provide adequate resources for the implementation of the Stage 2 BMP • Ensure all appropriate approvals have been obtained • Ensuring that all staff and contractors under their control are aware of environmental compliance issues and environmental controls listed in the EMS • Oversee project implementation • Order stop-work for any activity that may cause environmental harm • Management of site-based Liddell Transition Team • Manage demolition and rehabilitation works • Manage maintenance of plant and equipment
Manager Environment and Approvals – Liddell Transition	• Manage environmental approvals process • Ensure this Stage 2 BMP is established, implemented, and maintained • Report to the Site Manager – Liddell Transition on the performance of the Stage 2 BMP and recommendations for improvement. • Provide advice and assistance on environmental matters • Identify key environmental risks and opportunities to ensure high environmental performance • Attendance at on-site meetings to ensure environment related issues are raised for review • Monitoring the effectiveness of environmental management measures • Ensure the Environmental Management System achieves its intended outcomes • Planning for and responding to emerging environmental trends. • Initiating the external independent environmental audit program. • Liaising with Management in the setting of environmental objectives and targets, defining the context of the organisation and maintaining the interested parties register and all associated actions for the development. • Communicating environmental performance. • Manage, investigate and report on major environmental incidents.
Manager Health and Safety Site Transition	• Manage and advise on training needs • Assisting in the management and investigation of major environmental incidents. • Assist in developing Safe Work Method Statements (SWMS) for all tasks and ensuring the required environmental measures are included and the work is monitored throughout • Complete environmental inductions and required training

Role	Responsibilities
Stage 2 Liddell Ash Dam Project Manager	• Comply with Stage 2 BMP, including all relevant procedures, sub-plans, processes, operating standards. • Assisting in the management and investigation and reporting of all environmental incidents. • Ensure effective internal and external communication programs are in place • Engage competent and licensed contractors, as required by legislation, to undertake works • Ensure resources are available to support the Environmental Management System • Ensure employees are equipped with sufficient skills to comply with the EMS throughout the delivery of the development • Lead by example to promote environmentally sound practices • Compliance with all environmental and regulatory requirements and other reporting requirements. • Promote continual improvement and provide support as required • Input into regular reviews of HSEMS elements including the establishment and review of environmental objectives and targets. • Monitoring and improving environmental performance at a project level.
Stage 2 Liddell Ash Dam Superintendent	• Comply with Stage 2 BMP, including all relevant procedures, sub-plans, processes, operating standards. • Implement the EMS • Assisting in the management and investigation and reporting of major environmental incidents. • Appropriately communicate internal and external communication programs • Organisation of on-site personnel regarding their responsibilities within the HSEMS • Promote continual improvement and provide support as required • Responsible for resourcing employee activities and ensuring plant is operated and maintained in a manner that minimises risk to the environment • Ensure all staff have adequate training and experience to manage the risks associated with their roles • Assist in developing Safe Work Method Statements (SWMS) for all tasks and ensuring the required environmental measures are included and the work is monitored throughout • Ensure site inductions are conducted for all workers and contractors • Undertake environmental related duties as directed by the Project Manager. • Lead by example to promote environmentally sound practices
AGL Corporate Affairs	• Co-ordinate, in the context of standing emergency plans and procedures, a public relations/communication strategy to deal with environmental incidents • Communicate with the public and/or Interested Parties on environmental issues and initiatives.
Liddell Transition Environment Team	• Assist the Manager Environment and Approvals in carrying out their environmental management responsibilities, by: – Providing necessary technical input for environmental decision making – Co-ordinating environmental compliance – Assisting in developing environmental objective and targets and environmental management programs – Liaising with and providing information to the Independent Environmental Auditor
AGLM personnel working on the Development	AGLM personnel working on the development have a role in achieving a standard of environmental performance consistent with the documentation referenced in this EMS, including: • Comply with EMS, including all relevant procedures, sub-plans, processes, operating standards. • Complete environmental inductions and required training

Role	Responsibilities
Key contractor roles/subcontractors	
Project Ecologist	• Undertake pre-clearance surveys • Prepare pre-clearance reports • Rescue and relocate fauna outside the clearing front • Report on fauna relocated prior to clearing
All workers	• Comply with the BMP • Raise environmental issues and hazards • Report all environmental incidents, hazards, non-compliances and near misses in a timely manner • Notify the site supervisor, project manager and environmental officer immediately of any dead or injured animals. Work may need to stop in the area of the find (as advised by the project ecologist)

3.2 Emergency and incident response procedures

In the event of an emergency, the AGLM Emergency Response Management Plan and the AGLM Pollution Incident Response Management Plan (PIRMP) will be followed. As part of the Stage 2 works, project personnel including contractors will be briefed on who to contact in the case of an emergency and the procedures to follow in a range of potential emergency scenarios, including incidents and near misses. At all times, AGLM will have management personnel available to prevent, prepare for, respond to and recover from emergencies.

Immediate action will be taken to control and/or minimise impacts and environmental incidents. This will include:

- immediate control of hazards
- preserving the scene and any evidence required for an investigation
- immediate notification of the incident to the Emergency Response Team and assessment of external assistance requirements

AGLM representatives will:

- stop work activities
- contain and control incidents, as required
- contact local authorities
- notify appropriate personnel as per PRIMP, if required.

Information surrounding all incidents will be provided to AGLM for stakeholder communication, including potentially impacts community members.

3.3 Training and awareness

All employees and subcontractors are required to undertake inductions prior to work. The induction includes biodiversity management relevant to specific to the Stage 2 works.

The inductions will be updated as required. All personnel undertaking work activities involving environmental risks are to receive training targeting the management of these risks, including compliance requirements and environmental management procedures. This includes any management measures outlined in Chapter 5 of this BMP.

3.3.1 Training records

Training records for all personnel and contractors who have completed the induction are managed through Rapid Global, with the records to be stored and retained in accordance with statutory requirements. These records will include:

- records of attendance
- training materials
- records of competency assessments

3.4 Incidents and non-compliances

3.4.1 Definitions

For the purposes of the consent conditions, an incident is defined as an occurrence or set of circumstances that causes or threatens to cause material harm to the environment, and which may or may not be or cause a non-compliance. A non-compliance is defined as an occurrence, set of circumstances or development that is a breach of this consent.

3.4.2 Notifications

In accordance with conditions D4 and D5 of the development consent, DPHI must be notified within 7 days of a non-compliance and 24 hours of an incident occurring. For the purposes of this BMP, this pertains to non-compliance with conditions listed in Table 1.1 and related management measures in Chapter 5 of this BMP.

Non-compliances must be notified to DPHI, in writing, via the NSW planning portal (Major Projects), within 7 days of becoming aware of the non-compliance (consent condition D4). The development (including DA number and name), the relevant condition of consent, and the details why it does not comply, reasons for the non-compliance and actions undertaken or proposed to address the non-compliance, and when the non-compliance will be addressed.

The DPHI must be notified of incidents via the NSW planning portal (Major Projects) within 24 hours of becoming aware of the incident (consent condition D4). The notification must include the date, time, location of the incident. A description of what occurred, why it is classified as an incident, the immediate steps taken and a contact person must also be included in the notification.

In accordance with condition D6, the Applicant must also provide the DPHI with a subsequent incident (Appendix 6 of the consent conditions- incident notification and reporting requirements).

3.5 Reporting

A pre-clearance report will be completed by the project ecologist following assessment of each area to be cleared or dam to be dewatered. The report will include the following, at a minimum:

- the condition of boundary fences near the clearing area to protect no-go zones
- a description vegetation to be cleared and/or dam to be dewatered
- priority weeds, habitat features and soil-borne pathogens for management prior to and during clearing
- the presence of any fauna habitat features including (but not limited to) tree hollows, nests, fallen logs, rocks and other shelter habitats, and fauna likely to be encountered during clearing.

Records will be kept of the results of clearing, including the vegetation cleared or dams dewatered, any fauna captured and relocated, injured/juvenile fauna taken to a wildlife carer and any deceased fauna. The clearing results are to be documented in a post-clearing report following the completion of clearing in each area.

3.6 Revision of environmental management documents

In accordance with consent condition D7, this BMP will be reviewed and, if necessary, revised within three months of the following events:

a) submission of an incident report under conditions D5 or D6

b) submission of a compliance report under conditions D3

c) submissions of an Independent Environmental Audit under condition D1

d) the approval of any modification of the condition of consent (unless the conditions require otherwise)

e) notification of a change in the development phase under condition A10

f) Surrender of existing consents and approvals under condition A12.

The suitability of the existing environmental management measures in this document must be reviewed when triggered. If the review concludes an update is required, or to comply with a directive, revision of the document will occur and be submitted to the Planning Secretary for approval within three months of the review.

4 Biodiversity impacts and risks

4.1 Biodiversity impacts

Biodiversity impacts resulting from Stage 2 works comprise:

- removal of native and exotic vegetation, comprising small areas of native woodland containing five hollow-bearing trees, larger areas of derived native and exotic-dominated grasslands and wetlands
- removal of aquatic breeding and shelter habitat from dewatering and filling of dams and ponds
- fauna injury or fatality during works
- fauna strike / collision from equipment or vehicle during works.

These direct impacts are discussed further in the following sections, relevant to the Stage 2 development.

The development also has potential to result in indirect impacts to retained native vegetation and habitat, outside the Stage 2 development boundary, comprising:

- potential to spread weeds and pathogens
- potential for introduction of pest fauna
- potential for herbicide drift
- potential for noise, vibration, lighting, waste and air pollution impacts to degrade native vegetation or displace native fauna

The detailed measures in Chapter 5 of this BMP are designed to minimise and manage the above biodiversity impacts and risks.

4.2 Plant community type impacts

Stage 2 of the development will directly impact 30.28 (hectares) ha of vegetation, 18.29 ha of which comprises six native plant community type (PCTs) in various condition states, as shown in Table 4.1.

Table 4.1 Vegetation clearing relevant to Stage 2

Plant community type	Associated TECs	Direct impact (ha)
PCT 0 – Cleared and non-native vegetation, including exotic grassland	N/A	11.99
PCT 1071: *Phragmites australis and Typha orientalis coastal freshwater wetlands of the Sydney Basin Bioregion*	N/A	4
PCT 1603: Narrow-leaved Ironbark - Bull Oak - Grey Box shrub - grass open forest of the central and lower Hunter • Mod-good condition • Low condition • Planted/rehabilitated condition • Cleared – derived grassland condition • Rehabilitated grassland condition	• Central Hunter Grey Box—Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions (Mod-Good condition patches only) • Central Hunter Valley Eucalypt Forest and Woodland (Mod-Good condition patches only)	12.68

Plant community type	Associated TECs	Direct impact (ha)
PCT 1604 Narrow-leaved Ironbark - Grey Box - Spotted Gum shrub - grass woodland of the central and lower Hunter • Planted/rehabilitated condition • Moderate condition	• Central Hunter Ironbark—Spotted Gum—Grey Box Forest in the New South Wales North Coast and Sydney Basin Bioregions • Central Hunter Valley Eucalypt Forest and Woodland	0.29
PCT 1692 Bull Oak grassy woodland of the central Hunter Valley	N/A	1.20
PCT 1731 Swamp Oak - Weeping Grass grassy riparian forest of the Hunter Valley	N/A	0.12
Total	-	**30.28**

Two threatened ecological communities (TECs) listed under the New South Wales *Biodiversity Conservation Act 2016* (BC Act) and one TEC listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) will be disturbed by the development. These TECs are listed below:

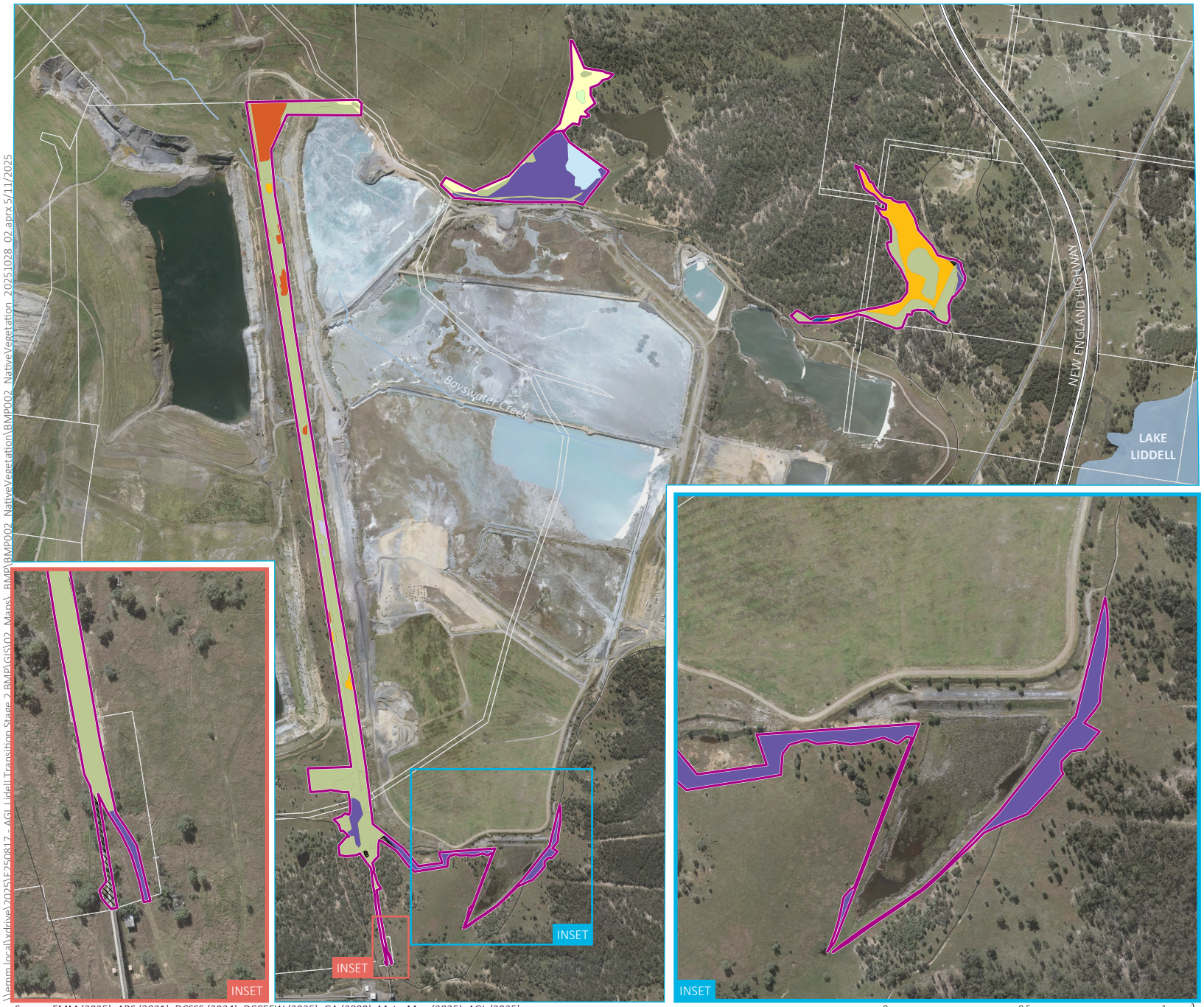
- the BC Act listed endangered ecological community *Central Hunter Ironbark Grey Box — Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions*
- the BC Act, listed endangered ecological community *Central Hunter Ironbark—Spotted Gum—Grey Box Forest in the New South Wales North Coast and Sydney Basin Bioregions*
- the EPBC Act listed critically endangered ecological community *Central Hunter Valley Eucalypt Forest and Woodland.*

Native vegetation and TECs are shown on Figure 4.1.

4.3 Threatened species and habitat

Three threatened fauna species listed under the BC Act and/or EPBC Act were previously recorded in the Stage 2 development area (Kleinfeder 2024), comprising Southern Myotis (*Myotis macropus*), Squirrel Glider (*Petaurus norfolcensis*) and Yellow-bellied Sheathtail Bat (*Saccolaimus flaviventris*) (Figure 4.2). Potential habitat is also present for the Brush-tailed Phascogale (*Phascogale tapoatafa*), Hunter Valley Delma (*Delma vescolineata*) and Pine Donkey Orchid (*Diuris tricolor*).

Habitat features including water features (i.e. seepage dams), dams and open water, nests, hollow logs, log piles and fallen trees are shown on Figure 4.3.



KEY

- Stage 2 boundary

Threatened ecological communities

- Central Hunter Grey Box—Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions (BC Act)/ Central Hunter Valley eucalypt forest and woodland ecological community (EPBC Act)

Native vegetation

- PCT 0 | Non-native
- PCT 1071 | Phragmites australis and Typha orientalis coastal freshwater wetlands of the Sydney Basin Bioregion
- PCT 1604 | Narrow-leaved Ironbark - Grey Box - Spotted Gum shrub - grass woodland of the central and lower Hunter (Moderate Condition)
- PCT 1607 | Blakely's Red Gum - Narrow-leaved Ironbark - Rough-barked Apple shrubby woodland of the upper Hunter (Moderate)
- PCT 1692 | Bull Oak grassy woodland of the central Hunter Valley
- PCT 1731 | Swamp Oak - Weeping Grass grassy riparian forest of the Hunter Valley
- PCT 1603 | Narrow-leaved Ironbark - Bull Oak - Grey Box shrub - grass open forest of the central and lower Hunter
  - Mod-good condition
  - Low condition
  - Planted/rehab
  - Rehab grassland
  - Cleared - derived grassland

Existing environment

- Major road
- Minor road
- Named watercourse
- Named waterbody
- Cadastral boundary

Central Hunter Grey Box—Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions (BC Act)/ Central Hunter Valley eucalypt forest and woodland ecological community (EPBC Act)

Source: EMM (2025); ABS (2021); DCSSS (2024); DCCEEW (2025); GA (2009); MetroMap (2025); AGL (2025)

0 0.5 1 km

GDA2020 MGA Zone 56

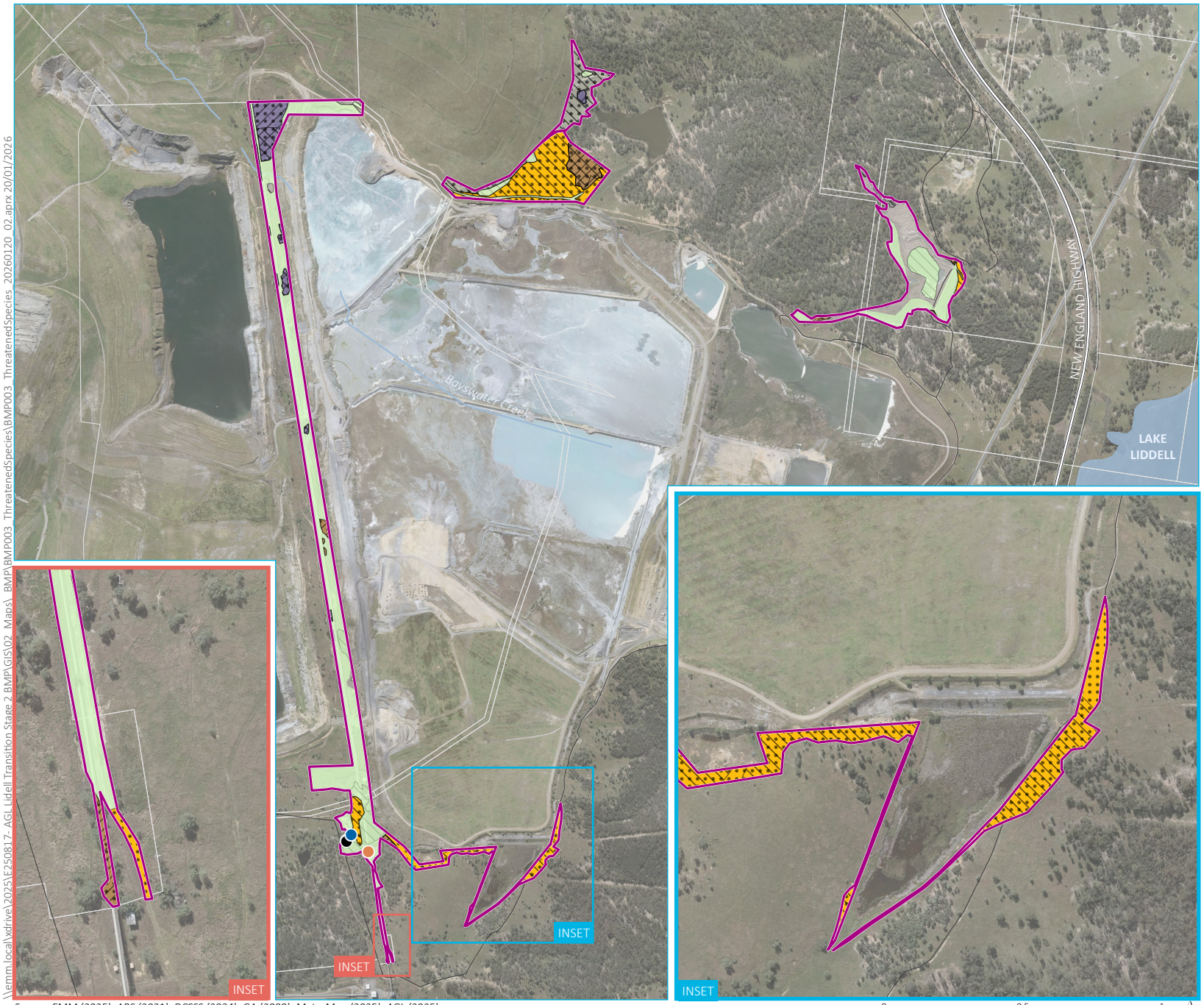
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Native vegetation relevant to Stage 2 works

AGL Liddell Transition
Biodiversity Management Plan
Figure 4.1

EMM creating opportunities

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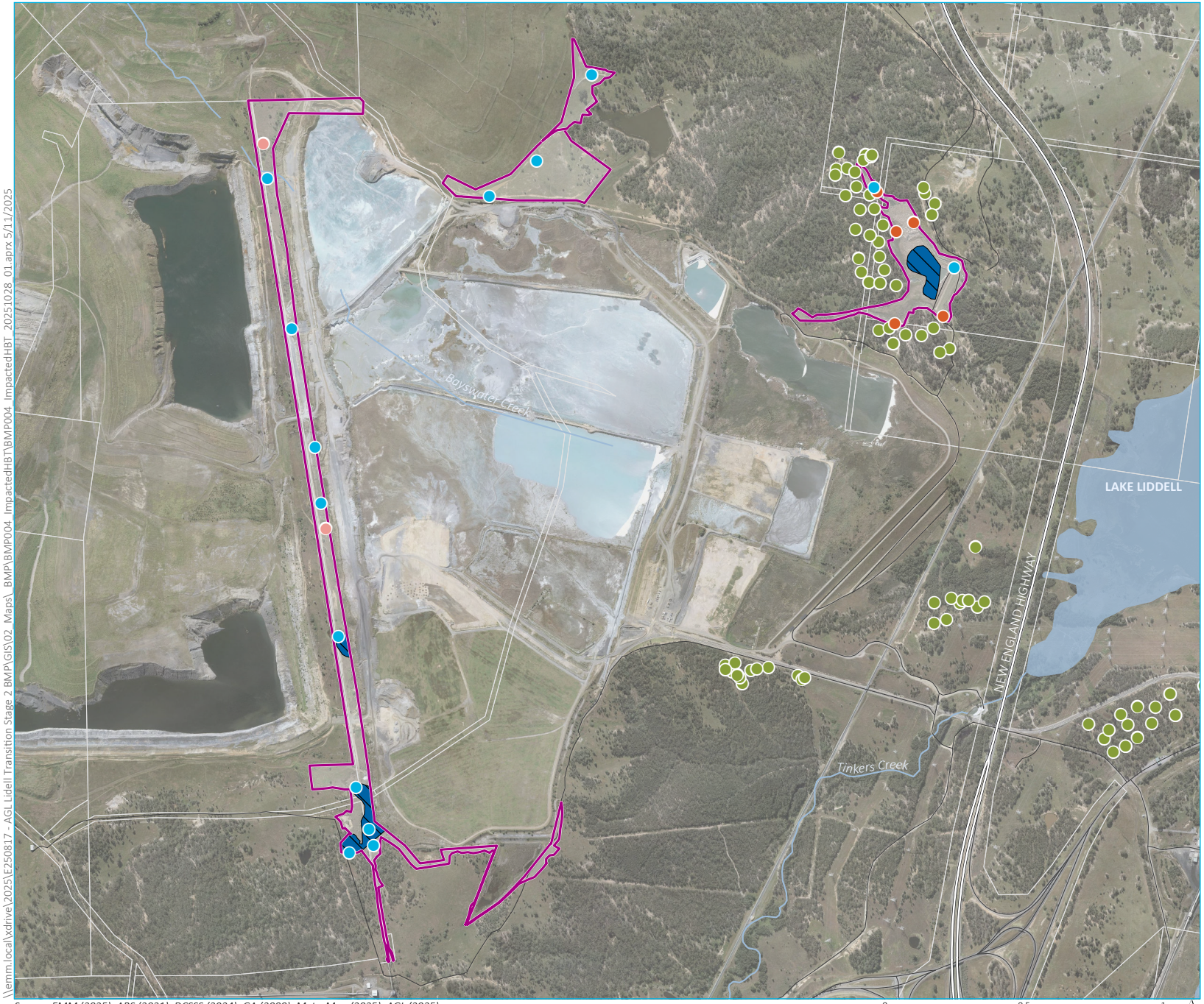
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Source: EMM (2025); ABS (2021); DCSSS (2024); GA (2009); MetroMap (2025); AGL (2025)

Threatened species habitat relevant to Stage 2 works

AGL Liddell Transition
Biodiversity Management Plan
Figure 4.2

EMM
creating opportunities



KEY

- Stage 2 boundary
- Impacted hollow bearing trees
- Potential nest box host trees
- Dams / Open waters

Habitat features

- Nest
- Water feature

Existing environment

- Major road
- Minor road
- Named watercourse
- Named waterbody
- Cadastral boundary

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Source: EMM (2025); ABS (2021); DCSSS (2024); GA (2009); MetroMap (2025); AGL (2025)

0 0.5 1 km

GDA2020 MGA Zone 56

N

Impacted Habitat Features

AGL Liddell Transition
Biodiversity Management Plan
Figure 4.3

EMM
creating opportunities

5 Detailed management measures

5.1 Avoid and minimise vegetation clearing and disturbance

The Liddell Future Use and Enabling Works Biodiversity Development Assessment Report (Kleinfeder 2024) committed to the avoidance of impacts on native vegetation and threatened species habitat. Relevant to this BMP, such impacts will be avoided outside the Stage 2 boundary.

The following measures will be implemented to avoid and minimise vegetation clearing and disturbance:

- Preparation and presentation of site inductions that identify environmental risks for all employees and subcontractors and employees involved in clearing operations. The inductions impress the importance of adherence to clearing limits, restricted entry to 'no go zones' and maintenance of boundary fencing.
- Vehicle and equipment parking areas and stockpile areas have been identified and positioned within the development site. Parking areas will be identified in the site induction.
- Erection and maintenance of exclusion fencing and signage on the Stage 2 boundary. Signage to include wording such as 'No Go Zone'.
- Restriction of construction impacts to within the Stage 2 boundary, with no encroachment of the "No-Go" zones.
- Identification and marking of contaminated soil for disposal to appropriately licenced landfills or onsite areas.
- Identification and delineation of the location of any priority weeds growing within the area to be cleared.
- Identification of the location of any threatened flora species, TECs, threatened species habitat and trees adjacent to creeks and waterways which have been marked or otherwise identified for preservation. These will be recorded on the site map used by the project ecologist to pinpoint the exact locations. This map will made accessible (e.g. printed and shown during Toolbox Talks or Pre-Starts) to all relevant workers in the area so all employees are aware in advance of areas to avoid.
- Confirmation of the marking of exclusion zones, including all trees and areas of vegetation to be retained. Exclusion zones are to be marked using signage and highly visible barrier or tape such as flagging, bunting, nightline or similar material.
- Visual inspection to assess potential for soil borne pathogens to be present.
- A pre-clearance survey within 48 hours of clearing by a suitably qualified ecologist, to check that boundary fences and no-go zones are in place in the area proposed to be cleared, identify the vegetation to be cleared and priority weeds for treatment prior to clearing, record and mark any habitat features requiring management during clearing (see Section 5.2), and undertake a visual inspection for potential soil borne pathogens.
- Completion of a pre-clearing report by a suitably qualified ecologist, which AGLM will keep on file.

5.2 Minimise fauna impacts and management of fauna recovery

During construction and operation of the development, vehicle and plant speed limits will be capped at 40 km/h to minimise the risk of wildlife collisions.

In addition to the pre-clearing survey specified in Section 5.1, specific pre-clearing and clearing procedures have been developed to minimise fauna impacts and manage fauna recovery. Pre-clearance surveys will be undertaken within 48 hours of clearing to identify and inspect habitat features such as dens, roosts, or animal breeding places (nests, hollows, woody debris, etc) where fauna may be encountered during clearing operations, which requires the presence of a suitably qualified ecologist or fauna spotter catcher to safely relocate fauna.

The suitably qualified ecologist or fauna spotter catcher will be present where required during clearing operations (i.e. fauna habitat identified during the pre-clearing survey) and will be appropriately equipped to capture, handle and release small to medium sized mammals, reptiles, amphibians and birds (e.g., calico catch bags, leather gloves, plastic tubs, transport cages etc.).

Clearing will cease when temperatures exceed 35®C and where possible, will be timed to avoid critical parts of breeding seasons for resident fauna. This comprises avoiding clearing of hollow trees between August and February when dependent young are in hollows and grasslands between December and February, where possible.

In addition to the measures in Section 5.1 that will avoid and minimise impacts to native vegetation, the following measures in this BMP are designed to support habitat integrity for insectivorous bats and amphibians:

- Identification of trees for hollow salvage and locations for salvaged hollow installation, as outlined in Section 5.3.1.
- Identification of suitable locations for temporary nest boxes will be identified during the pre-clearing survey to install for the release of unharmed hollow-dependent fauna captured during clearing. Temporary nest boxes must be in place prior to the commencement of clearing hollow trees (Section 5.3.1).
- Hollow-bearing tree clearing procedures, as outlined in Section 5.3.2.
- Minimising herbicide and pesticide use, as outlined in Section 5.4.
- Maximising salvage of vegetative and soil resources, as outlined in Section 5.5.
- Controlling weeds, pests and feral pathogens, as outlined in Section 5.6.

The above measures will support the habitat integrity for insectivorous bats and amphibians by retaining roosting habitat features in the locality and salvaging vegetative and soil resources for storage and use in Stage 3 of the project, when rehabilitation will be undertaken.

Specific procedures will be implemented in areas containing hollow-bearing trees, aquatic habitats and Hunter Valley Delma habitats (Figure 4.2). Procedures for hollow-bearing trees are detailed in Section 5.3, while aquatic and Hunter Valley Delma habitats are detailed in the following sections.

5.2.1 Prior to dam dewatering and habitat clearing

i Procedures to be implemented prior to dam dewatering

Several small seepage dams and some larger dams are present within the Stage 2 boundary that may contain habitat for frogs and other aquatic species (Figure 4.2). Pre-clearance surveys will identify frog habitats and areas where frog fencing would be installed to minimise the number of frogs present in the dam during dewatering, and prevent any frogs rescued during dewatering from re-entering the dam. Frog fences will be checked for integrity during weekly site inspections and necessary repairs performed.

ii Procedures to be implemented prior to clearing in Hunter Valley Delma habitats

The Hunter Valley Delma known only to occur in the Hunter Valley, from Maitland to Muswellbrook in an approximately 25 kilometre (km) corridor. The exotic grassland (PCT 0) within the Stage 2 boundary and the wider LPS, excepting inundated areas near water features and dams, provides habitat for Hunter Valley Delma. During preclearing surveys for the Stage 1 works, the species has typically been observed occupying small burrows under partially embedded rocks around tussock-forming grass species such as Kangaroo Grass (*Themeda triandra*) and spear grasses (*Austrostipa spp*.). As the Hunter Valley Delma is a newly described species, little is known of its habitat preferences. However, given that it is a similar species to the Striped Legless Lizard (*Delma impar*), it is considered likely to occupy similar habitats to the species including soil cracks, spider burrows and underground debris.

The Hunter Valley Delma (*Delma vescolineata*), like all delma species, lacks forelimbs and has reduced hind limbs that appear as small flaps (TSSC 2022). The top of the head is darker than the body with dark streaks or spots beneath the mouth, eyes and ears. Behind both ears, on the sides, the colour may be a slight rusty-yellow colour, with a light brown or gray body. Some individuals have dark flecks and pale light lines along the length of the body and tail with others less prominent. The Hunter Valley Delma can grow up to 25 centimetre (cm) in length, with a white underside.



Photograph 5.1 **Hunter Valley Delma (*Delma vescolineata)* captured and relocated as part of stage one works. Individual captured at the Borrow Pit north of the development footprint (21 August 2025).**



Photograph 5.2 **Hunter Valley Delma (*Delma vescolineata)* captured and relocated as part of stage one works. Individual captured at the Borrow Pit north of the development footprint (21 August 2025).**

Stage 2 works that are to occur within areas mapped as potential Hunter Valley Delma habitat are to be surveyed no greater than 1 week prior to slashing or soil disturbance work. Prior to clearing in Hunter Valley Delma habitat, the following procedure will be followed:

- Suitable relocation sites will be identified prior to clearing. Relocation sites will contain rocks large enough for Hunter Valley Delma to shelter under and soil cracks for temporary shelter when foraging.
- An ecologist/fauna spotter catcher (FSC) will perform a pre-clearing inspection which involves actively searching under semi-submerged rocks, logs, soil cracks and tussock grasses for the presence of the Hunter Valley Delma.
- The pre-clearing inspection would, where safe to do so, require all rocks to be manually flipped, and burrows inspected.
- Captured individuals are to be relocated to areas where the species have previously been found, and to areas that are not to be disturbed as part of the Stage 2 works. Species are not to be held in bags for more than five hours, where possible.

Given that the Hunter Valley Delma and its habitat are poorly understood, data will be recorded from all individuals found during the pre-clearing inspection and relocated and documented in the post-clearing report at the completion of Stage 2 works. This information will be used to guide management and inform future work on the development.

The following information will be recorded from each Hunter Valley Delma encountered:

- length of species (in cm)
- number of species found (if multiple individuals under same rock/habitat feature)
- approximate size of rock/habitat feature species was recorded under
- depth of rock in the soil (in cm)
- aspect/incline of slope found on

- estimate (%) of vegetation cover in one meter radius surrounding where the individual was found
- description of soil type individual was found on
- record additional notes/observations if necessary to provide as much information as possible
- pictures and/or video of individuals and habitat.

5.2.2 During dewatering and habitat clearing

i During any vegetation clearing

The Site Manager Liddell Transition shall ensure that the clearing procedure is followed:

- Monitor the clearing operations daily to ensure proper management and compliance with this procedure.
- Speed limits for vehicles will be capped at 40 km/hr through the work areas to reduce risk of collision with fauna. This will be clearly signed throughout the area.
- A suitably experienced and qualified ecologist will be present during all clearing operations where habitat areas have been identified for target species and where any hollow bearing trees (HBT)s are proposed to be removed.
- Clearing will occur sequentially towards areas of refuge to prevent vegetation islands and allow dispersal of fauna.
- Non-habitat trees, shrubs and groundcover will be cleared first allowing fauna the opportunity to move from the habitat trees.
- Where applicable during works, any trenches that are left open overnight must be checked daily for fauna, with any healthy fauna moved to the pre-determined relocation sites.
- Weed-infested and/or pathogen-impacted topsoil will be stockpiled separately for management in accordance with Section 5.5. All work boots, machinery and equipment should be cleaned prior to entering the development site, and before being transferred to another site, to minimise the risk of transferring soil-borne pathogens, seeds and fungi.

ii During dam dewatering

Where access is deemed safe, an ecologist or fauna spotter catcher will capture and relocate native aquatic fauna to suitable locations (excepting pest fauna, see section 5.6.2).

iii During clearing in Hunter Valley Delma habitat

Hunter Valley Delma found during the pre-clearing surveys in Hunter Valley Delma habitat (Figure 4.2) are to be taken to the pre-determined relocation sites before soil disturbance (Section 5.2.1i). Clearing in Hunter Valley Delma habitat is to be supervised by a fauna spotter catcher, who will:

- inspect the area for any remaining Hunter Valley Delma immediately before soil disturbance
- inspect the disturbed topsoil for any injured or deceased individuals.

iv Injured and juvenile fauna

The following local wildlife organisations will be contacted in the event that injured and/or juvenile animals are require care during pre-clearing or clearing works:

- **Hunter Wildlife Rescue Line**: 0418 628 483 www.hunterwildlife.org.au
- **Wildlife Aid** (Upper Hunter focus covering Singleton, Muswellbrook and Upper Hunter Shires) Rescue Line: 0429 850 089 E-mail: committee@wildlifeaid.org.au

As a courtesy, these organisations would be contacted prior to the commencement of clearing, with donations to contribute to the cost of caring for injured or juvenile fauna requiring care because of clearing operations.

5.3 Minimise impacts to hollow-dependant species

Three of the threatened species with potential habitat within the Stage 2 boundary are hollow dependant species: Southern Myotis, Brush-tailed Phascogale and Squirrel Glider.

The Habitat Relocation Management Plan (Appendix B) identified that five HBTs, comprising one Narrow-leaved Ironbark (*Eucalyptus crebra*) and four dead stags will be cleared during Stage 2 works, as shown in Figure 4.3.

5.3.1 Prior to clearing hollow-bearing trees

Pre-clearing surveys will be undertaken by a suitably qualified ecologist to identify and mark all hollow trees to be removed and assess habitat features (i.e. nests, burrows, fallen timber) for management during clearing. The location of habitat trees will be assessed for safe access, potential access constraints and climb suitability. Arborist-assisted dismantling would only be implemented if deemed safe following a thorough risk assessment by the Project Team. Trees suitable for arborist-assisted dismantling will be identified and marked during the pre-clearing survey. Such trees may include, but are not limited to:

- trees with extensive hollows or large internal voids
- dead stags or structurally compromised trees likely to fracture during mechanical felling
- trees containing nests, dreys or other habitat features within the canopy.

Suitable locations for temporary nest boxes will be identified during the pre-clearing survey to install for the release of unharmed hollow-dependent fauna captured during clearing. Temporary nest boxes must be in place prior to the commencement of clearing hollow trees.

5.3.2 During clearing of hollow-bearing trees

The following clearing procedure will be followed to minimise impacts to hollow-dependent species:

- A suitably experienced and qualified ecologist will be present during all clearing operations where habitat areas have been identified for target species, and where any HBTs are proposed to be removed.
- Non-habitat trees, shrubs and groundcover will be cleared first allowing fauna the opportunity to move from the habitat trees.
- The clearing front will advance towards areas of refuge. This gradual clearing method will provide fauna with the opportunity to self-relocate in advance of the clearing front, reducing the chance of injury, mortality and predation.

- Live habitat trees are to be knocked with an excavator bucket or other machinery on the day prior to clearing, to create enough disturbance for nocturnal fauna to self-relocate from the tree during the evening. The dead stags to be cleared will be assessed prior to clearing to determine if knocking the trees prior to clearing presents a safety risk to plant operator, in which case it would not be undertaken. Excessive knocking of the tree must not take place.

- Where practicable in terms of site conditions and safety constraints, habitat trees will be assessed for climb suitability. If deemed safe to access the habitat trees, an arborist will be engaged to dismantle the habitat features. Where an arborist cannot safely access the tree, the tree will be felled as gently as possible, using a 'slow drop' method to protect the integrity of the tree material around the hollow.

- If nests are identified in trees to be felled at a height that can be safely reached by the ecologist, the nest will be removed and relocated prior to the tree being felled.

- Any hollow fallen timber should be checked for fauna by an ecologist and carefully relocated outside the clearing front to an area which is not to be disturbed as part of the development.

- Felled habitat trees will be immediately inspected for fauna by an ecologist. If fauna is found, the ecologist will capture and identify the species and assess it for injuries. If the captured fauna is observed to be unharmed, it will be released into temporarily installed nest box in suitable nearby habitat. If fauna is observed to be injured, wildlife carers will be called. If the fauna is badly injured and unlikely to survive, the ecologist can humanely euthanise the fauna (e.g. via cervical dislocation).

- Felled habitat trees will be left in situ for 24 hours after felling to allow any remaining fauna to self-relocate. Where possible, felled trees will be re-positioned such that hollows face upwards, allowing fauna to escape.

- Any microbats captured during diurnal or nocturnal inspections would be housed in small cloth bags and either housed in a quiet location during the day for nocturnal release or released into bat boxes. The release technique will be at the discretion of the project ecologist, and in accordance with the handling and release techniques specified in the Microbat Management Plan (Appendix C).

The post-clearing report will document the installation, maintenance and monitoring of relocated hollows and nest boxes.

5.4 Minimise pesticide and herbicide use

Chemical control of weeds such as herbicides should only be used if necessary. To limit the use of herbicides, measures will be taken to reduce the spread of weeds during Stage 2 works. Any priority weeds (high threat weeds and weeds of national significance) cleared during vegetation clearance, including any affected topsoil, will be disposed in a manner that prevents spread, as required by the *Biosecurity Act 2015*. Vehicle and machinery hygiene protocols will also be identified and upheld to reduce the spread of these weeds throughout the site, discussed further in Section 5.6.1.

Manual control methods are preferred and should be used instead of chemical controls where possible. Where chemical controls are necessary, it is recommended that targeted application methods or spot spraying be used to limit the amount of pesticides and herbicides used and area affected.

The *Pesticides Act 1999* and Pesticides Regulation 2017 govern the use, storage and record keeping requirements of pesticides. All pesticides must be registered with the Australian Pesticides and Veterinary Medicines Authority (APVMA) before use.

AGLM's Vegetation Management Strategy contains further information on the range of weed species that occur along with the recommended methods of control and management and should be consulted for further information.

Use of pesticides are not proposed.

5.5 Maximise salvage of vegetative and soil resources for beneficial re-use

Where possible, vegetative and soil resources within the disturbance area will be salvaged for beneficial reuse in the enhancement of rehabilitation. Habitat features such as sections of felled trees containing hollows, logs, coarse woody debris and bush rock should be salvaged and stored outside the Stage 2 boundary for later use in rehabilitation, during Stage 3 works.

Where possible, trees will be felled in a manner to preserve hollow features, and if suitable they will be inspected and marked by ecologist for reuse. Salvaged hollows will be stockpiled separately, and a contractor experienced in hollow salvage should be employed to repurpose, seal and brace hollows to be put back on site in accordance with the approved Habitat Relocation Management Plan (Appendix B).

If existing tree hollows cannot be relocated (e.g. damaged by clearing activities) artificial nest boxes will be installed at 4:1 ratio to those lost as specified in the BDAR and in accordance with the Habitat Relocation Management Plan (Appendix B). These nest boxes should be targeted towards the requirements of the threatened species. Where possible, the nest box design should match the original hollow type. Figure 4.2 shows the locations of potential trees for hollow/nest box relocation, as identified in previous ecological surveys. The salvaged hollows/nest boxes should be placed in locations close to the area of the original hollow.

Topsoil is an important source of seeds and can be used to successfully revegetate after disturbances like bulk earthworks. Topsoil will be stockpiled, where appropriate, for reuse in accordance with Managing Urban Stormwater: Soils and construction – Volume 1. Stockpiles should be no more than 2 m high, and should not be compacted, to maximise viability of the native seedbank. Mulched vegetation which is free of weeds will also be stockpiled for use in rehabilitation in Stage 3 and/or used for erosion and sediment control.

5.6 Control weeds, feral pests and pathogens

5.6.1 Weed management

Construction activities associated with Stage 2 works has the potential to spread weed species both within and beyond the development area. Several priority weeds for the Hunter Local Land Services Region were recorded in the Liddell Future Land Use and Enabling Works BDAR (Kleinfeder 2024), comprising Coastal Galenia (*Galenia pubescens*), Fireweed (*Senecio madagascariensis*), Tiger Pear (*Opuntia aurantica*), African Lovegrass (*Eragrostis curvula*), Coolatai Grass (*Hyparrhenia hirta*), African Boxthorn (*Lycium ferocissimum*) and Lantana (*Lantana camara*).

Weed management will be necessary during Stage 2 works and in the year following completion of the works, with subsequent weed control managed by AGLM's Vegetation Management Strategy. Priority weeds will be identified during pre-clearance surveys by a suitably qualified ecologist reported in the pre-clearance survey report.

Where identified, priority weeds will be controlled in accordance with the methods identified on the 'NSW WeedWise' website (Department of Primary Industries 2025a) and control will be undertaken by appropriately accredited weed contractors (eg AQF3 accreditation).

Where feasible, any priority weeds cleared during vegetation clearance, including any affected topsoil, will be disposed of at a waste management facility licensed to handle, bury, or process organic waste, as required by the *Biosecurity Act 2015*.. Where soil is not taken offsite, all weed affected topsoil is to be stockpiled, monitored and treated with herbicide.

Vehicle and machinery hygiene protocols will be implemented to reduce the spread of weeds throughout the site. Information on the wash down procedures can be found in the NSW Department of Primary Industries and Regional Development Management Guide: Vehicle and Machinery Clean Down Procedures (https://www.dpi.nsw.gov.au/__data/assets/pdf_file/0018/1631322/DPIRD-Vehicle-and-Machinery-Clean-Down-Procedures-9.5.25.pdf).

5.6.2 Pest fauna

Pest animals including foxes and feral pigs can be opportunistically attracted to construction sites through lack of hygiene (waste) as well as habitat disturbance and displaced native fauna. Management includes hygiene practices to ensure waste products are appropriately captured and treated, and exclusion fencing. A feral animal baiting program is conducted across the wider AGL properties and is scheduled in coordination with the Local Land Services (LLS) baiting program. The baiting program should target red foxes and feral cats using Sodium fluoroacetate laced baits (1080) which can be supplied by the LLS Control Officer. Evidence of any feral pig activity is to be provided to AGLM for consideration of management options. Pest fish species encountered during dam dewatering will be humanely euthanised.

5.6.3 Pathogens

To minimise the spread of pathogens affecting plant species (e.g. *Phytophthora cinnamomi, Pucciniales spp.*), all plant and equipment coming on to site must be declared free of organic matter including mud, vegetation and seeds via a documented inspection, with records kept and included in the development's annual report.

To minimise the spread of pathogens affecting fauna (e.g. Chytrid fungus, affecting frog species), all personnel undertaking in-water work will ensure that decontamination processes are followed in accordance with relevant guidelines including *Hygiene protocols for the control of diseases in Australian frogs* (https://www.dcceew.gov.au/environment/invasive-species/publications/hygiene-protocols-control-diseases-australian-frogs). All frogs will be handled in accordance with the above guideline.

Equipment that interacts with dam water or sediments, such as boots, nets and vehicle tyres, will be cleaned with an appropriate cleaning solution and/or disinfectant. Disposable gloves will be worn when handling aquatic flora and fauna.

5.7 Unexpected threatened species or ecological community discovery

If any threatened species or threatened ecological community is unexpectedly encountered during construction activities, the below procedure will be followed:

1. If threatened flora, fauna or TECs are unexpectedly encountered, stop all work in that location.
2. Notify the ecologist immediately.
3. As required, the project ecologist will conduct an assessment of significance of likely impact and develop management options.
4. If the project ecologist identifies that an impact is not likely to occur to the threatened species, then recommence works and maintain regular inspections of the area where the threatened species was found.
5. If the project ecologist identifies that an impact is likely to occur to the threatened species, consult with the following relevant agencies as required: AGLM, CPHR (a credit liability may be required), Commonwealth DCCEEW (for an MNES) and DPHI.
6. Review BDAR, BMP and approval conditions, and obtain any necessary approvals, permits or licenses.

7. Recommence works in accordance with any new mitigation measures and/or approvals.

8. Include species locations and protocols in subsequent inductions and toolbox talks.

5.8 Temporary soil stabilisation

Schedule 1 of the development consent defines rehabilitation as the treatment or management of disturbed land or water for the purpose of establishing a safe and stable environment. Given the long history of the site, pre-existing conditions are not known, and the large amount of ash and other materials deposited on the site do not allow 'pre-existing' landforms to be returned to the site. Rehabilitation therefore has the following aims:

- Return the site to a stable landform in disturbed areas.
- Provide a long lasting and non-invasive vegetative cover which allows the continued management of the site.
- Rehabilitate areas outside of continuous management areas to native bushland areas (where bordering on existing native vegetation) or grazing land (where these areas currently occur).
- Control priority weeds across the site.

Following the completion of capping and landform shaping across the site, the following broad actions will be undertaken to temporarily stabilise soils, until such time as full rehabilitation occurs in Stage 3:

- Establish a topsoil or topsoil substitute across shaped areas.
- Establish vegetative growth via seeding and planting.
- Monitor rehabilitated areas for erosion, growth and weeds.
- Maintain areas by slashing, mowing and weed control.

6 Biodiversity work plan

This chapter consolidates the biodiversity management actions, timing, responsibility and performance measures to be implemented while undertaking activities associated with the Stage 2 works.

Table 6.1 Biodiversity work plan

Biodiversity safeguards	Reference	Management action	Timing	Responsibility	Performance measures
Beneficial re-use and soil stabilisation	BRSS1	Habitat features such as sections of felled trees containing hollows, logs, coarse woody debris and bush rock should be salvaged and stored outside the Stage 2 boundary for later use in rehabilitation, during Stage 3 works.	During clearing and maintained until Stage 3 rehabilitation	Liddell Transition Environment Team	Salvaged habitat features stored in a safe area and retain habitat features, for use in rehabilitation during Stage 3.
	BRSS2	Salvaged hollows will be stockpiled separately, and a contractor experienced in hollow salvage should be employed to repurpose, seal and brace hollows to be put back on site in accordance with the approved Habitat Relocation Management Plan (Appendix B).	During clearing and maintained until Stage 3 rehabilitation	Liddell Transition Environment Team	
	BRSS3	If existing tree hollows cannot be relocated (e.g. damaged by clearing activities) artificial nest boxes will be installed at 4:1 ratio to those lost as specified in the BDAR and in accordance with the Habitat Relocation Management Plan (Appendix B).	During clearing and maintained until Stage 3 rehabilitation	Liddell Transition Environment Team	
	BRSS4	Topsoil will be stockpiled, where appropriate, for reuse in accordance with Section 5.5.	During clearing and maintained until Stage 3 rehabilitation	Liddell Transition Environment Team	
	BRSS5	Following the completion of capping and landform shaping across the site, the actions in Section 5.8 will be undertaken to temporarily stabilise soils.	Completion of capping and landform shaping	Liddell Transition Environment Team	Soils remain stable for use in closure in Stage 3.
Clearing limits	CL1	Site inductions will be held that identify environmental risks for all employees and subcontractors and employees involved in clearing operations. The inductions would impress the importance of adherence to clearing limits, restricted entry to 'no go zones' and maintenance of boundary fencing.	Prior to site access and ongoing during Stage 2 works	Manager Health and Safety Site Transition	No inadvertent vegetation clearing/damage outside Stage 2 boundary

Biodiversity safeguards	Reference	Management action	Timing	Responsibility	Performance measures
	CL2	The location of any threatened flora species, TECs, threatened species habitat and trees adjacent to creeks and waterways which have been marked or otherwise identified for preservation will be recorded on the site map. This map will be made accessible (e.g. printed and shown during Toolbox Talks or Pre-Starts) to all relevant workers in the area so all employees are aware in advance of areas to avoid.	For the duration of Stage 2 works	Liddell Transition Environment Team	
	CL3	Vehicle and equipment parking areas and stockpile areas are to be identified and positioned within the development site. Parking areas will be identified in the site induction.	Prior to commencement of Stage 2 works	Liddell Transition Environment Team	
	CL4	Construction impacts will be restricted to within the Stage 2 boundary.	Ongoing during Stage 2 works	Liddell Transition Environment Team	
	CL5	Exclusion fencing and signage will be erected and maintained on the Stage 2 boundary, including all trees and areas of vegetation to be retained. Signage will include wording such as 'Environmental Protection Area - No Go Zone'. Exclusion zones will be marked using signage and highly visible barrier or tape such as flagging, bunting, nightline or similar material.	Prior to commencement of Stage 2 works. Exclusion fencing and signage will be checked weekly, with repairs/replacement actioned immediately.	Liddell Transition Environment Team	
Clearing procedures	CP1	A pre-clearance survey within 48 hours of clearing by a suitably qualified ecologist, to check that boundary fences and no-go zones are in place in the area proposed to be cleared, identify the vegetation to be cleared and priority weeds for treatment prior to clearing, dens, roosts, or animal breeding places (nests, hollows, woody debris, etc) where fauna may be encountered during clearing operations, which requires the presence of a suitably qualified ecologist or fauna spotter catcher to safely relocate fauna and undertake a visual inspection for potential soil borne pathogens.	Within 48 hours of clearing, in each area to be cleared.	Liddell Transition Environment Team, Project Ecologist	Pre-clearing report completed prior to commencement of each clearing front and kept on file.

Biodiversity safeguards	Reference	Management action	Timing	Responsibility	Performance measures
	CP2	If any threatened species or threatened ecological community is unexpectedly encountered during construction activities, the procedure in Section 5.7 will be followed.	During pre-clearing and clearing works	Liddell Transition Environment Team, Project Ecologist	No clearing any unexpected threatened biodiversity
	CP3	The local wildlife organisations in Section 5.2.2 will be contacted if juvenile and/or injured animals require care during pre-clearing or clearing works.	During pre-clearing and clearing works	Liddell Transition Environment Team, Project Ecologist	Minimise mortality of fauna during clearing
	CP4	Pre-clearance surveys will identify frog habitats and areas where frog fencing would be installed to minimise the number of frogs present in the dam during dewatering, and prevent any frogs rescued during dewatering from re-entering the dam. Frog fences will be checked for integrity during weekly site inspections and necessary repairs performed.	Within 48 hours of dam dewatering, and weekly frog fence inspections.	Liddell Transition Environment Team, Project Ecologist	
	CP5	Prior to clearing in Hunter Valley Delma habitat, the procedure in Section 5.2.1 will be followed.	Prior to clearing	Liddell Transition Environment Team, Project Ecologist	
	CP6	Prior to clearing hollow-bearing trees, the procedure in Section 5.3.1 will be followed.			
	CP7	A pre-clearing report will be completed by a suitably qualified ecologist, which AGLM will keep on file.	Within one week of pre-clearing survey	Liddell Transition Environment Team, Project Ecologist	
	CP8	The Site Manager Liddell Transition shall ensure that the clearing procedures in Section 5.2.2 (i) to (iii) are followed.	During each clearing campaign	Liddell Transition Environment Team, Project Ecologist	
	CP9	The suitably qualified ecologist or fauna spotter catcher will be present where required during clearing operations (i.e. fauna habitat identified during the pre-clearing survey) and will be appropriately equipped to capture, handle and release small to medium sized mammals, reptiles, amphibians and birds (e.g., calico catch bags, leather gloves, plastic tubs, transport cages etc.).	During each clearing campaign	Liddell Transition Environment Team, Project Ecologist	Fauna is safely relocated or taken into care where necessary. Post-clearing report that confirms attendance by suitably qualified ecologist or fauna.

Biodiversity safeguards	Reference	Management action	Timing	Responsibility	Performance measures
	CP10	During clearing of hollow-bearing trees, the procedure in Section 5.3.2 will be followed.	During clearing of hollow-bearing trees	Liddell Transition Environment Team, Project Ecologist	Fauna is safely relocated into temporary nest boxes or taken into care where necessary. Post-clearing report that confirms attendance by suitably qualified ecologist or fauna.
	CP11	Clearing will cease when temperatures exceed 35®C and where possible, will be timed to avoid critical parts of breeding seasons for resident fauna. This comprises avoiding clearing of hollow trees between August and February when dependent young are in hollows and grasslands between December and February, where possible.	During clearing	Liddell Transition Environment Team, Project Ecologist	Minimise mortality of fauna during clearing
General	GEN1	During construction and operation of the development, vehicle and plant speed limits will be capped at 40km/h to minimise the risk of wildlife collisions.	For the duration of Stage 2 works	Stage 2 Liddell Ash Dam Superintendent	Wildlife collision risk is reduced
Introduced species, pathogens and contaminants	ISPC1	Contaminated soil will be identified and marked for disposal to appropriately licenced landfills or onsite areas.	Prior to clearing	Liddell Transition Environment Team	No contamination incidents that would adversely affect biodiversity values
	ISPC2	To minimise the spread of pathogens affecting plant species (e.g. *Phytophthora cinnamomi, Pucciniales spp.*), all plant and equipment coming on to site must be declared free of organic matter including mud, vegetation and seeds via a documented inspection, with records kept and included in the development's annual report.	Prior to site entry	Liddell Transition Environment Team	No new pathogens are introduced to site and records are kept of vehicle wash down events
	ISPC3	To minimise the spread of pathogens (e.g. Chytrid fungus, affecting frog species), all personnel undertaking in-water work will ensure that decontamination processes are followed in accordance with *Hygiene protocols for the control of diseases in Australian frogs*	Prior to site entry	Liddell Transition Environment Team	
	ISPC4	Equipment that interacts with dam water or sediments, such as boots, nets and vehicle tyres, will be cleaned with an appropriate cleaning solution and/or disinfectant. Disposable gloves will be worn when handling aquatic flora and fauna.	Prior to site entry	Liddell Transition Environment Team	

Biodiversity safeguards	Reference	Management action	Timing	Responsibility	Performance measures
	ISPC5	Manual control methods are preferred and should be used instead of chemical controls where possible. Where chemical controls are necessary, it is recommended that targeted application methods or spot spraying be used to limit the amount of pesticides and herbicides used and area affected.	Prior to clearing	Liddell Transition Environment Team	No adverse effects related to herbicide application
	ISPC6	Priority weeds will be identified during pre-clearance surveys by a suitably qualified ecologist reported in the pre-clearance survey report.	Prior to clearing	Liddell Transition Environment Team	Priority weed spread is prevented and records are kept of weed control events
Introduced species, pathogens and contaminants	ISPC7	Priority weeds will be controlled in accordance with the methods identified on the 'NSW WeedWise' website (Department of Primary Industries 2025a) and control will be undertaken by appropriately accredited weed contractors (e.g. AQF3 accreditation).	During Stage 2 works and the year following its completion	Liddell Transition Environment Team	Priority weed spread is prevented and records are kept of weed control events
	ISPC8	Priority weeds cleared during vegetation clearance, including any affected topsoil, will be disposed of in a manner that prevents spread. Where possible, priority weeds will be disposed of at a waste management facility licensed to handle, bury, or process organic waste, as required by the *Biosecurity Act 2015* . Where soil is not taken offsite, all weed affected topsoil is to be stockpiled, monitored and treated with herbicide.	Prior to clearing	Liddell Transition Environment Team	
	ISPC9	To minimise the spread of weeds and pathogens, vehicle and machinery hygiene protocols will be implemented NSW Department of Primary Industries and Regional Development Management Guide: Vehicle and Machinery Clean Down Procedures	Prior to site entry	Liddell Transition Environment Team	
	ISPC10	A feral animal baiting program is conducted across the wider AGL properties will be conducted in accordance with Section 5.6.2	Ongoing during Stage 2 works	Liddell Transition Environment Team	Introduced fauna spread is prevented, and records are kept of control events
	ISPC11	Pest fish species encountered during dam dewatering will be humanely euthanised.	Ongoing during Stage 2 works	Liddell Transition Environment Team	

7 References

AGLM Emergency Response Management Plan

AGLM Pollution Incident Response Management Plan

AGLM Vegetation Management Strategy

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Appendix A

Planning Secretary endorsement of authors and Consultation

EMM
creating opportunities

Department of Planning, Housing & Infrastructure

Our ref: SSD-24937520-PA-32

Matthew Parkinson
Manager Environment and Approvals
AGL Macquarie Pty Ltd
New England Highway
Muswellbrook, NSW, 2333

16/10/2025

Subject: Appointment of experts for Biodiversity Management Plan

Dear Mr Parkinson,

I refer to your request dated 1 October 2025 for the Planning Secretary's endorsement of Katie Diver and Candace Lim as suitably qualified and experienced persons under Part B, condition B32 of the consent for the Liddell Future Land Use and Enabling Works (SSD-24937520).

The Department has reviewed the nominations and information you have provided and is satisfied that Katie Diver and Candace Lim are suitably qualified and experienced for the purposes of preparing the Biodiversity Management Plan. Accordingly, I can advise that the Planning Secretary endorses the appointment of Katie Diver and Candace Lim as suitably qualified and experienced persons under Part B, condition B32 of SSD-24937520.

If you wish to discuss the matter further, please contact Kiera Plumridge at kiera.plumridge@dpie.nsw.gov.au.

Yours sincerely,

Jack Turner
Team Leader
Resource Assessments

As nominee of the Planning Secretary

Department of Planning, Housing and Infrastructure

Reference: SSD-24937520-PA-46

Matthew Parkinson
Manager Environment and Approvals
AGL MACQUARIE PTY LIMITED
New England Highway
Muswellbrook, NSW, 2333

01/05/2026

Liddell Future Landuse Project - Biodiversity Management Plan (BMP)

Dear Mr Parkinson

Thank you for submitting the BMP as required by Schedule 2, Condition B32 of Liddell Future Landuse as modified (the consent) to the NSW Department of Planning, Housing and Infrastructure (the Department).

The Department has reviewed the BMP and considers more information is required to satisfy the condition of consent. Under the provisions of Schedule 2, Condition A4 of the consent, I, as nominee of the Planning Secretary, request that an amended BMP be submitted as a response to this request for information (RFI-119182738) addressing the below points by no later than 5:00pm on 22 May 2026 (or as otherwise agreed by the Planning Secretary).

Should you wish to discuss the matter further, please contact Charissa Pillay, (Senior Planning Officer) on 02 9995 5944 or email charissa.pillay@planning.nsw.gov.au.

Yours sincerely



Wayne Jones
Team Leader - Post Approval
Resource Assessments

As nominee of the Planning Secretary

Document: “Biodiversity Management Plan Liddell Future Land Use and Enabling Works Project” prepared by EMM
Revision: Issue V3 March 2026
Reviewed: Charissa Pillay – April 2026

B32. Biodiversity Management Plan	Sufficient (Yes/No/Partial)	DPHI Comment	CPHR Comment	EMM addressed
(a) be submitted to the Planning Secretary for approval prior to the commencement of construction;				
(b) be prepared:				
(i) by a suitably qualified and experienced person/s whose appointment has been endorsed by the Planning Secretary;	-	-	-	
(ii) in consultation with CPHR;	Yes	Letter dated 16 March 2026	-	
(iii) in accordance with the Biodiversity Assessment Method and be consistent with the avoid and minimise commitments in the Biodiversity Development Assessment Report for the development (dated 22 October 2024); and	Yes	Table 2.1 and section 5 address the requirement.	-	
(iv) with reference to any relevant biodiversity management plan guidance material provided by CPHR;	Yes	Previous comments provided by CPHR on the Liddell Future Works and Enabling Project Biodiversity Management Plan Stage 1 have been considered in the preparation of this Stage 2 BMP. CPHR has Minimising impacts to hollow-dependant species Section 5.3 of the BMP states that trees will be pushed over using an excavator via a slow-drop method. As noted in our advice on the Stage 1 BMP, CPHR considers that the best-practice method for clearing certain habitat trees is via dismantling by a climbing arborist. This method allows for tree sections containing habitat features to be lowered to the ground in a controlled manner and reduces the risk of injury to fauna. CPHR requires that candidate trees for arborist-assisted dismantling are identified during the habitat tree marking and pre-clearing assessment. These trees may include, but are not limited to: • trees with extensive hollows or large internal voids • dead stags or structurally compromised trees likely to fracture during mechanical felling • trees containing nests, dreys or other habitat features within the canopy. Additionally, the BMP notes that unharmed fauna captured during clearing will be released into nearby suitable habitat. For hollow-dependent fauna, CPHR recommends	Closed	-

Document: "Biodiversity Management Plan Liddell Future Land Use and Enabling Works Project" prepared by EMM
Revision: Issue V3 March 2026
Reviewed: Charissa Pillay – April 2026

		release into a temporarily installed nestbox within nearby suitable habitat. This approach provides relocated fauna with secure refuge until individuals can relocate naturally. Rehabilitation works Section 5.8 of the BMP states that temporary rehabilitation works will be undertaken during Stage 2 to stabilise landforms and manage priority weeds, with full rehabilitation to occur in Stage 3 following capping and post-construction landform shaping.		
(c) support the enhancement and composition of any threatened ecological community found within the approved development area including, the Central Hunter Grey Box – Ironbark Woodland;	Yes	Weed control measures for avoidance areas are provided in Section 5.7. Section 5.6 provides measures to improve native vegetation quality.	Addressed	-
(d) implement measures to minimise the use of pesticides and herbicides within the approved development area;	Yes	Measures are provided in Section 5.4.	Addressed	-
(e) support the integrity of habitat for insectivorous bat and amphibian species;	No	Measures provided in Section 5 do not describe the measures to support the integrity of habitat for insectivorous bat and amphibian species	Include a discussion on how the project supports the integrity of habitat for insectivorous bat and amphibian species	Measures are provided in Section 5.2 for the protection of these taxa.
(f) incorporate salt tolerant species as part of the saline discharge rehabilitation works associated with the Liddell Ash Dam as outlined in the Statement of Environmental Effects prepared by Coffey Environments and dated 18 July 2011;	Partial	**Proponent response**: Temporary stabilisation will occur during Stage 2 to stabilise soils until rehabilitation works in Stage 3. Rehabilitation will be undertaken as part of Stage 3 works (Table 1.1). Accordingly, these rehabilitation measures will be detailed in the Stage 3 BMP and revision of the Land Closure and Rehabilitation Plan. **DPHI Response**: What salt tolerate species has been investigated? What measures will be implemented in Stage 2 to temporary stabilise soils?	Discuss the salt tolerate species to be discussed in Stage 3 and discuss the current temporary measures for Stage 2.	Temporary stabilisation will occur during Stage 2 to stabilise soils until rehabilitation works in Stage 3 (Section 5.8). Rehabilitation will be undertaken as part of Stage 3 works (Table 1.1). Accordingly, salt-tolerant species will be incorporated into the rehabilitation measures, to be detailed in the Stage 3 BMP and revision of the Land Closure and Rehabilitation Plan.
(g) include a description of measures and timeframes that would be implemented to:				
(i) minimise clearing and avoiding unnecessary disturbance of vegetation by the development;	Yes	Measures are documented in Section 5.1.	Addressed	-
(ii) minimise impacts on fauna, and implementing fauna recovery and management protocols;	Yes	Measures are documented in Section 5.2.	Addressed	-
(iii) maximise the salvage of vegetative and soil resources within the approved disturbance area for beneficial reuse in the enhancement of rehabilitation of the approved development area;	Yes	Measures are documented in Section 5.3.	Addressed	-

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(iv) control weeds, feral pests, and pathogens;	Yes	Measures are documented in Section 5.6.	Addressed	-
(v) manage any incidental threatened species discovered within the approved development area during construction, operation, upgrading or decommissioning of the development, including a protocol to identify the avoid and/or minimise and/or offset options to be implemented if additional threatened species are discovered within the approved development area; and	Yes	Measures are documented in section 5.7	Addressed	-
(vi) retain, rehabilitate or restore vegetation connectivity and provide habitat for threatened species such as the squirrel glider.	Partial	Measures are documented in Section 5.1 to retain habitat in areas outside the Stage 2 footprint. Rehabilitation will be undertaken as part of Stage 3 works (Table 1.1). Accordingly, these rehabilitation measures will be detailed in the Stage 3 BMP and revision of the Land Closure and Rehabilitation Plan. DPHI Response- Its unclear in section 5.1 how the project will restore vegetation connectivity	Discuss how the project in Stage 2 will restore vegetation connectivity	As the works for Stage 2 chiefly relate to dam dewatering and rehabilitation is planned to be undertaken during Stage 3 (Table 1.1), the measures in this Stage 2 BMP have focused on retention of habitat connectivity, by restricting works to the Stage 2 footprint and protecting adjacent retained native vegetation. Rehabilitation measures, including those that rehabilitate and restore connectivity for threatened species such as the Squirrel Glider, will be detailed in the Stage 3 BMP and revision of the Land Closure and Rehabilitation Plan.
B33 Construction must not commence until the biodiversity management plan is approved by the Planning Secretary	No	Stage 2 works would commence following approval of this plan by the Planning Secretary.	DPHI – Include the commitment in the BMP	Section 1.3
B34 The biodiversity management plan, as approved by the Planning Secretary, must be implemented for the development	No	This plan would be implemented for the duration of the Stage 2 works.	Include the commitment in the BMP	Addressed in section 1.3 Objective – AGLM are committed to implementing the management measures identified in this BMP for the duration of Stage 2 works.
Compliance **Non-compliance notification** D4. Within seven days of becoming aware of a non-compliance, the Applicant must notify the Department of the non-compliance. The notification must: (a) be in writing; (b) submitted via the NSW planning portal (Major Projects); (c) identify the development (including the development application number and name); (d) set out the condition of this	No	The condition not included in the BMP	Include the condition in the BMP	Section 3.4.2 Added specifics.

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consent that the development is non-compliant with; (e) why it does not comply; (f) the reasons for the non-compliance (if known); and (g) what actions have been undertaken, or will be undertaken; and when, to address the non-compliance.				
Incident notification D5. The Applicant must notify the Department within 24 hours of becoming aware of an incident. The notification must be made via the NSW planning portal (Major Projects) and address details of the incident including: (a) date, time and location; (b) a brief description of what occurred and why it has been classified as an incident; (c) a description of what immediate steps were taken in relation to the incident; and (d) identifying a contact person for further communication regarding the incident.	No	The BMP does not include the condition	Include D5 into the BMP	Section 3.4.2
D6. The Applicant must provide the Department with a subsequent incident report in accordance with Appendix 6 (Incident Notification and Reporting Requirements).	No	The BMP does not include the condition	Include D6 into the BMP	Section 3.4.2
Revision of environmental management documents D7. Within three months of the following events: (a) the submission of an incident report under conditions D5 or D6; (b) (b) the submission of a compliance report under condition D3; (c) the submission of an Independent Environmental Audit under condition D1; (d) the approval of any modification of the conditions of this consent (unless the conditions require otherwise); or (e) notification of a change in the development phase under condition A10;	No	The BMP does not include the condition	Include D7 into the condition	Section 3.6

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(f) surrender of existing consents and approvals under condition A12. The suitability of the existing environmental management documents required under this consent must be reviewed. If the review concludes an update to an environmental management document is required, or to comply with a directive, the relevant environmental management document must be revised and submitted to the Planning Secretary for approval within three months of the review.				

Department of Climate Change, Energy, the Environment and Water

Your ref: PAE-106997956
Our ref: DOC26/118532

David Bone
Associate Director Environmental Management & Delivery
EMM Consulting Pty Ltd
dbone@emmconsulting.com.au

Dear David

Liddell Future Land Use and Enabling Works Stage 2 – Biodiversity Management Plan

Thank you for your Major Projects Portal request dated 20 February 2026 seeking advice from the Conservation Programs, Heritage & Regulation Group (CPHR) of the NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW) on the Biodiversity Management Plan (BMP) for the Liddell Future Land Use and Enabling Works Project - Stage 2.

CPHR has reviewed the draft Stage 2 BMP and considers that most of our previous advice on the Stage 1 BMP, dated 11 July 2025 (see DOC25/375239-2), has been appropriately incorporated.

We commend the EMM team for preparing a thorough and well-documented plan that clearly identifies the biodiversity values within the project area and outlines suitable controls to minimise and mitigate impacts during clearing and construction.

Please ensure you address the following two outstanding requirements:

Minimising impacts to hollow-dependant species
Section 5.3 of the BMP states that trees will be pushed over using an excavator via a slow-drop method. As noted in our advice on the Stage 1 BMP, CPHR considers that the best-practice method for clearing certain habitat trees is via dismantling by a climbing arborist. This method allows for tree sections containing habitat features to be lowered to the ground in a controlled manner and reduces the risk of injury to fauna.

CPHR requires that candidate trees for arborist-assisted dismantling are identified during the habitat tree marking and pre-clearing assessment. These trees may include, but are not limited to:

- trees with extensive hollows or large internal voids
- dead stags or structurally compromised trees likely to fracture during mechanical felling
- trees containing nests, dreys or other habitat features within the canopy.

Additionally, the BMP notes that unharmed fauna captured during clearing will be released into nearby suitable habitat. For hollow-dependent fauna, CPHR recommends release into a temporarily installed nestbox within nearby suitable habitat. This approach provides relocated fauna with secure refuge until individuals can relocate naturally.

Rehabilitation works
Section 5.8 of the BMP states that temporary rehabilitation works will be undertaken during Stage 2 to stabilise landforms and manage priority weeds, with full rehabilitation to occur in Stage 3 following capping and post-construction landform shaping.

When preparing the Rehabilitation Management Plan to support the Stage 3 BMP, CPHR's comments regarding the requirements for full rehabilitation works should be addressed (see DOC25/375239-2).

CPHR considers that the Stage 2 BMP can proceed to review by the consent authority, provided the advice in this letter is addressed in prior to submission.

If you have any further questions about this advice, please contact our Planning Team at hcc.planning@environment.nsw.gov.au

Yours sincerely,



Stacy Warren
Senior Manager, Conservation Planning and Assessment
Conservation Programs, Heritage & Regulation Group (CPHR)
NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW)

16 March 2026

Appendix B

Habitat relocation management plan (Kleinfelder 2025)

EMM
creating opportunities

Habitat Relocation Management Plan

Liddell Future Land Use and Enabling Works Project

25004458

02 May 2025







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Habitat Relocation Management Plan

Liddell Future Land Use and Enabling Works Project

Kleinfelder Project: 25004458

Kleinfelder Document: NCA25R180321

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Document Control:

Version	Description	Date	Author	Technical Review	Peer Review
1.0	Draft for Client review	04 April 2025	Rob Townsend	Brad Deane	Fig Forest
2.0	Updated following Client review	02 May 2025	Rob Townsend	Brad Deane	Fig Forest

Only AGL Macquarie Pty Ltd, its designated representatives or relevant statutory authorities may use this document and only for the specific purpose for which this submission was prepared. It should not be otherwise referenced without permission.

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1 INTRODUCTION

1.1 BACKGROUND AND HRMP REQUIREMENT

An Environmental Impact Statement (EIS) for the Liddell Future Land Use and Development Project (the Development) was prepared by GHD Australia Pty Ltd in February 2023 in accordance with the Secretary's Environmental Assessment Requirements (SEARs) issued under State Significant Development SSD-24937520. A Response to Submissions (RtS) Report (GHD, 2024a) was prepared 19 February 2024 to address submissions received during exhibition of the EIS. An Amendment Report (GHD, 2024b) was subsequently submitted 11 June 2024 addressing minor changes to the Development including a reduction in the disturbance footprint to reduce biodiversity and cultural heritage impacts. A Biodiversity Development Assessment Report (BDAR) (Kleinfelder 2024) was prepared to assess potential impacts to biodiversity values, and to provide relevant management measures (avoidance, minimise and mitigate) that should be implemented during demolition and construction works approved under SSD-24937520.

The Development was declared a State Significant Development (SSD) in accordance with Section 4.36(2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and clause 2.5; 2.19 and 23(5) of Schedule 1 of *State Environmental Planning Policy (Planning Systems) 2021* (Planning Systems SEPP). Development consent for SSD-24937520 was issued by the NSW Department of Planning, Housing and Infrastructure (DPHI) on 31 January 2025.

This Habitat Relocation Management Plan (HRMP) has been prepared in accordance with Statement of Commitments , specifically to provide compensatory habitat tree hollows removed as part of the Development and to provide "*A plan and report documenting the installation, maintenance and monitoring of relocated hollows and nest boxes*…." (BDAR, pp 143). Residual project impacts to biodiversity will be offset in a staged approach as described in the overarching Biodiversity Management Plan (BMP). The BMP is required under Condition B32 of the Conditions of Consent (CoC) issued for SSD-24937520.

The purpose of this HRMP is to confirm compensatory habitat requirements for SSD-24937520 and to outline the methods for installation, management and monitoring of this compensatory habitat. The objectives of this HRMP are as follows:

- Outline methodology for clearing of habitat features, including controls for the protection of fauna from adverse impacts.
- Identify the number of nest boxes required to fulfill compensatory habitat requirements under SSD-24937520.
- Identify suitable host trees for the installation of compensatory habitat.
- Outline selection criteria for compensatory habitat, location and methodology for installation.
- Provide a monitoring and maintenance schedule to gauge the effectiveness of this HRMP at settling fauna and to ensure compensatory habitat remains operable throughout the lifetime of this HRMP.

Management of wider habitat features recorded within the Development Site under the BDAR are managed via the overarching BMP. For the purpose of this HRMP, a habitat feature is a hollow within a habitat tree. The locations of existing habitat trees impacted by the project are illustrated in **Figure 1**.

As per Condition B33 of the SSD-24937520 CoC, construction must not commence until the BMP (and this appended HRMP) is approved by the NSW Planning Secretary.

1.2 STAGING OF MANAGEMENT PLANS

Pursuant to Conditions A19 - A21 of the SSD-24937520 CoC, AGL Macquarie (AGL) received approval from DPHI to Stage Management Plans on the 3 April 2024. This HMP may thus either be implemented in its entirety or based upon the three stages of impacts approved under SSD-24937520. These stages are illustrated on **Figure 1**. **Section 1.4** provides a breakdown of compensatory habitat requirements per stage.

1.3 Development Design - Avoid and Minimise

The design of the Development is largely restricted to previously disturbed areas immediately adjacent to existing infrastructure proposed for demolition, tracks for access, and areas subject to land rehabilitation. Areas of higher condition such as remnant native woodland / open forest, threatened species habitat, and Threatened Ecological Communities (TECs) identified within the north-western and south-western portions of the Development Site have been largely avoided, thus minimising the amount of habitat features that will be impacted. However, some habitat trees are unable to be avoided and will be impacted by the Development, as identified in **Section 1.4**.

HEBDEN ROAD

NEW ENGLAND HIGHWAY

TINKERS CREEK

SALTWATER CREEK

CHILCOTTS GULLY

Legend

- Development Site
- Stage 1 Footprint
- Stage 2 Footprint
- Stage 3 Footprint
- Hollow-bearing Trees to be removed
- Motorway
- Primary Road
- Arterial Road
- Sub-arterial Road
- Local Road
- Access Road
- Watercourse - Stream Order (modified from DFSI 2021)

Regional Context

0 5 10 20 30 40 50 km

SCONE
ABERDEEN
MUSWELLBROOK
DENMAN
SINGLETON
CESSNOCK
YENGO
BARRINGTON TOPS National Park

MAIN MAP EXTENT

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Source: Esri, M

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0 0.25 0.5 0.75 1 1.25 1.5 km

N

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PROJECT REFERENCE: 25004458

DATE DRAWN: 4/29/2025 05:15 Version 2

DRAWN BY: BDeane

DATA SOURCE:
NSW DFSI - 2025
AGL - 2020

Locality & Staging

AGL Macquarie
Habitat Replacement
Liddell Future Use and Enabling Works Project

FIGURE:

1

1.4 VEGETATION CLEARING AND HABITAT LOSS

1.4.1 Overall Development

Vegetation clearing activities will impact 81.11 ha of native vegetation and 62.04 ha of exotic vegetation during the Development (all stages; refer to BMP for staging information).

Over the course of the development it is anticipated that 22 hollow features will be impacted by the removal of 13 hollow-bearing trees consisting of 7 live trees and 6 dead stag trees. The breakdown of hollows by species for the entirety of the Development is provided in **Table 1**. The breakdown of trees and hollows to be impacted by Stage is in **Table 2**.

Table 1: Habitat Tree Species and Hollow Count

Species	No. trees	No. small hollows (under 10cm)	No. medium hollows (10-20cm)	No. large hollows (over 20cm)
Eucalyptus crebra (Narrow-leaved Ironbark)	3	3	1	1
Eucalyptus spp.	4	2	1	1
Stag	6	4	8	1
Total	**13**	**9**	**10**	**3**

1.4.2 Staged Development

A breakdown of hollows removed through each stage of the Development is provided in **Table 2**.

Table 2: Habitat Tree Species and Hollow Count per Stage

Stage	Species	No. trees	No. small hollows (under 10cm)	No. medium hollows (10-20cm)	No. large hollows (over 20cm)
One	*Eucalyptus crebra* (Narrow-leaved Ironbark)	1	1	0	1
	Eucalyptus spp.	4	2	1	1
	Stag	0	0	0	0
	Total (Stage 1)	**5**	**3**	**1**	**2**
Two	*Eucalyptus crebra* (Narrow-leaved Ironbark)	1	1	0	0
	Eucalyptus spp.	0	0	0	0
	Stag	4	3	4	1

Stage	Species	No. trees	No. small hollows (under 10cm)	No. medium hollows (10-20cm)	No. large hollows (over 20cm)
	Total (Stage 2)	**5**	**4**	**4**	**1**
Three	*Eucalyptus crebra* (Narrow-leaved Ironbark)	1	1	1	0
	Eucalyptus spp.	0	0	0	0
	Stag	2	1	4	0
	Total (Stage 3)	**3**	**2**	**5**	**0**
	Grand Total	**13**	**9**	**10**	**3**

1.5 Potential Impacts to Threatened Species

Natural tree hollows (or cavities) provide essential shelter and breeding opportunities for a range of fauna species. The protection of habitat trees is often a priority for private land conservation, however in many modified landscapes old trees no longer exist. Allowing for the natural development of hollows in modified landscapes can be a slow process. Installing artificial hollows is a long standing accepted method employed to provide additional habitat for species that depend on hollows for nesting or roosting. When the availability of natural hollows is limited, the addition of artificial hollows has been identified as a management action to provide supplementary habitat for a range of different hollow-dependent species, such as bats, birds and marsupials (Biodiversity Conservation Trust *(*BCT) 2020).

Targeted surveys conducted as part of the BDAR identified the following species of threatened fauna on the Development Site that may utilise both retained hollow-bearing trees and hollow-bearing trees which are approved for removal:

- Squirrel Glider (*Petaurus norfolcensis*).
- Brush-tailed Phascogale (*Phascogale tapoatafa*).
- Southern Myotis (*Myotis macropus*).
- Large Bent-wing Bat (*Miniopterus orianae oceanensis*).
- Yellow-bellied Sheathtail Bat (*Saccolaimus flaviventris*).
- Eastern False Pipistrelle (*Falsistrellus tasmaniensis*).
- Eastern Cave Bat (*Vespadelus troughtoni*).

It should be noted that a specific Microchiropteran Bat Management Plan (MMP) has been produced to manage potential impacts to the bat species listed above, and is appended to the BMP in Appendix C.

As well as these threatened species, a wide variety of non-threatened native fauna such as arboreal mammals, aves, Microchiropteran bats utilise hollow tree features as part of their lifecycle.

1.6 Management of Clearing of Habitat Features

BMP provides protocols for the clearance of vegetation, with the following subsections of the BMP outlining controls in place to manage impacts to Habitat Features:

1.6.1 Pre-clearance surveys of Habitat Features

The overarching BMP includes the management measure that a pre-clearance survey will be required to identify and mark all habitat features within the Development Site. This survey will be undertaken no more than four

weeks prior to the commencement of clearing to ensure temporary (seasonal) features such as avian nests are recorded. All features will be marked with flagging tape and / or paint and the feature and its location captured for reporting.

Habitat features include, but aren't limited to:

- Hollows.
- Nests.
- Roosts.
- Dens.
- Termitaria.
- Rocky areas (bush rock).
- Wood piles and hollow logs on the ground.
- Decorticating bark.
- Bowers.
- Any other signs that may indicate the presence of resident or migratory fauna.

Additionally, the potential presence of fauna through indicative signs including fresh scat, scratching, urinal staining etc should also be recorded.

Comparative habitat assessments are to be included in the pre-clearance surveys to identify appropriate like for like habitat and release locations for fauna during clearing works.

1.6.2 Habitat Feature Clearance

The area to be cleared each day must be first inspected by the FSC to avoid impacts to mobile species such the Hunter Valley Delma by assessing any potential habitat, and to ensure all habitat features have been identified and are clearly marked and evident to the clearing contractor.

Due to the presence of Squirrel Gliders which are more likely to relocate to one of several other dens in the area, under-scrubbing of the shrub and ground layer should occur at least one day prior to the clearing of habitat trees.

Following felling, hollow-bearing trees should be inspected, where safe to do so, to determine that they are free from animals before the tree is moved or sheared. Where this cannot be verified the tree should be left in-situ overnight to allow any fauna to disperse, unless the operator is capable of 'cracking' the hollow in a suitable location to make a determination. This process must be guided by the FSC.

The first round of clearing, 'under-scrubbing', the removal of most vegetation except habitat and hollow-bearing trees, will take place in two stages and be supervised by fauna spotter/catchers. FSC supervision is not required for areas of exotic grasslands that are not part of the *Delma vescolineata* species polygons as provided in the BMP.

- In stage one, bulldozers will maintain a raised blade (25–50mm above the ground).
- After stage one, a short time will be given for displaced fauna to be spotted and removed for relocation if necessary.
- In stage two, bulldozers will remove topsoil and adjust the soil contour as necessary.

Sequential clearing must be employed to avoid the creation of vegetation islands and to allow all animals the opportunity to disperse.

All habitat features must be felled or otherwise disturbed in the presence of the FSC. Soft felling is encouraged and engaging a clearing company with experience in soft felling is recommended. Hollow-bearing trees are to be nudged first in an attempt to flush any animals, including microbats that may be roosting in the tree.

Each habitat tree must be immediately inspected by the FSC or as soon as it is safe to do so. All hollows are to be inspected by torch to identify any animals present, or lack thereof. Any animal observed should be extracted with care and inspected for injury. Injured fauna are to be taken to the veterinarian as soon as possible. Displaced fauna that may not be able to care for themselves (i.e., chicks or other young) should be made safe and taken to a suitably qualified carer as soon as possible. Animals that are injured and are unlikely to survive, based on the decision of the FSC, should be euthanised humanely by suitably qualified personnel.

1.6.3 Re-use of hollows

Where feasible, trees should be felled in a manner that may preserve the hollow feature. Hollows that are suitable for re-use will be appropriately marked by the FSC and the feature sheared appropriately to be used for offsetting requirements.

Salvaged hollows deemed suitable for re-use shall be stockpiled separately. A contractor with experience in repurposing salvaged hollows shall be sought. The contractor should be provided with salvaged hollows and instruction of the entrance size to be recreated. Salvaged hollows should be suitably sealed and braced for hanging back on the site as soon as possible after felling.

1.7 HABITAT FEATURES IDENTIFIED

A review of threatened species records and their specific habitat requirements indicate that the Development Site has the potential to represent suitable foraging and breeding habitat for a number of locally occurring threatened and non-threatened fauna species.

Habitat for threatened and non-threatened fauna alike was recorded under the approved BDAR. A summary of the key fauna habitat features identified within the Development Site includes:

- A total of 7 live hollow-bearing Trees (HBTs) and 6 dead hollow-bearing stags as listed in **Section 1.4**.
- Fallen logs and timber (limited to remnant vegetation areas).
- Mature Eucalypts that may provide foraging and nesting habitat for native bird species.
- A number of waterbodies, primarily dams and Lake Liddell, located to the east of the Development Site.
- Rocky Areas located to the north of the Borrow Pit Area (outside of the Development Site).
- Infrastructure present on site may provide habitat for Microbats.

Wider habitat features recorded within the Development Site during production of the BDAR (as noted above) will be managed via the overarching BMP. For the purpose of this HRMP, a habitat feature is a hollow within a habitat tree. The locations of habitat trees recorded within the Development Site are illustrated in **Figure 1**.

1.7.1 Plant community types and known hollow locations

The following Plant Community Types (PCTs) have been identified on site with corresponding HBT's to be impacted:

- PCT1603 - Narrow-leaved Ironbark - Bull Oak - Grey Box shrub - grass open forest of the central and lower Hunter (Mod_Good Condition). -Five habitat trees.
- PCT 1604: Narrow-leaved Ironbark - Grey Box - Spotted Gum shrub – grass woodland of the central and lower Hunter - No habitat trees.
- PCT 1607: Blakely's Red Gum - Narrow-leaved Ironbark - Rough-barked Apple shrubby woodland of the upper Hunter (Moderate Condition) - No habitat trees.
- PCT 1692: Bull Oak grassy woodland of the central Hunter Valley - Three habitat trees.
- PCT 1731: Swamp Oak - Weeping Grass grassy riparian forest of the Hunter Valley - No habitat trees
- PCT 1071: Phragmites australis and Typha orientalis coastal freshwater wetlands of the Sydney Basin Bioregion - Two habitat trees.
- PCT 0 Exotic Grassland -Three habitat trees.

1.8 REPLACEMENT HABITAT FEATURE REQUIREMENTS

Table 19 of the BDAR stated that loss of habitat and specifically loss of breeding habitat in cleared tree hollows would require the following:

- Installation of artificial hollows (nest-boxes) prior to clearing for the relevant Stage of works (see **Section 1.2** and **Section 1.4**).
- Tree hollows from trees cleared for the Development should be relocated and installed in suitable mature trees as close to their original location as possible.

- If existing tree hollows cannot be successfully relocated for any reason (e.g. they are damaged during clearing), artificial nest boxes should be installed in appropriate habitat at a 4:1 ratio to those lost.
- The locations selected for relocated hollows will be provided to BCD prior to works commencing.
- A plan [this HRMP] and report documenting the installation, maintenance and monitoring of relocated will be prepared and provided to BCD prior to works commencing.

The BMP states that retained hollows can be used to meet compensatory habitat obligations at a 1:1 ratio, nest boxes must be used to supplement the required obligations at a 4:1 ratio. Therefore, up to a maximum of 88 replacement habitat locations are required to offset the 22 hollows that have been identified to be impacted under the approved BDAR.

2 REPLACEMENT HABITAT

A hierarchical approach should be implemented whereby hollows should be salvaged if possible and reused on a 1:1 ratio at locations identified in **Table 4.** Where any hollows are not be able to be salvaged, it will trigger a requirement to install nest boxes at a 4:1 ratio, with installation to occur at locations identified in **Table 4**. The following information has been produced with consideration of the *Biodiversity Conservation Trust Guideline for Artificial Hollows* (BCT 2020).

Nest box / salvaged hollow installation is to occur prior to the relevant Stage of clearing for the Development. Hollow numbers and sizing for each Stage of the Development are provided in **Section 1.4**, **Table 2**.

2.1 SALVAGED HOLLOWS

Natural hollows impacted by the Development should be salvaged if possible and reused on a 1:1 ratio at locations identified in **Table 4**. Where possible, large hollows (>20cm) should be placed in larger trees with a diameter at breast height (DBH) greater than 80cm. Small (<10cm) and medium (10 to 20 cm) hollows should be placed in any sized (DBH) replacement location.

Ideally, a salvaged hollow will include a pre-formed entrance and can be cut above and below the hollow to provide a natural lid and base. However, many natural hollows would simply provide the 'shell' and require a cap to be installed at either end, and an entrance hole to be created. Salvageable hollows will be initially identified and marked for retention by the FSC, with the scope of repurposing works to be determined under the guidance of an ecologist and / or the suitably experienced contractor engaged to repurpose hollows (see **Section 1.6.3**).

2.2 NEST BOXES

2.2.1 Nest Box Selection

Depending upon which hollows can be salvaged and reused, the replacement nest boxes should be selected to be relative to the habitat feature (hollow) they are replacing. Large hollows (>20cm) should be replaced with nest boxes in larger trees of greater than 80cm DBH. Small (<10cm) and medium (10 to 20 cm) hollows should be placed in any sized replacement location.

Nest box design selection should also be targeted to threatened species identified as present in the Development site under the approved the BDAR (see **Section 2.3**, **Table 3**). The final number and type of nest boxes selected will be made by an ecologist, referencing the number and size of salvaged hollows and threatened (and non-threatened) hollow-dependent fauna identified under the BDAR.

2.2.2 Nest Box Design

Replacement habitat target species consists of Birds, Mammals (notably Squirrel Glider) and Microchiropteran Bats including the threatened species presented in **Section 1.5**. This results in three potential nest box designs to use, these being front entry (Birds and Mammals) rear (tree facing) entry (Squirrel Glider) and bottom entry (Microchiropteran Bats).

Nest boxes should be made from either sustainably sourced hardwood or marine grade plywood to maximise longevity.

2.3 REPLACEMENT HABITAT INSTALLATION

Replacement habitat features should be installed at a height suitable for the intended target species (see **Table 3**).

Table 3: Nest Box Specification (modified from BCT 2020)

Species	Dimension (l x w x h)	Diameter of Entrance	Depth below entrance	Height above ground	Placement
Squirrel Glider	14x15x60 cm	35-45 mm, rear entry	N/A	3 - 6 metres	Vertical
Brush Tailed Phascogale	15x20x40 cm	35 mm	300 mm	3 - 6 metres	Vertical
Microchiropteran Bats	10x20x45 cm	10 mm slit	Entrance at bottom	3 metres	Clear flight path (i.e.no vegetation blocking entrance)
Small / medium hollow replacement	15x15x50 cm	55 mm	350 mm	3-5 metres	Vertical to 45 degrees
Large hollow replacement	30x40x1500 cm	200 mm	1200 mm	8-10 metres	Vertical

To prevent nest boxes dislodging from host trees (particularly thick-barked species) and to allow for future tree growth, installation should utilise the Habisure™ system or similar (BCT 2020). If the nest box or salvaged hollow is not suitable for this hanging system (e.g. heavy and dangerous to install), high-quality stainless-steel fixings can be used to attach the replacement habitat to the tree.

Nest boxes should be installed with a north to north-easterly aspect to maximise exposure to winter sunlight and minimise exposure on summer afternoons.

To provide baseline data and assist in ongoing identification of each nest box, the following information should be recorded during installation of compensatory habitat:

- Unique identifier.
- Species of host tree.
- Nest box size / target species.
- Location, recorded as GPS coordinates (see **Section 2.4**).
- Nest box height.
- Installation date.
- Relevant Stage of vegetation impacts.
- Photograph taken of the compensatory habitat location on the host tree.

2.4 Replacement Habitat Locations

Habitat assessment for locations to be utilised for nest box replacement sites included a desktop assessment and on-site specific assessment of suitable trees likely to provide long-term stability for replacement nest boxes and salvaged tree hollows.

Replacement habitat for habitat trees cleared for the Development should be installed on suitable mature trees located outside the approved clearing footprint but as close to their original location as possible. The locations selected for relocated hollows is shown at **Table 4** and will be provided to BCD prior to works commencing.

2.4.1 On site assessment - Nestbox Tree Selection

An on-site assessment was undertaken by a suitably qualified Ecologist between the 19/03/2025 and 21/03/2025 to identify the required replacement habitat locations with consideration of the hollow size of the replacement habitat required and the area and PCT from which the existing hollow to be impacted is located.

Replacement habitat features are to be installed on mature trees located outside the approved clearing footprint but as close as possible to the original position (i.e. where the HBT was removed). Trees were selected based on size (DBH) with mature trees over 30 cm DBH selected where possible. Similar species as the HBT to be removed were selected. Where the cleared hollows were from stags (dead trees) and the species could not be identified, the most common species in the area were selected (**Table 4**). Selected trees were recorded using a hand-held GPS device, with the tree physically marked by four pink spray-painted dots so as to be visible from any direction of approach.

It should be noted that while up to 88 locations are required, it has been assumed that large trees >80cm DBH are suitable for up to two replacement features to be installed. In total, 102 potential installation locations have been identified. This allows for contingency should there be any issues identified during installation (e.g. existing use of a selected tree by a predator of the target species). Should more than one replacement feature be installed on a single tree, then consideration should be given to ensure there is no potential for conflict between the target species of each feature.

The locations of the existing hollows (to be impacted) and identified replacement habitat locations are demonstrated in **Figure 2** to **Figure 5.**

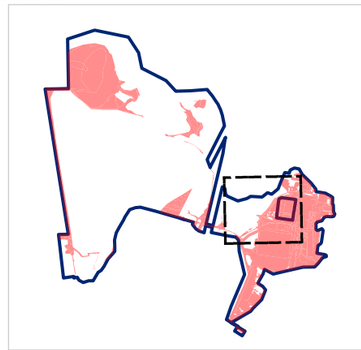


Legend

- Development Site
- Stage 1 Footprint
- Stage 2 Footprint
- Stage 3 Footprint
- Potential Nest Box Host Trees (labelled per Tree ID)
- Hollow-bearing Trees to be removed
- Motorway
- Primary Road
- Arterial Road
- Sub-arterial Road
- Local Road
- Access Road
- Watercourse - Stream Order (modified from DFSI 2021)

Plant Community Types

- Waterbody
- Infrastructure / Tracks
- Planted Vegetation / Gardens
- Zone 1 - PCT 1603: Narrow-leaved Ironbark - Bull Oak - Grey Box shrub - grass open forest of the central and lower Hunter (Mod-Good Condition) - **EEC**
- Zone 2 - PCT 1603: Narrow-leaved Ironbark - Bull Oak - Grey Box shrub - grass open forest of the central and lower Hunter (Low Condition)
- Zone 3 - PCT 1603: Narrow-leaved Ironbark - Bull Oak - Grey Box shrub - grass open forest of the central and lower Hunter (Cleared - Derived Grassland)
- Zone 4 - PCT 1603: Narrow-leaved Ironbark - Bull Oak - Grey Box shrub - grass open forest of the central and lower Hunter (Planted/Rehab)
- Zone 5 - PCT 1603: Narrow-leaved Ironbark - Bull Oak - Grey Box shrub - grass open forest of the central and lower Hunter (Rehab grassland)
- Zone 6 - PCT 1607: Blakely's Red Gum - Narrow-leaved Ironbark - Rough-barked Apple shrubby woodland of the upper Hunter (Moderate) - **EEC**
- Zone 7 - PCT 1604: Narrow-leaved Ironbark - Grey Box - Spotted Gum shrub - grass woodland of the central and lower Hunter (Moderate Condition) - **EEC**
- Zone 8 - PCT 1692: Bull Oak grassy woodland of the central Hunter Valley
- Zone 9 - PCT 1731: Swamp Oak - Weeping Grass grassy riparian forest of the Hunter Valley
- Zone 10 - PCT 1071: Phragmites australis and Typha orientalis coastal freshwater wetlands of the Sydney Basin Bioregion
- Zone 11 - Exotic Grassland



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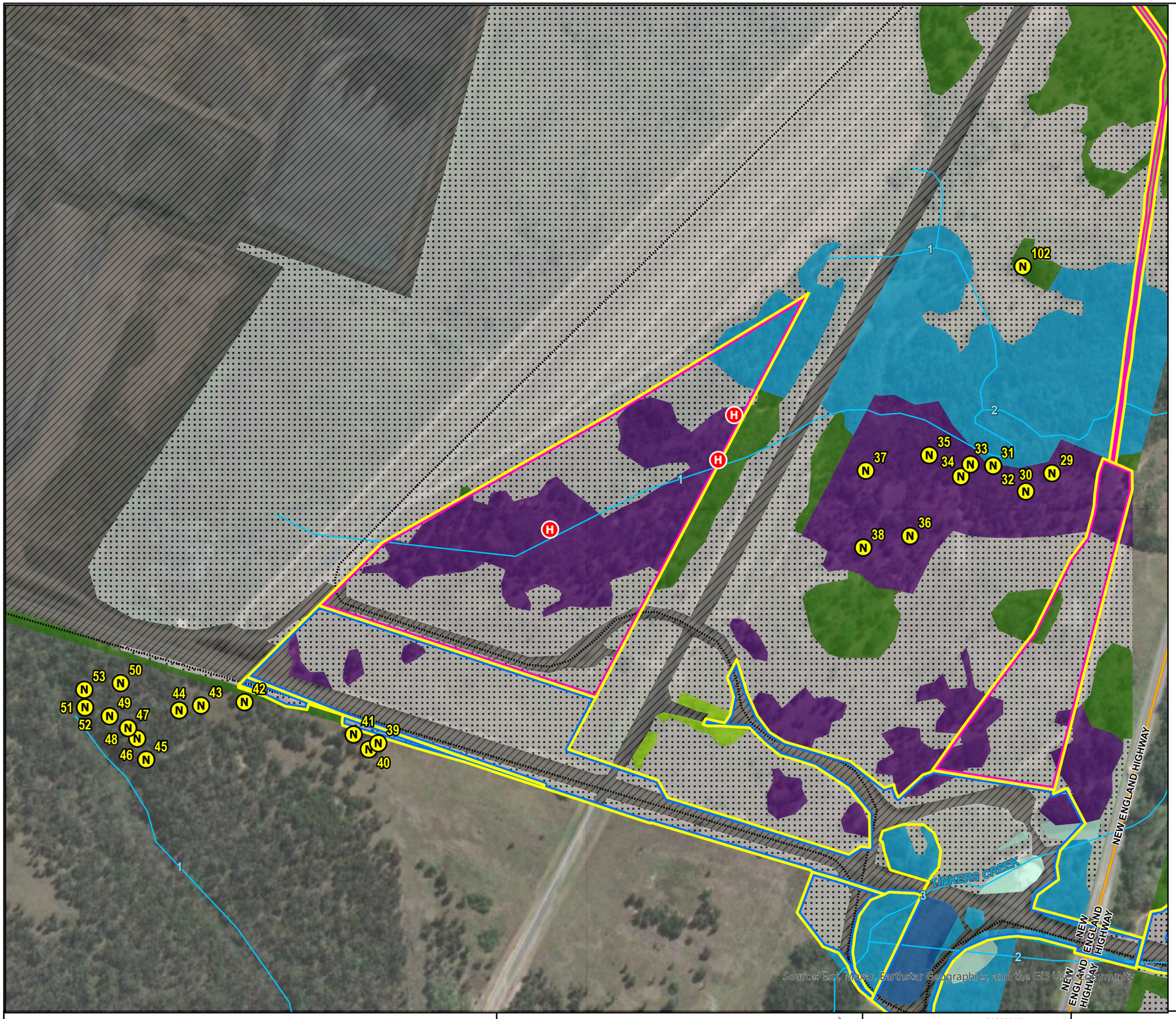
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DATA SOURCE: AGL Macquarie - 2022

Habitat Replacement (East)

AGL Macquarie
Habitat Replacement
Liddell Future Use and Enabling Works Project

FIGURE: **2**

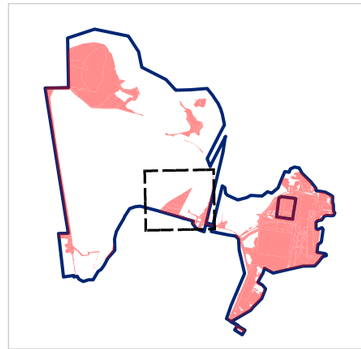


Legend

- Development Site
- Stage 1 Footprint
- Stage 2 Footprint
- Stage 3 Footprint
- Potential Nest Box Host Trees (labelled per Tree ID)
- Hollow-bearing Trees to be removed
- Motorway
- Primary Road
- Arterial Road
- Sub-arterial Road
- Local Road
- Access Road
- Watercourse - Stream Order (modified from DFSI 2021)

Plant Community Types

- Waterbody
- Infrastructure / Tracks
- Planted Vegetation / Gardens
- Zone 1 - PCT 1603: Narrow-leaved Ironbark - Bull Oak - Grey Box shrub - grass open forest of the central and lower Hunter (Mod-Good Condition) - **EEC**
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- Zone 6 - PCT 1607: Blakely's Red Gum - Narrow-leaved Ironbark - Rough-barked Apple shrubby woodland of the upper Hunter (Moderate) - **EEC**
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- Zone 8 - PCT 1692: Bull Oak grassy woodland of the central Hunter Valley
- Zone 9 - PCT 1731: Swamp Oak - Weeping Grass grassy riparian forest of the Hunter Valley
- Zone 10 - PCT 1071: Phragmites australis and Typha orientalis coastal freshwater wetlands of the Sydney Basin Bioregion
- Zone 11 - Exotic Grassland



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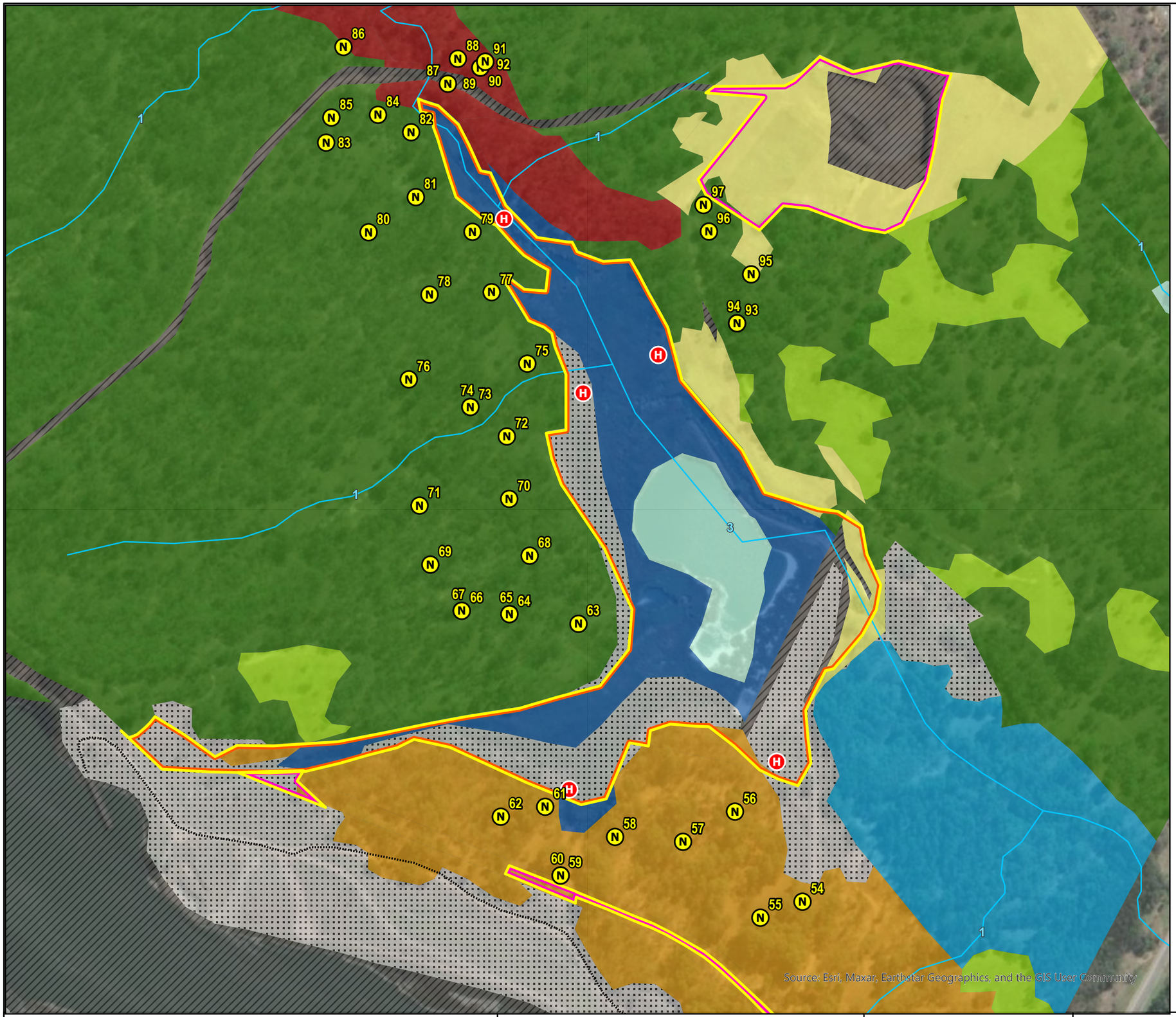
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DATA SOURCE: AGL Macquarie - 2022

Habitat Replacement (South)

AGL Macquarie
Habitat Replacement
Liddell Future Use and Enabling Works Project

FIGURE: **3**

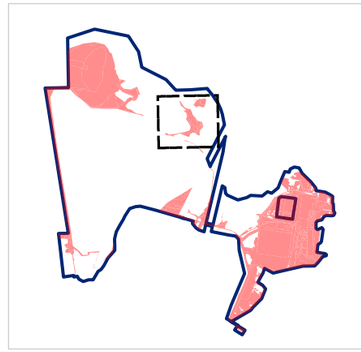


Legend

- Development Site
- Stage 1 Footprint
- Stage 2 Footprint
- Stage 3 Footprint
- Potential Nest Box Host Trees (labelled per Tree ID)
- Hollow-bearing Trees to be removed
- Motorway
- Primary Road
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- Sub-arterial Road
- Local Road
- Access Road
- Watercourse - Stream Order (modified from DFSI 2021)

Plant Community Types

- Waterbody
- Infrastructure / Tracks
- Planted Vegetation / Gardens
- Zone 1 - PCT 1603: Narrow-leaved Ironbark - Bull Oak - Grey Box shrub - grass open forest of the central and lower Hunter (Mod-Good Condition) - **EEC**
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- Zone 11 - Exotic Grassland



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Habitat Replacement (North)

AGL Macquarie
Habitat Replacement
Liddell Future Use and Enabling Works Project

FIGURE: **4**

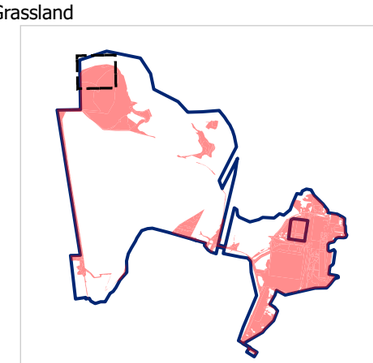


Legend

- Development Site
- Stage 1 Footprint
- Stage 2 Footprint
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Plant Community Types

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Habitat Replacement (Northwest)

AGL Macquarie
Habitat Replacement
Liddell Future Use and Enabling Works Project

FIGURE: **5**

Table 4: **Locations of receiving trees for nest box installation**

Plant Community Type (PCT)	Location No.	Species	DBH	Easting	Northing
PCT 1603	1	*Eucalyptus crebra*	40cm	309454	6416865
PCT 1603	2	*Eucalyptus crebra*	30cm	309414	6416855
PCT 1603	3	*Eucalyptus crebra*	42cm	309383	6416942
PCT 1603	4	*Eucalyptus crebra*	38cm	309316	6416857
PCT 1603	5	*Eucalyptus crebra*	68cm	309285	6416773
PCT 1603	6	*Eucalyptus crebra*	67.5cm	309222	6416781
PCT 1603	7	*Eucalyptus crebra*	36cm	309181	6416825
PCT 1603	8	*Eucalyptus crebra*	79cm	309115	6416801
PCT 1603	9	*Eucalyptus crebra*	70cm	308990	6416432
PCT 1603	10	*Eucalyptus crebra*	110cm	308957	6416444
PCT 1603	11	*Eucalyptus crebra*	110cm	308957	6416444
PCT 1603	12	*Eucalyptus crebra*	34cm	308967	6416408
PCT 1603	13	*Eucalyptus crebra*	110cm	308835	6416415
PCT 1603	14	*Eucalyptus crebra*	110cm	308835	6416415
PCT 1603	15	*Eucalyptus moluccana*	101cm	308854	6416338
PCT 1603	16	*Eucalyptus moluccana*	101cm	308854	6416338
PCT 1603	17	*Eucalyptus crebra*	52cm	308782	6416367
PCT 1603	18	*Eucalyptus crebra*	47cm	308769	6416310
PCT 1603	19	*Eucalyptus crebra*	36cm	308718	6416369
PCT 1603	20	*Eucalyptus crebra*	56cm	308718	6416258
PCT 1603	21	*Eucalyptus crebra*	47cm	308683	6416304
PCT 1603	22	*Eucalyptus moluccana*	58cm	308658	6416342
PCT 1603	23	*Eucayptus tereticornis*	110cm	308675	6416228
PCT 1603	24	*Eucayptus tereticornis*	110cm	308675	6416228
PCT 1603	25	*Eucalyptus crebra*	52cm	308615	6416286
PCT 1603	26	*Eucalyptus crebra*	59cm	308631	6416206
PCT 1603	27	*Eucalyptus moluccana*	60cm	308598	6416253
PCT 1603	28	*Eucalyptus crebra*	55cm	308542	6416306
PCT 1692	29	*Eucalyptus crebra*	33cm	308168	6416745
PCT 1692	30	*Eucalyptus crebra*	22cm	308143	6416727
PCT 1692	31	*Eucalyptus moluccana*	82.5cm	308111	6416751
PCT 1692	32	*Eucalyptus moluccana*	82.5cm	308111	6416751

Plant Community Type (PCT)	Location No.	Species	DBH	Easting	Northing
PCT 1692	33	*Eucalyptus crebra*	55cm	308089	6416752
PCT 1692	34	*Eucalyptus crebra*	27cm	308080	6416740
PCT 1692	35	*Eucalyptus crebra*	36cm	308049	6416760
PCT 1692	36	*Eucalyptus crebra*	36cm	308032	6416682
PCT 1692	37	*Angophora floribunda*	25cm	307988	6416744
PCT 1692	38	*Eucalyptus crebra*	37cm	307987	6416670
PCT 1603 (likely - outside mapping extent)	39	*Eucayptus tereticornis*	74cm	307522	6416473
PCT 1603 (likely - outside mapping extent)	40	*Eucalyptus crebra*	50cm	307513	6416467
PCT 1603 (likely - outside mapping extent)	41	*Eucayptus tereticornis*	39cm	307498	6416481
PCT 1603 (likely - outside mapping extent)	42	*Eucalyptus crebra*	36cm	307392	6416510
PCT 1603 (likely - outside mapping extent)	43	*Angophora floribunda*	30cm	307350	6416506
PCT 1603 (likely - outside mapping extent)	44	*Angophora floribunda*	46cm	307329	6416501
PCT 1603 (likely - outside mapping extent)	45	*Eucalyptus crebra*	25cm	307298	6416453
PCT 1603 (likely - outside mapping extent)	46	*Angophora floribunda*	29cm	307289	6416473
PCT 1603 (likely - outside mapping extent)	47	*Eucalyptus crebra*	80cm	307280	6416483
PCT 1603 (likely - outside mapping extent)	48	*Eucalyptus crebra*	80cm	307280	6416483
PCT 1603 (likely - outside mapping extent)	49	*Eucalyptus crebra*	63cm	307262	6416494
PCT 1603 (likely - outside mapping extent)	50	*Angophora floribunda*	35cm	307272	6416526
PCT 1603 (likely - outside mapping extent)	51	*Eucayptus tereticornis*	85cm	307238	6416502
PCT 1603 (likely - outside mapping extent)	52	*Eucayptus tereticornis*	85cm	307238	6416502
PCT 1603 (likely - outside mapping extent)	53	*Eucalyptus crebra*	49cm	307237	6416519
PCT 1604	54	*Corymbia maculata*	55cm	308043	6417656
PCT 1604	55	*Eucalyptus crebra*	55cm	308008	6417642
PCT 1604	56	*Corymbia maculata*	48cm	307985	6417730

Plant Community Type (PCT)	Location No.	Species	DBH	Easting	Northing
PCT 1604	57	*Eucalyptus crebra*	65cm	307942	6417704
PCT 1604	58	*Corymbia maculata*	46cm	307885	6417707
PCT 1604	59	*Corymbia maculata*	123cm	307840	6417674
PCT 1604	60	*Corymbia maculata*	123cm	307840	6417674
PCT 1604	61	*Eucalyptus crebra*	31cm	307826	6417731
PCT 1604	62	*Corymbia maculata*	52cm	307789	6417722
PCT 1603	63	*Eucalyptus crebra*	46cm	307851	6417884
PCT 1603	64	*Eucalyptus crebra*	83cm	307793	6417891
PCT 1603	65	*Eucalyptus crebra*	83cm	307793	6417891
PCT 1603	66	*Eucalyptus moluccana*	82cm	307753	6417893
PCT 1603	67	*Eucalyptus moluccana*	82cm	307753	6417893
PCT 1603	68	*Eucalyptus crebra*	28cm	307809	6417940
PCT 1603	69	*Eucalyptus crebra*	70cm	307726	6417931
PCT 1603	70	*Eucayptus tereticornis*	44cm	307791	6417987
PCT 1603	71	*Eucalyptus crebra*	70cm	307716	6417980
PCT 1603	72	*Eucayptus tereticornis*	51cm	307788	6418039
PCT 1603	73	*Eucalyptus crebra*	85cm	307757	6418063
PCT 1603	74	*Eucalyptus crebra*	85cm	307757	6418063
PCT 1603	75	*Eucalyptus crebra*	47cm	307804	6418100
PCT 1603	76	*Eucalyptus moluccana*	46 cm	307705	6418085
PCT 1603	77	*Eucalyptus moluccana*	50cm	307773	6418159
PCT 1603	78	*Eucayptus tereticornis*	39cm	307721	6418156
PCT 1603	79	*Eucayptus tereticornis*	31cm	307756	6418209
PCT 1603	80	*Eucalyptus crebra*	49cm	307669	6418207
PCT 1603	81	*Eucalyptus moluccana*	53cm	307708	6418237
PCT 1603	82	*Eucalyptus crebra*	48cm	307703	6418291
PCT 1603	83	*Eucayptus tereticornis*	34cm	307632	6418281
PCT 1603	84	*Eucayptus tereticornis*	47cm	307675	6418305
PCT 1603	85	*Eucayptus tereticornis*	50cm	307636	6418302
PCT 1603	86	*Eucayptus tereticornis*	42cm	307645	6418361
PCT 1607	87	*Eucayptus tereticornis*	33cm	307733	6418332
PCT 1607	88	*Eucayptus tereticornis*	44cm	307741	6418353
PCT 1607	89	*Eucayptus tereticornis*	86.5cm	307760	6418346

Plant Community Type (PCT)	Location No.	Species	DBH	Easting	Northing
PCT 1607	90	*Eucayptus tereticornis*	86.5cm	307760	6418346
PCT 1607	91	*Eucayptus tereticornis*	80cm	307764	6418351
PCT 1607	92	*Eucayptus tereticornis*	80cm	307764	6418351
PCT 1603	93	*Eucalyptus crebra*	95cm	307979	6418137
PCT 1603	94	*Eucalyptus crebra*	95cm	307979	6418137
PCT 1603	95	*Eucalyptus crebra*	36cm	307990	6418178
PCT 1603	96	*Eucalyptus crebra*	42cm	307954	6418213
PCT 1603	97	*Eucayptus tereticornis*	58cm	307949	6418235
PCT 1603	98	*Eucalyptus moluccana*	44cm	306136	6419265
PCT 1603	99	*Eucalyptus moluccana*	53cm	306130	6419262
PCT 1603	100	*Eucalyptus moluccana*	56cm	306074	6419236
PCT 1603	101	*Eucalyptus moluccana*	52cm	306058	6419228
PCT 1603	102	*Eucayptus tereticornis*	70cm	308136	6416943

3 MONITORING, MAINTENANCE AND REPORTING

3.1 MONITORING

Annual monitoring of replacement habitat should be performed in spring each year for a period of 4 years following installation. Monitoring should commence at least 6 months after installation to allow for habitat uptake. Longer durations may apply dependent on the season of installation, for example, if nest boxes are installed in winter or spring, then the first round of monitoring would be performed the following year in spring. Monitoring will be undertaken using pole mounted cameras or similar industry recognised methodology.

Data collected during each annual monitoring event will include the following at each installed replacement feature location:

- Date of inspection.
- Replacement habitat feature location.
- Prevailing weather conditions.
- Assessment of replacement habitat condition and whether any maintenance is required (see **Section 3.2**).
- Evidence of fauna activity.
- Presence of any species including threatened species.
- Presence of any pest species.
- Comments / notes for future monitoring and / or maintenance.

3.2 MAINTENANCE

Spring monitoring of compensatory habitat will include assessment of the habitat condition to ensure the habitat remains suitable for fauna occupation. **Table 5**, adapted from the *Biodiversity Conservation Trust Guideline for Artificial Hollows* (BCT 2020), outlines condition thresholds for repair or replacement of compensatory habitat.

Table 5: Condition assessment and repair of compensatory habitat (adapted from BCT, 2020).

Condition	Description	Action
Good	No damage or minimal damage that does not affect the function of the hollow.	None
Moderate	Minor damage, but the hollow still provides suitable habitat for the target species (e.g. lid slightly loose, sides warping due to moisture).	Occupied – monitor. Not occupied – undertake repairs.
Poor	Major damage to artificial hollow making it no longer suitable for occupation by the target species (e.g. detached from tree, semi-detached from tree, major structural damage).	Occupied – monitor. Not occupied – undertake repairs or replace.

3.3 REPORTING

Reporting under this HRMP will be integrated with reporting regarding the overarching BMP, which will be documented as part of the annual Compliance Reporting required under Part D, Conditions D2 and D3 of the SSD-24937520 CoC . Reporting will continue through the lifetime of this HRMP, taken to be 4 years post installation of compensatory habitat for the final stage (Stage 3) of the Development.

Reporting will detail the status of impacts to habitat features (number cleared), the status of installation of replacement features (number and location), include a summary of the data described in **Section 3.1** and include a summary of maintenance / replacement works undertaken (see **Section 3.2**) ..

4 REFERENCES

Kleinfelder 2024. *Liddell Future Land Use and Enabling Works Biodiversity Development Assessment Report*. Available online at: https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=RFI-75919707%2120241024T065952.468%20GMT

Biodiversity Conservation Trust 2020. Guideline for Artificial Hollows. Available online at. : https://www.bct.nsw.gov.au/sites/default/files/202008/BCT_Artificial%20Hollow%20Guidelines_Final%20for%20publication.pdf

Appendix C

Microbat Management Plan (Wingbeat Ecology 2025)

EMM
creating opportunities

AGL Macquarie Microbat Management Plan

Liddell Future Land Use & Enabling Works Project

April 2025
Ref: WB20250403



AGL Macquarie Microbat Management Plan

Liddell Future Land Use & Enabling Works Project

Project Ref: WB20250403

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30/04/2025	V2 (final draft)	Kristy Peters	Peer review - Rob Townsend (Kleinfelder)	AGL Macquarie Pty Ltd

Disclaimer This document has been prepared by Wingbeat Ecology for the specific purpose and client outlined in the report. It is not to be used for any other purpose or by any other party without prior written consent from Wingbeat Ecology. The scope of this report was determined in consultation with the client, taking into account time, safety and budget constraints, as well as the availability of relevant data and reports. Due consideration has been given to site conditions, applicable legislation, and supporting documentation available at the time of preparation. However, as environmental conditions, regulations, and available information may change over time, this report should be considered current as of the date of its preparation.

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Abbreviations

AGL	AGL Energy Pty Ltd
AGLM	AGL Macquarie Pty Ltd
AR	Amendment Report
BAM	Biodiversity Assessment Method
BC Act	NSW *Biodiversity Conservation Act 2016*
BDAR	Biodiversity Development Assessment Report
BMP	Biodiversity Management Plan
BPS	Bayswater Power Station
CWPS	Cooling Water Pumping Station
DPHI	NSW Department of Planning, Housing and Infrastructure
EMS	Environmental Management Strategy
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
FSC	Fauna Spotter Catcher
HBT	Hollow-bearing Tree
HRMP	Habitat Restoration Management Plan
HVGT	Hunter Valley Gas Turbine
LAD	Liddell Ash Dam
LPS	Liddell Power Station
MMP	Microbat Management Plan
MW	megawatt
SEPP	State Environmental Planning Policy
SSD	State Significant Development
TEC	Threatened Ecological Community
TfNSW	Transport for NSW

1. Introduction

This Microbat Management Plan (MMP) has been prepared as required under the AGL Macquarie (AGLM) Liddell Power Station (LPS) "Liddell Future Land Use & Enabling Works" (the Development) Amendment Report (AR). The Project has been declared a State Significant Development (SSD) in accordance with Section 4.36(2) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and clause 2.5; 2.19 and 23(5) of Schedule 1 of State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems SEPP). It is permissible with development consent. Development consent SSD 24937520 (the Consent) was issued by the Department of Planning, Housing and Infrastructure (DPHI) on 31 January 2025.

To support the demolition and rehabilitation of the site, a series of management plans are required under the SSD, including this MMP which is an Appendix to the Biodiversity Management Plan (BMP). The BMP is required under Condition B32 of the Consent.

1.1. Project background

LPS, near Muswellbrook, NSW, operated from the 1970s until its closure on 28 April 2023 as part of AGLM's transition to a low-carbon future. AGLM acquired LPS and the adjacent Bayswater Power Station (BPS) from Macquarie Generation in 2014. The LPS site includes the decommissioned Hunter Valley Gas Turbines (HVGTs) and various supporting infrastructure for water supply, coal and ash management, power supply, and control systems (referred to hereafter as the Study Area). The Liddell Ash Dam (LAD) and BPS are excluded from the scope of this MMP.

Key project elements include:

- borrow pit establishment, stabilisation, and extraction;
- construction of an asbestos disposal facility; and
- demolition of LPS and associated infrastructure.

A Biodiversity Development Assessment Report (BDAR) has been prepared by Kleinfelder (2024) which states that the entire project footprint will affect 81.11 ha of native vegetation and require removal of trees containing 22 hollows. Key project infrastructure zones inspected for this MMP are mapped in **Figure 1**. This MMP is informed by the Habitat Restoration Management Plan (HRMP) (Kleinfelder 2025b) in relation to actions to provide compensatory habitat (i.e. replacement of the loss of habitat hollows) for a range of native fauna species, including microbats.

1.2. Aims and objectives

This MMP provides measures to manage impacts to microbats during tree clearing and infrastructure demolition. The objectives of this MMP are to comply with the commitments made in the revised BDAR by:

- Detailing the microbat species present within the Study Area and Development Site (as per the project BDAR, Kleinfelder 2024).
- Identifying the buildings and infrastructure which have potential entry points and roosting opportunities.
- Advising personnel on managing microbat encounters during demolition and hollow-bearing tree clearance.
- Reducing risks of microbat injury or mortality where reasonable and practicable.
- Minimising disturbances to any breeding microbats.
- Recommending habitat replacement strategies.
- Provision of exclusion techniques and/or other management practices (as appropriate).

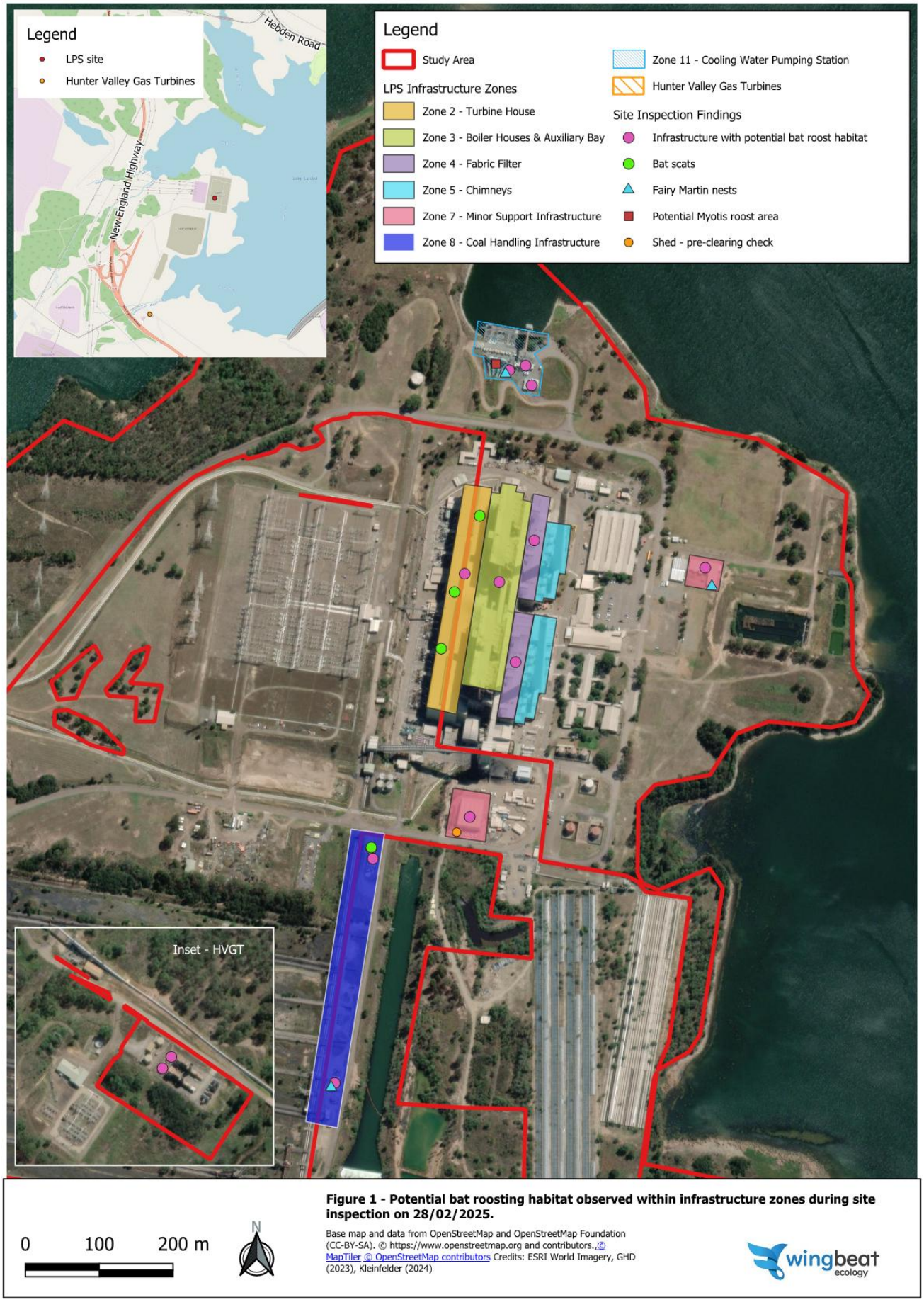


Figure 1 - Potential bat roosting habitat observed within infrastructure zones during site inspection on 28/02/2025.

Figure 1 – Potential bat roosting habitat observed within infrastructure zones during site inspection on 28/02/2025.

1.3. Microbat habitat to be impacted

1.3.1. Native vegetation and hollow-bearing trees

Vegetation within the Study Area (all Stages as per BDAR) includes remnant woodland, grassland, exotic vegetation, and rehabilitation grassland/woodland. Five Plant Community Types (PCTs) were identified (Kleinfelder, 2024):

- **PCT 1603**: Narrow-leaved Ironbark - Bull Oak - Grey Box shrub-grass open forest (central/lower Hunter)
- **PCT 1604**: Narrow-leaved Ironbark - Grey Box - Spotted Gum shrub-grass woodland (central/lower Hunter)
- **PCT 1607**: Blakely's Red Gum - Narrow-leaved Ironbark - Rough-barked Apple shrubby woodland (upper Hunter)
- **PCT 1692**: Bull Oak grassy woodland (central Hunter Valley)
- **PCT 1731**: Swamp Oak - Weeping Grass grassy riparian forest (Hunter Valley)

The development will affect 81.11 ha of native vegetation and 62.04 ha of exotic vegetation. The project design focuses on disturbed areas near existing infrastructure, access tracks, and rehabilitation zones, avoiding higher condition remnant woodland, threatened species habitats, and Threatened Ecological Communities (TECs) in the northwest and southwest (Kleinfelder, 2024). While foraging habitat impacts (open forest/waterbodies) are expected, connectivity will be largely maintained through intact forests and waterbodies in the Study Area. Intact vegetation in the northern Study Area will remain well-connected to broader suitable habitats (Kleinfelder, 2024).

A total of 108 Hollow-bearing Trees (HBTs) were recorded within the Study Area (including 35 dead stags with hollows), which contain a total of 172 hollows (Kleinfelder, 2024). Within these HBTs a total of 22 hollows are expected to be impacted by the proposed development, of which 9 are small hollows most suitable for microbat roosting. A HRMP has been prepared to confirm compensatory habitat requirements for SSD-24937520 and to outline the methods for installation, management and monitoring of this compensatory habitat (for more detail refer to Kleinfelder, 2025b). During Stage 1 works three small, one medium and two large hollows will be removed. Further detail relating to the management of clearing of hollow-bearing trees is provided in **Section 4**.

1.3.2. Decommissioned infrastructure

As approved under SSD 24937520, all redundant infrastructure at LPS will be demolished as part of the Stage 1 works, which includes:

- The Turbine House including turbines, generators and turbine auxiliary equipment,
- The Boiler House including boilers, economisers, coal bunkers, coal mills, and boiler auxiliary equipment,
- Fabric Filter Plant, ID fans and gas ducts,
- Transformers and power systems,
- The electrical and mechanical plant from the cooling water pumping station (CWPS),
- The coal supply system including coal conveyors, bins, coal yards, stackers and reclaimers and all associated switch yards and switch rooms,
- Ancillary buildings including offices, workshops, warehouses, amenities, roads and carparks where not suitable for re-use,
- The 50 MW HVGTs.

Development activities will be carried out during the following construction hours:

- Monday to Friday: 7:00 am to 6:00 pm
- Saturday: 8:00 am to 6:00 pm
- At no time on Sundays or public holidays

Blasting activities will be carried out Monday to Saturday: 7:00 am to 5:00 pm and at no times on public holidays. The expected duration of the Stage 1 works is estimated at 36 months, commencing in approximately May 2025. Demolition in Stage 1 will generally include:

- Site establishment and preliminary works.
- Asbestos removal.
- Mechanical and explosive demolition of above ground infrastructure.
- Removal of infrastructure to the bottom of slab and foundations to the
- equivalent level.
- Cleaning of pits as required, and punching of pits to allow drainage then filled with crushed concrete.

Some infrastructure may be retained and modified where a suitable use is identified e.g. for water management. Demolition techniques will predominantly be ‘mechanical demolition’ and ‘induced collapse’ methods (using a combination of engineered cut and pull methods and explosive methods). ‘Deconstruction and dismantling’ are another technique proposed for some of the equipment in the Turbine Hall where an induced

collapse and mechanical demolition would be difficult to achieve safely and cost effectively (GHD, 2023).

Most of the larger infrastructure components within the power station (e.g. Turbine House, Boiler Rooms, stacks) will be demolished using a range of techniques that require a broad exclusion zone and do not allow site personnel including the Project Ecologist/'fauna spotter catcher' (FSC) to safely observe the demolition and enter to inspect afterwards (i.e. large machines being used to cut and pull down the metal walls and roof of the power station). The Project Ecologist/FSC role will focus more on undertaking pre-clearing inspections and observing demolition of the smaller brick and timber buildings in Zone 7, 8, 11 and the HVGT site (for more detail refer to **Section 1.4** and **Section 4**).

Prior to full scale demolition, buildings will undergo a process of pre-stripping and removal of hazardous materials. This process will create considerable noise and vibrations and will introduce temporary lighting back into areas that have remained relatively dark throughout the day. This pre demolition process will occur over several months and will continue as the demolition works progress. The progressive nature of the pre demolition and demolition works, including the blasting of the stacks, should aid in discouraging any bats from returning to roost within the Development Site.

A summary of the site inspection results undertaken to assess potential microbat roosting habitat within the various infrastructure across the site is provided in **Section 3**, with photographs provided in **Appendix A**. Locations of the various infrastructure zones are shown in **Figure 1**. Locations of hollow-bearing trees proposed to be cleared are mapped within the HRMP (Kleinfelder, 2025b).

1.4. Health and safety

AGL's corporate Health, Safety and Environment Policy applies to all AGLM employees, contractors, products, services, and joint ventures under AGLM's operational control. AGL is committed to conducting their business in a way that causes no harm to people and minimises impact on the environment (AGL, 2023). The approved demolition and clearing works will take place over a period of about 36 months and during that time there is the potential for AGLM employees, contractors and sub-contractors to encounter microbat species.

Bites from bats in Australia can carry Australian Bat Lyssavirus (ABLV), a virus similar to rabies that can be fatal if not treated rapidly with vaccinations. Contact or exposure to bat faeces, urine or blood do not pose a risk of exposure to ABLV, nor does working near bat-roosting areas, as long as microbats are not handled.

If a person is bitten or scratched by a bat, the Australian Department of Health recommends that that person immediately:

1. wash the wound thoroughly with soap and water for at least five minutes;
2. apply an antiseptic with antiviral action; and
3. seek medical attention from a doctor or nearest public health unit.

All handling of live microbats should only be carried out by a qualified and vaccinated ecologist or FSC experienced in handling microbats as detailed below.

1.4.1. Project Ecologist / Fauna Spotter Catcher

A suitably qualified and trained Ecologist or FSC will be engaged during *certain demolition works (where reasonable and practicable) to capture, assess, and relocate any displaced microbats. Any injured animals will be taken to a veterinarian or wildlife carer for further assessment (see **Section 4.2** for more detail).

The ecologist or FSC must hold a National Parks and Wildlife Service scientific licence for handling native fauna, an Animal Care and Ethics Committee approval, and be vaccinated against ABLV. The Australian Bat Society (ABS) has prepared safe bat handling guidelines and these must be followed for this project - see ABS safe bat handling guidelines - Ausbats.

*As outlined in **Section 1.3.2** there are some large infrastructure components predominantly constructed from metal and concrete products within the power station (e.g. Turbine House, Boiler Rooms, stacks) which will be demolished using a range of techniques that will require a broad exclusion zone and do not allow site personnel including a Project Ecologist/FSC to safely observe the demolition and enter to inspect afterwards. The Project Ecologist/FSC role will focus more on pre-clearing surveys and observing demolition of the smaller brick and timber buildings in Zone 7, 8, 11 and the HVGT site (refer to **Figure 1**).

2. Microbat Assessment Methods

2.1. Field survey for BDAR

Targeted microbat surveys were undertaken in accordance with the *'Species credit' threatened bats and their habitats NSW survey guide for the Biodiversity Assessment Methodology* (OEH 2018). Anabat™ bat-call detectors were used to passively record Microchiropteran bat calls across the study area during the field surveys which informed the BDAR. Six detectors were deployed by Kleinfelder ecologists near waterbodies and rocky areas in the north of the Study Area, and along potential flyways. The initial recording was undertaken over four nights (24–28 January 2022). Four Harp Traps targeting bat flyways and waterbodies were set across the Study Area during the same period and checked daily at sunrise. Additional Anabat™ surveys were conducted by EcoResolve from 29 January to 2 February 2024. This additional Anabat survey effort was undertaken near the project infrastructure at the request of the former NSW Biodiversity, Conservation and Science (BCS) group. Details of survey effort targeting threatened microbat species are provided in **Table 1** as per the BDAR (Kleinfelder, 2024). The locations of bat survey effort are provided within the BMP mapping.

Table 1 – Survey effort completed as part of the Biodiversity Development Assessment Report.

Scientific Name	Common Name	Survey Requirements	Survey Effort
Chalinolobus dwyeri	Large-eared Pied Bat	November to January	**Anabat surveys** 24/01/2022-28/01/2022 and 06/04/2022. (EcoResolve) 29/01/2024 - 2/02/2024 **Harp trap surveys** 24/01/2022-28/01/2022
Miniopterus australis	Little Bent-winged Bat	December to February	**Anabat surveys** 24/01/2022-28/01/2022 **Harp trap surveys** 24/01/2022-28/01/2022
Miniopterus orianae oceanensis	Large Bent-winged Bat	December to February	**Anabat surveys** 24/01/2022-28/01/2022 (EcoResolve) 29/01/2024 - 2/02/2024 **Harp trap surveys** 24/01/2022-28/01/2022
Myotis macropus	Southern Myotis	October to March	**Anabat surveys** 24/01/2022-28/01/2022 **Harp trap surveys** 24/01/2022-28/01/2022
Vespadelus troughtoni	Eastern Cave Bat	November to January	**Anabat surveys** 24/01/2022-28/01/2022 (EcoResolve) 29/01/2024 - 2/02/2024 **Harp trap surveys** 24/01/2022-28/01/2022

2.2. Desktop review for BDAR

A desktop review of the *NSW Bionet* database was undertaken by Kleinfelder as part of the BDAR to identify microbat species known to occur within the locality (i.e. within a 5 km radius) of the Study Area at the time of its preparation (Kleinfelder, 2024). Seventeen species were identified through this review, of which 12 species are known to occur on site (based on call analysis – refer to **Section 3.1** for more details). **Table 2** provides the

results of the desktop review from the BDAR, indicating which species are known or likely to occur on site and outlining each species' roosting preferences.

2.3. Site inspection

A site inspection of structures proposed for demolition was conducted on Friday, 28th February 2025, by Kristy Peters of Wingbeat Ecology and Narawan Williams of Fauna Field Ecology. The primary objective of this visit was to assess the potential use of these structures by microbat species for roosting. A total of 12 person hours was spent inspecting both the larger infrastructure components (Turbine House (Ground Floor, Level 1), Mill Hall and the Boiler Rooms), along with smaller, ancillary buildings such as workshops, warehouses, the Social Club, and various old brick and timber-framed buildings across the site associated with the coal conveyors and the CWPS. The HVGT infrastructure was not assessed on the day however, photographs were provided by AGLM staff to make a preliminary assessment of the likelihood of microbat usage.

The site inspection involved an external and internal evaluation of the structures to identify potential microbat roosting habitats, such as crevices, cavities, or sheltered areas that could provide suitable conditions for microbat occupancy. Particular attention was given to features like wall gaps, roofing spaces, and structural voids, which are commonly used by microbats as roosting sites. Handheld torches, headtorches, and binoculars were used to search for the presence (or signs of presence) of roosting microbats in conjunction with an Anabat™ Walkabout active detector.

The likelihood of microbat presence within each structure was assessed based on visible signs, such as guano deposits, staining, or direct observations of microbats. Additional factors considered included proximity to surrounding habitat, such as waterbodies, woodland areas, and known flyways that enhance the suitability of the structures for microbat activity.

This assessment formed the basis for pre-, during and post-clearing management recommendations provided in **Section 4** to manage the potential impacts on microbat species during tree-clearing and demolition activities.

2.3.1. Survey limitations

Visual inspections during the day cannot always determine presence or signs of microbats, especially in larger structures such as the LPS complex. It was not possible during the site inspection to thoroughly search all potential roost sites due to inability to access wall, roof and sub-floor cavities (i.e. for safety reasons relating to 'working at heights' and in 'confined spaces'). These limitations can be managed as per recommendations in **Section 4**.

Table 2 – Microbat species known or likely to occur in the Study Area based on project BDAR findings, along with species' roosting preferences (indicated by grey shading).

Scientific Name	Common Name	BC Act	EPBC Act	*Present on site	^No. of records within 5 km	Roosting preference				
						Tree-roosting	Cave-dwelling	Man-made structures	Abandoned mines	Fairy Martin nests
Austronomus australis	White-striped Freetail-bat			+	7					
Chalinolobus dwyeri	Large-eared Pied Bat	V	V		-					
Chalinolobus gouldii	Gould's Wattled Bat			+	9					
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V		+	2					
Micronomus norfolkensis	Eastern Coastal Free-tailed Bat	V			3					
Miniopterus australis	Little Bent-winged Bat	V			1					
Miniopterus orianae oceanensis	Large Bent-winged Bat	V		+	18					
Myotis macropus	Southern Myotis	V		+	4					
Ozimops planiceps	South-eastern Free-tailed Bat			+	4					
Ozimops ridei	Eastern Free-tailed Bat			+	3					
Rhinolophus megaphyllus	Eastern Horseshoe-bat				1					
Saccolaimis flaviventris	Yellow-bellied Sheathtail-bat	V		+	1					
Scoteanax rueppellii	Greater Broad-nosed Bat	V			3					
Scotorepens balstoni	Inland Broad-nosed Bat			+	1					
Vespadelus pumilus	Eastern Forest Bat			+	2					
Vespadelus troughtoni	Eastern Cave Bat	V		+	5					
Vespadelus vulturnus	Little Forest Bat			+	5					
			Total	**12**						

*Presence based on call analysis; ^Records within 5 km from NSW Bionet Atlas

3. Microbat Assessment Results

3.1. Ultrasonic surveys

Ultrasonic call analysis from the BDAR indicated that five threatened species listed as 'vulnerable' under the Biodiversity Conservation (BC) Act occur at the Study Area:

- Large Bent-winged Bat (*Miniopterus orianae oceanensis*),
- Southern Myotis (*Myotis macropus*),
- Yellow-bellied Sheath-tailed Bat (*Saccolaimus flaviventris*),
- Eastern False Pipistrelle (*Falsistrellus tasmaniensis*) and
- Eastern Cave Bat (*Vespadelus troughtoni*).

An additional seven non-threatened species were detected from echolocation call analysis and may roost on site (refer to species in **Table 2**).

3.2. Affected threatened species assessment

Apart from the Southern Myotis, all the other threatened species detected within the Study Area were recorded outside of the Development Site (Stage 1 works area). They were detected to the west of the New England Highway in the north-west of the Study Area away from the Liddell Power Station infrastructure (refer to BMP mapping).

3.2.1. Southern Myotis (*Myotis macropus*)

Southern Myotis was detected in association with suitable foraging habitat within the Development Site during Anabat surveys for the BDAR. As per the *NSW survey guidelines for 'Species credit' threatened bats* (DPIE, 2018) and the *NSW Wildlife Atlas Threatened Biodiversity Data Collection (TBDC)* (DPE, 2025), potential foraging habitat for the Southern Myotis is considered as waterbodies or pools stretching 3 m or wider. A number of waterbodies across the Development Site and within 200 m of the Development Site were considered as representative of suitable foraging habitat for the Southern Myotis (Kleinfelder, 2024). The species polygon for the Southern Myotis as per the project BDAR (Kleinfelder (2024) forms an area of 96.74 ha (refer to BMP mapping).

Potential roosting habitat for this species was also observed during the site inspection on 28th February 2025 including land and water-based structures near the CWPS, hollow-bearing trees and Fairy Martin nests.

3.2.2. Large Bent-winged Bat (*Miniopterus orianae oceanensis*)

The species is listed as a dual Ecosystem/Species Credit species (Ecosystem Credit for foraging habitat and Species Credit for breeding habitat). Given that breeding habitat (mines, caves or tunnels) are not located within the Development Site or within

proximity, a Species Credit obligation was not generated for the species. Impacts to this species are assessed via the calculation of Ecosystem Credits (Kleinfelder, 2024).

Potential roosting habitat for this species within man-made structures, which would generally only be used outside of the species' known breeding period of November – February, was observed on site during the site inspection on 28th February 2025. Non-breeding Bent-wing Bats are known to use structures for roosting during the breeding period, however, they would generally only be found roosting as individuals or in small groups.

3.2.3. Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*)

This 'ecosystem credit' species roosts in large tree hollows and are often solitary but may be found in groups of two to six, and occasionally in large maternity colonies of over 100 (Churchill, 2022). Solitary animals are sometimes found roosting in animal burrows, in cracks in dry clay soil, and under slabs of rock. Hollow-bearing trees on site represent potential roosting habitat for this species.

3.2.4. Eastern False Pipistrelle (*Falsistrellus tasmaniensis*)

This 'ecosystem credit' species roosts mainly in hollow trunks of eucalypt trees in colonies of between 3 – 80 individuals, and on occasion they are recorded roosting in old wooden buildings (Churchill, 2022). The buildings on site are not considered to provide significant roosting habitat for this species, however hollow-bearing trees on site represent potential roosting habitat for this species.

3.2.5. Eastern Cave Bat (*Vespadelus troughtoni*)

Given that breeding or roosting habitat (mines, caves or tunnels) for the Eastern Cave Bat are not located within the Development Site or within proximity (2 km), the site does not provide suitable breeding habitat for this species. There is potential for Eastern Cave Bats to be found roosting in Fairy Martin nests within the Development Site.

3.3. Diurnal structure inspection of infrastructure

The results of the microbat habitat inspection conducted on 28th February 2025 are mapped in **Figure 1** and photographs of observed potential roosting locations are provided in **Appendix A**. **Table 3** provides a summary of the site assessment findings for infrastructure zones and the individual structures within them. Each zone or structure has been given an initial roosting likelihood rating based on the site inspection and results of the project BDAR. This rating has then been revised to reflect disturbance from noise, lighting, and vibration during pre-stripping and hazardous materials removal which will likely deter bats from returning to the structures ahead of full scale demolition.

Table 3 – Assessment of likelihood of roosting microbats within site zones/individual structures at the LPS site pre- and post- stripping and hazardous materials removal taking place.

Site Zones / Structure Name	General Observations	Potential Entry Points/Potential Habitat Observed	Assessed Likelihood of Microbat Presence Pre-strip	*Assessed Likelihood of Microbat Presence Post-strip	Photograph references (Appendix A)
Zone 2 – Turbine House • Ground Floor • Level 1	Level 1 of the Turbine Hall is very dark in most places throughout. Three microbat scats were found on the floor of the Turbine House, two on Level 1 and one on the Ground Floor. No obvious signs of microbat presence (no piles of guano, no detection of bat calls using an active bat detector device, no bats sighted using handheld torches).	Several potential entry points around exterior of building from small holes in corners through to large, open breezeway areas that allow easy access. Complex joins and voids within the roof structure may provide some roosting habitat for certain species.	Moderate	Low	Photographs 1 – 14
Zone 3 – Boiler houses and Auxiliary Bay	No obvious signs of microbat presence (no piles of guano, no detection of bat calls using an active bat detector device, no bats sighted using handheld torches). Several potential entry points around the exterior of this zone and many dark, narrow roof and wall voids between infrastructure and piping.	This area is easily accessible from 'Mill Hall', a long access tunnel running north-south and from access voids along the eastern side of the boiler houses.	Moderate	Low	
Zone 4 - Workshops	No obvious signs of microbat presence (no piles of guano, no bats sighted using handheld torches).	Internal voids (narrow channels) in roof joins between metal and wood panelling and access to the roof space where wood panelling is rotting away.	Moderate	Low	
Zone 7 - Structure 1 - Workshop	The workshop is still in use, but lighting is turned off overnight. No obvious signs of microbat presence (no piles of guano, no detection of bat calls using	Several potential entry points around exterior of building observed in roof eaves/gutter joins. Potential internal entry/exit points in open cavity running around ceiling perimeter.	Moderate	Low	Photographs 15 – 20

Site Zones / Structure Name	General Observations	Potential Entry Points/Potential Habitat Observed	Assessed Likelihood of Microbat Presence Pre-strip	*Assessed Likelihood of Microbat Presence Post-strip	Photograph references (Appendix A)
	handheld Anabat Walkabout device, no bats sighted using handheld torches).				
Zone 7 - Structure 2 – Shed beside Workshop	Metal structure with no concealed roof or wall cavities. Metal trusses are smooth with limited ability for bats to attach.	Large, open front entry to the shed with some potential for opportunistic roosting in dark corners/ceiling trusses.	Low	Low	
Zone 7 - Structure 3 – Social Club	There are multiple potential access points both into the roof/wall cavity and underneath the building. Potential roosts in currently disused Fairy Martin nests under verandah.	Several potential entry points around exterior of building observed in roof eaves/gutter joins. The building is raised on brick piers and there is access to the sub-floor void.	Moderate	Moderate	Photographs 21 – 23
Zone 8 - Structure 1 – Larger building near canal outlet	The building is no longer in use and falling into disrepair. There are multiple potential access points into timber framed building.	Several potential entry points around exterior of building observed in roof eaves/gutter joins. Fairy Martin nests on western side of building.	Moderate	Moderate	Photographs 24 & 25
Zone 8 - Structure 2 – Larger square building at northern end of canal	The building is no longer in use and falling into disrepair. There are multiple potential access points into timber framed building with some staining visible at one access point.	Several potential entry points around exterior of building observed in roof eaves/gutter joins.	Moderate	Moderate	Photograph 26
Zone 8 - Structure 3 – Smaller square building at northern end of canal	The building is no longer in use and falling into disrepair. A few potential bat scats observed inside between wooden corner posts.	Multiple potential access points into timber framed building.	Moderate	Moderate	Photographs 27 & 28

Site Zones / Structure Name	General Observations	Potential Entry Points/Potential Habitat Observed	Assessed Likelihood of Microbat Presence Pre-strip	*Assessed Likelihood of Microbat Presence Post-strip	Photograph references (Appendix A)
Zone 11 – CWPS - Structure 1	There are multiple potential access points into the roof/wall cavity. Potential roosts in currently disused Fairy Martin nests under eaves.	Several entry points around exterior of building observed in roof eaves/gutter joins.	Moderate	Moderate	Photograph 29
Zone 11 – Structure 2	There are multiple potential access points into the roof/wall cavity. Some discolouration visible at one potential access point (Photograph 31).	Several entry points around exterior of building observed in roof eaves/gutter joins. Welcome Swallows and their nests observed inside the building.	Moderate	Moderate	Photographs 30 & 31
Zone 11 – Structure 3	Underneath pumping station 'bridge' structure. Could potentially provide roosting habitat for Southern Myotis.	Potential voids underneath the pumping station were not surveyed as part of the BDAR or site inspection on 28/02/2025.	Moderate	Moderate	Photograph 32
Zone 11 – Structure 3	There are multiple potential access points into the roof/wall cavity.	Some potential entry points around exterior of building observed in roof eaves/gutter joins. Welcome Swallows and their nests observed inside the building and potential internal roof and/or wall access.	Moderate	Moderate	Photograph 33
Hunter Valley Gas Turbines (HVGT) – Structure 1	Pump housings at the HVGT site with 'low' potential roosting habitat in small, concealed spaces.	The HVGT site was not inspected by Wingbeat Ecology. Photographs provided by AGLM.	Low	Low	Photograph 34
Hunter Valley Gas Turbines (HVGT) – Structure 2	Metal hopper structure at HVGT site with some 'low' potential for roosting in concealed spaces.	The HVGT site was not inspected by Wingbeat Ecology. Photographs provided by AGLM.	Low	Low	Photograph 35
Hunter Valley Gas Turbines	Small brick building part of the HVGT infrastructure with some potential access points into roof and wall cavities.	The HVGT site was not inspected by Wingbeat Ecology. Photographs provided by AGLM.	Moderate	Moderate	Photographs 36 & 38 (example of

Site Zones / Structure Name	General Observations	Potential Entry Points/Potential Habitat Observed	Assessed Likelihood of Microbat Presence Pre-strip	*Assessed Likelihood of Microbat Presence Post-strip	Photograph references (Appendix A)
(HVGT) – Structure 3					building interior)
Hunter Valley Gas Turbines (HVGT) – Structure 4	Second small brick building part of the HVGT infrastructure with some potential access points into roof and wall cavities.	The HVGT site was not inspected by Wingbeat Ecology. Photographs provided by AGLM.	Moderate	Moderate	Photograph 37 & 38 (example of building interior)

*It is noted that the likelihood of microbat presence within the smaller brick and timber buildings could be downgraded to 'Low' after 'post-stripping' and pre-clearance surveys as outlined in **Section 4** have occurred. However, a conservative approach has been taken at this time and can be reassessed as the project progresses.

4. Impact Mitigation Strategies

4.1. Discussion of potential impacts

Approved demolition works and vegetation clearing will impact potential microbat roosting habitats, including man-made structures near known land and water foraging habitats and open forest and woodlands containing hollow-bearing trees. Direct disturbance of roosts may either cause a bat/s to abandon the roost and potentially be subject to predation in daylight hours, or to be hurt or killed by direct strike. These structures and natural hollows may be used by several threatened microbat species as outlined in **Section 3** in addition to several other common species.

Potential roosting cavities underneath the CWPS were not accessed as part of the site inspection on 28th February 2025 (refer to **Appendix A** – Photograph 29). The underside of the pumping station was identified as a potential roost for Southern Myotis, however the species has not been detected in the vicinity of this area during Anabat surveys for the BDAR.

Based on the structures present and the results of field assessment to date, no roosting bats observed, and the small amount of bat scats sighted, the proposed works present a 'low' to 'moderate' risk to microbats (refer to **Table 3**) which may be roosting within the LPS and associated infrastructure. Mitigation measures are to be applied to reduce the impacts discussed above.

4.2. Safe bat handling and release techniques

Any microbats captured during diurnal or nocturnal inspections would be housed in small cloth bags and either:

- Housed in a dark, cool, dry, quiet location for nocturnal release on the same evening/or the following night after capture, or
- Relocated into bat boxes.

The ecologist would determine the most appropriate option, considering the animal's welfare. Bags containing microbats would be hung in a cool, dry place off the ground, preferably within a wire box (e.g. a cat carry cage) for safety. Microbats housed in this way can be taken off site if required. Microbats of the same species would be housed together with no more than five in any one bag. Large bats (head and body 75-95 millimetres) would not be grouped with smaller bats (head and body < 75mm) and be assessed for heat stress as required. If temperatures exceed 25°C, a cooler location within a local building would be sought. It is recommended that any bats captured be held and released at dusk in preference to relocation into bat boxes. This is an alternative option but should only be done by an experienced microbat specialist as

bats will often fly out soon after being placed inside. Bats would not be held for longer than 24 hours. *Note: Any microbats captured during the works must be released within the study area*.

4.2.1. Contact information for local wildlife rescue organisations

Contact information for local wildlife organisations is provided below in the case of injured animals requiring care during clearing and demolition activities.

Hunter Wildlife Rescue

Rescue Line: 0418 628 483

www.hunterwildlife.org.au

Wildlife Aid (Upper Hunter focus covering Singleton, Muswellbrook and Upper Hunter Shires)

Rescue Line: 0429 850 089

E-mail: committee@wildlifeaid.org.au

4.3. Demolition pre-clearing / clearing protocol

Prior to full scale demolition, buildings will undergo a process of pre-stripping and removal of hazardous materials and other non-structural items such as switchboards and cabinets. This process will create considerable noise and vibrations and will introduce lighting back into areas that have remained relatively dark throughout the day. This pre demolition process will occur over several months and will continue as the demolition works progress. The progressive nature of the pre demolition and demolition works, including the blasting of the stacks, should aid in discouraging bats from returning to roost within the Development Site.

After taking into consideration the planned pre-stripping activities as described above from the large, complex LPS infrastructure, it is considered that post 'strip out', the likelihood of roosting microbats being present in these areas would be 'low' (refer to risk assessment in **Table 3**). AGLM have safety concerns about staff or contractors re-entering these areas 'post-strip' as there have already been observations in certain areas of cladding becoming unstable. Access to undertake Emergence Surveys or to complete the 'Daily Bat Inspection Checklist' as outlined for other areas of the site below is therefore unlikely to be possible due to safety concerns in Zones 2, 3 and 4.

However, if bats are observed flying out from any of these Zones during demolition, the contractor should 'Stop Work' as per Point 5 below and notify the site Environmental Adviser. An Ecologist should be contacted to discuss next steps before proceeding with demolition works. If there have been microbats observed flying out of the cordoned off demolition area and landing on the ground or on/in nearby structures, the FSC will be

required to attend site to assess any individuals, capture any injured bats and follow the safe-handling of bats and injury management procedures outlined in **Section 4.2**.

The following measures outline a clear sequence of actions and responsibilities to minimise impacts to microbats during staged demolition works of the smaller brick and timber buildings within Zones 7, 8, 11 and the HVGT site:

1. Emergence Surveys – Prior to Demolition

- **Responsibility**: Project Ecologist (experienced in microbat ecology).
- **Timing**: Within four (4) weeks prior to scheduled demolition within specific Zones or of individual structures.
- **Method**: Conduct dusk emergence surveys using visual observation, handheld active bat detectors, and thermal imaging at identified entry points of structures.
- **Purpose**:
    - Assess current bat use of individual buildings.
    - Inform selection of demolition methods.
    - Determine need for exclusion techniques, capture and relocation and/or roost replacement via bat boxes.
    - Identify whether follow-up Daily Bat Inspections are required.
    - Decide whether an FSC is required on site during demolition of specific structures.

2. Adaptive Management – If Microbats Are Detected

- **Responsibility**: Project Team (led by Ecologist in consultation with FSC and demolition supervisor).
- **Action**: If emergence surveys confirm bat use, implement one or more of the following:
    - **Deterrents**: Use internal lighting to discourage roosting.
    - **Soft Demolition**: Carefully dismantle roosting features (e.g., eaves, roof spaces) before heavy machinery is used where practical and safe to do so.
    - **Exclusion Methods**:
        - Install artificial bat boxes in safe nearby locations.
        - Fit one-way exclusion devices on roosts to allow exit but prevent re-entry.

        - Gradually seal off roost access to encourage natural relocation.
    - **Capture & Relocation**: If necessary, capture and relocate individuals in accordance with licencing requirements and ethical protocols.

3. Daily Bat Inspection – Day of/Day before Demolition

- **Responsibility**: Ecologist / FSC for 'moderate' risk structures or AGLM staff / contractor for 'low' risk structures.
- **Timing**: Within 48 hours prior to demolition.
- **Method**: Inspect moderate or low-risk structures (as identified in **Table 3**) using the Daily Bat Inspection Checklist (see **Appendix C**).
- **Outcome**:
    - If **no bats are found**, demolition may proceed without FSC supervision.
    - If **bats are detected**, stop work and refer to the "Stop Work" protocol (Point 5 below).

4. Fairy Martin Nest Removal

- **Responsibility**: Ecologist vaccinated for Australian bat lyssavirus.
- **Method**: Carefully remove nests (located under eaves) using a long pole and handheld net. Inspect for any roosting bats or other fauna before discarding nests.
- **Outcome**: Any captured fauna will be safely released or managed appropriately.

5. Stop Work Protocol – If Bats Are Encountered During Demolition

- **Responsibility**: All on-site personnel to report, Project Ecologist/FSC to lead response.
- **Action**: Immediately cease works. Ecologist or FSC will assess and relocate microbats as needed using appropriate equipment (e.g., calico bags, gloves, containers).
- **Requirement**: Only resume demolition after ecological clearance is completed.

6. Injury Management Protocol

- **Responsibility**: FSC or Ecologist.
- **Action**: Capture and assess any injured bats. If required, transfer to a licensed wildlife carer for treatment (refer to **Section 4.2.1**).

7. Timing of Works – Avoiding Sensitive Periods

- **Responsibility**: Project Manager in consultation with Ecologist.
- **Action**: Schedule works in Zones 7, 8, 11 and the HVGT site where possible to avoid sensitive periods (refer to **Appendix C** for Southern Myotis and Bent-winged Bat seasonal windows).
- **Preferred Window**: April to August (outside key reproductive periods).

4.4. Vegetation clearing including hollow-bearing tree removal

Pre-Clearance / Clearance Measures

A range of pre-clearance and clearance measures during hollow-bearing tree removal are outlined in the BMP. Any bats encountered during hollow-bearing tree removal will be managed in accordance with **Section 4.2** above.

Habitat Replacement and Enhancement for Microbats

- **Loss of breeding habitat in cleared tree hollows:** Tree hollows from trees cleared for the project will be relocated and installed in suitable mature trees as close to their original location as possible. If existing tree hollows cannot be successfully relocated (e.g., they are damaged during clearing), artificial nest boxes are to be installed in appropriate habitat at a 4:1 ratio to those lost. Refer to the Habitat Restoration Management Plan (Kleinfelder, 2025b) for more detail. Information about bat nest box design, installation and maintenance is provided in **Appendix D**.
- **Habitat Enhancement:** Enhance retained habitat by protecting nearby vegetation, improving connectivity, and reducing edge effects to provide optimal foraging and roosting opportunities for locally occurring species. Refer to the Habitat Restoration Management Plan (Kleinfelder, 2025b) for more detail.

5. Roles and Responsibilities

Table 4 outlines the roles and responsibilities of key AGLM staff and contractors relevant to demolition and vegetation clearing of potential microbat roosting habitat as part of Stage 1 works (as per the project Environmental Management Strategy (EMS), (AGL, 2025).

Table 4 - Roles and responsibilities of key AGLM personnel and contractors

Role	Responsibility
Key AGLM personnel	
Program Director – AGL Closure Programs	• Managerial authority and responsibility for all environmental matters within LPS demolition and rehabilitation works. • Management of Liddell Transition Team. • Regular review of environmental management programs including the establishment of environmental objectives and targets. • Monitoring and improving environmental performance. • Timely renewal of operating licences. • Compliance with all licence conditions and regulatory reporting requirements. • Manage maintenance of plant and equipment.
Site Manager Liddell Transition	• Provide adequate resources for the implementation of the EMS. • Ensure all appropriate approvals have been obtained. • Ensuring that all staff and contractors under their control are aware of environmental compliance issues and environmental controls listed in the EMS. • Oversee project implementation. • Order stop-work for any activity that may cause environmental harm. • Management of site-based Liddell Transition Team. • Manage demolition and rehabilitation works. • Manage maintenance of plant and equipment.
Manager Environment and Approvals – Liddell Transition	• Manage environmental approvals process. • Ensure the project EMS is established, implemented, and maintained. • Report to the Site Manager – Liddell Transition on the performance of the EMS and recommendations for improvement. • Planning for and responding to emerging environmental trends. • Initiating the external independent environmental audit program. • Liaising with Management in the setting of environmental objectives and targets, defining the context of the organisation and maintaining the interested parties register and all associated actions for the project. • Communicating environmental performance. • Assisting in the management and investigation, and reporting of major environmental incidents.
Liddell Transition Environment Team	• Assist the Manager Environment and Approvals in carrying out their environmental management responsibilities, by: ○ Providing necessary technical input for environmental decision making. ○ Co-ordinating environmental compliance. ○ Assisting in developing environmental objectives and targets and environmental management programs.

Role	Responsibility
	○ Liaising with and providing information to the Independent Environmental Auditor.
Key Contractor roles	
Project HSEQ Manager	• Provide advice and assistance on environmental matters to the Project Manager, Project Site Manager and employees • Identify key environmental risks and opportunities to ensure high environmental performance • Attendance at on-site meetings to ensure environment related issues are raised for review • Monitoring the effectiveness of environmental management measures • Manage and advise on training needs • Plan for and respond to emerging environmental trends. • Support external independent environmental audits. • Assisting in the management and investigation of major environmental incidents. • Manage the contractor's environmental management responsibilities, including the following • Provide necessary technical input • Co-ordinate environmental compliance. • Assist in developing and updating environmental objectives and targets and environmental management programs. • Provide information to the Independent Environmental Auditor • Conduct investigations into incidents and non-conformance events • Lead by example to promote environmentally sound practices • Assist in developing Safe Work Method Statements (SWMS) for all tasks and ensuring the required environmental measures are included and the work is monitored throughout • Carry out Daily Bat Inspection Checklists for demolition of 'low risk' structures
Project Manager	• Ensure effective internal and external communication programs are in place • Ensure the DEMP meets AGLM and DPHI requirements for the project • Responsible to ensure the DEMP is implemented and maintained • Engage competent and licensed sub-contractors, as required by legislation, to undertake works • Organisation of on-site personnel with regard to their responsibilities within the HSEMS • Accountable for the effectiveness, suitability, and adequacy of the contractor Environmental Management System. • Promote continual improvement and provide support as required • Ensure the Environmental Management System achieves its intended outcomes • Ensure resources are available to support the Environmental Management System • Ensure employees are equipped with sufficient skills to comply with the EMS throughout the delivery of the project • Responsible for resourcing employee activities and ensuring plant is operated and maintained in a manner that minimises risk to the environment • Input into regular reviews of HSEMS elements including the establishment and review of environmental objectives and targets.

Role	Responsibility
	• Monitoring and improving environmental performance at a project level. • Compliance with all environmental and regulatory requirements and other reporting requirements. • Lead by example to promote environmentally sound practices
Project Site Manager	• Carry out Daily Bat Inspection Checklists for demolition of 'low risk' structures • Assist in the implementation of the DEMP and this EMS • Ensure all project staff have adequate training and experience to manage the risks associated with their roles • Assist in developing Safe Work Method Statements (SWMS) for all tasks and ensuring the required environmental measures are included and the work is monitored throughout • Ensure site inductions are conducted for all workers and sub-contactors, • Undertake environmental related duties as directed by the Project Manager. • Lead by example to promote environmentally sound practices
Area Supervisors	• Lead by example to promote environmentally sound practices • Assist in the implementation of the DEMP and this EMS, • Other Environmental related duties as directed by the Project Site Manager. • Lead by example to promote environmentally sound practices
Project Ecologist / FSC	• Undertake pre-clearance surveys (emergence surveys) within four (4) weeks of planned demolition of 'moderate' risk structures • Attend site for demolition of buildings with 'moderate' risk of roosting microbats • Provide guidance to AGLM to ensure the aims of the MMP are achieved and impacts to microbats are safely managed.
All Workers	• Comply with the DEMP and the EMS. • Raise environmental issues or hazards. • Report all environmental incidents, hazards, non-compliances and near misses in a timely manner. • It is the responsibility of any worker that identifies a dead or injured microbat to notify the site supervisor, project manager and environmental officer immediately. Work may need to stop in the area of the find (as advised by the ecologist).

5.1.1. Reporting and communication

Reporting and communication of the outcomes of management measures undertaken as part of the MMP will be communicated to relevant Departments and stakeholders in accordance with the monitoring requirements outlined in the BMP.

6. References

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Transport for NSW (2023). Microbat management guidelines. Prepared by Transport for NSW Environment & Sustainability Branch, March 2023.

Appendix A – Site Photographs

Zones 2 - 4



Photograph 1 – Dark interior of Turbine House, flashlight beam showing potential roof roosting places (Zone 2).



Photograph 2 – Flashlight illuminating complex corner beam structures with narrow roosting spaces inside Turbine House, Level 1 (Zone 2).

Zones 2 - 4

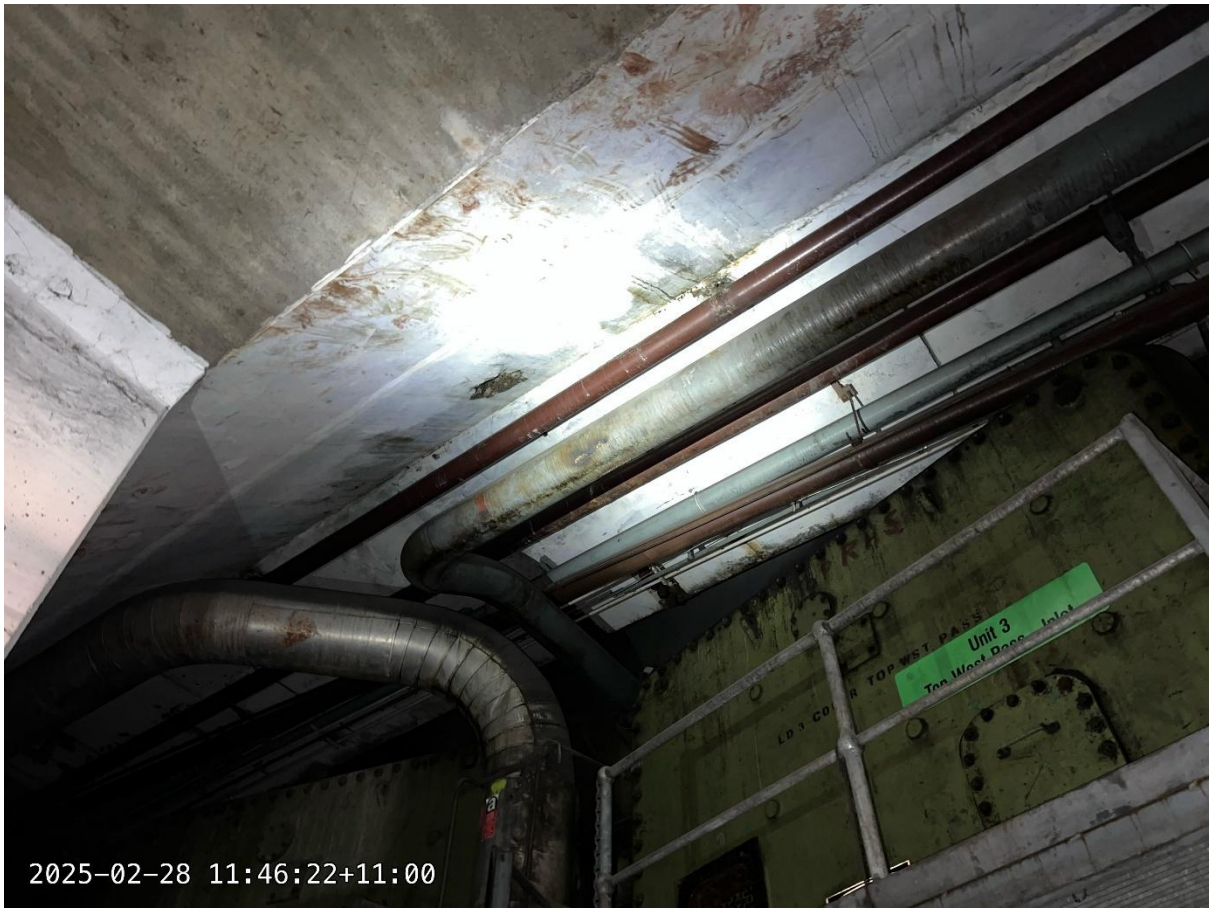


Photograph 3 – View to northern end of the station Turbine Hall (Level 1) showing dark corner zone (Zone 2).



Photograph 4 – Ground level of Turbine Hall showing potential roost spaces in rougher walled areas (Zone 2).

Zones 2 - 4



Photograph 5 – Ground level of Turbine Hall showing rough patches in concrete roof surface and dark, narrow spaces between pipe infrastructure (Zone 2).



Photograph 6 – Circular drainage holes in roof of Turbine Hall ground floor, some plugged with rags providing potential roosting places (bat scat found beneath these holes, no bats sighted) (Zone 2).

Zones 2 - 4



Photograph 7 – Looking north to LPS Turbine Hall, Boiler rooms, stacks and associated minor infrastructure (Zones 2, 3 and 4)



Photograph 8 – Dark corner of Turbine Hall, Level 1 showing a potential entry point and roosting area (Zone 2)

Zones 2 - 4



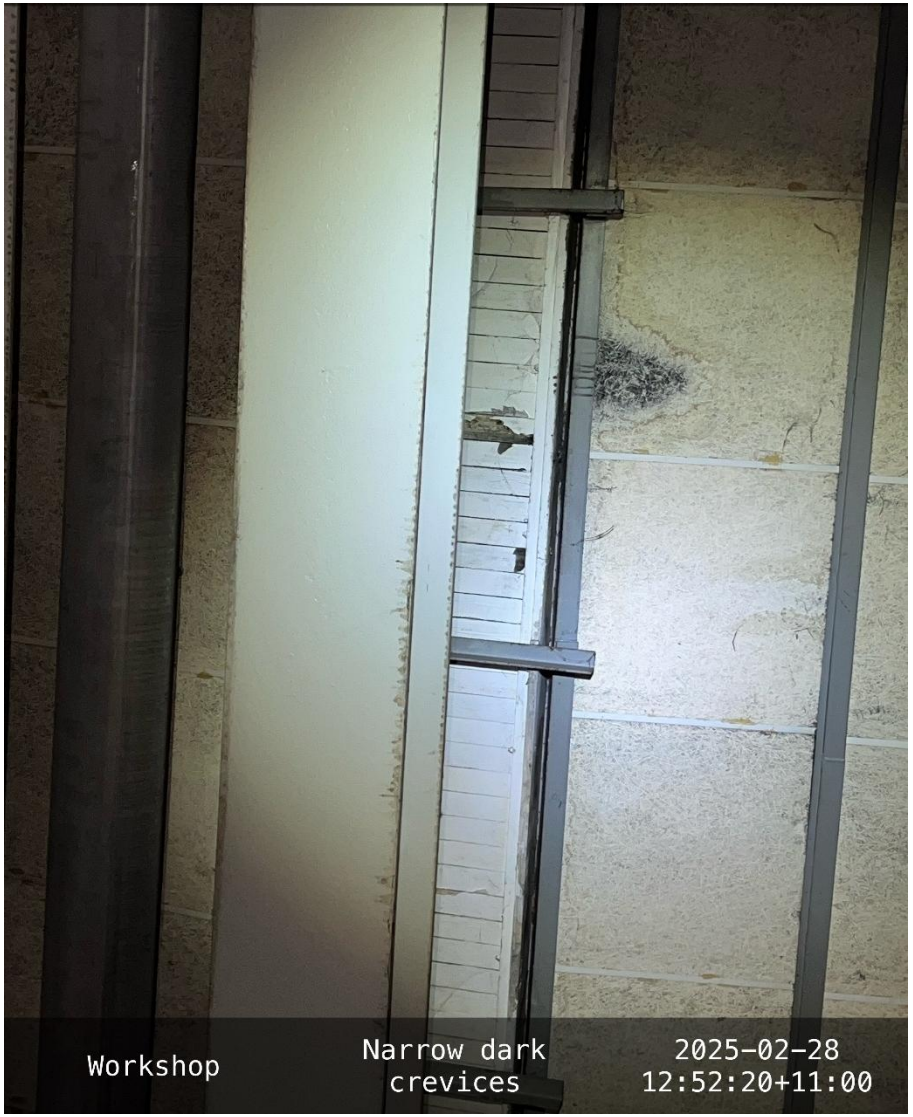
Photograph 9 – Bat scat found on floor of Level 1 of the Turbine Hall (Zone 2).



Photograph 10 – Flashlight illuminating various cross beam junctions and narrow gaps between beams and rafters on Level 1 of the Turbine Hall (Zone 2).

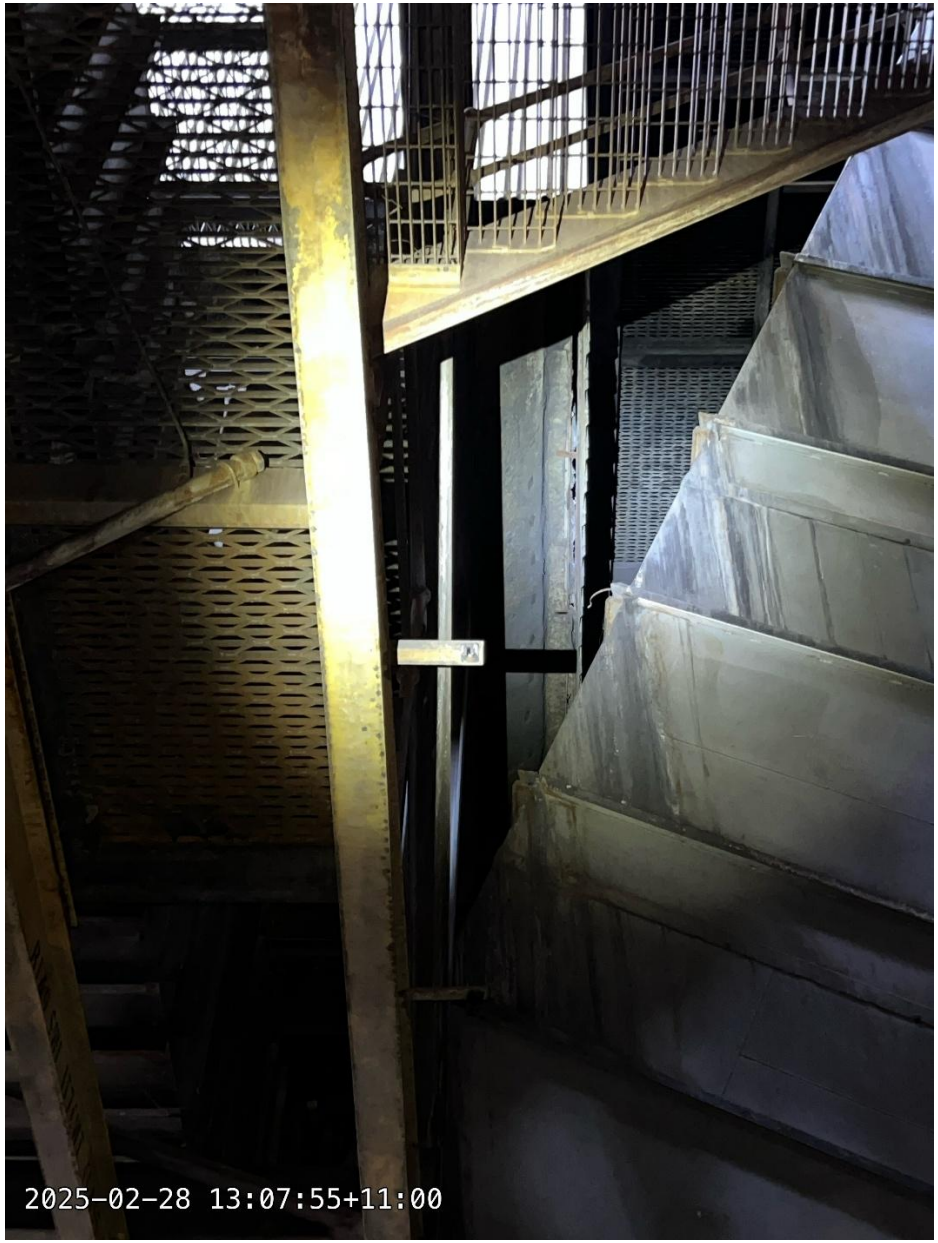
Zones 2 - 4





Photographs 11 & 12 – Workshop to the east of the Power Station near the stacks, photos showing narrow, dark spaces between cross beams and narrow crevices beside rotting wood panelling (Zone 4).

Zones 2 - 4





Photographs 13 & 14 – Roof spaces containing small, dark voids with rougher surfaces in the Mill Hall and boiler room areas (Zone 4).

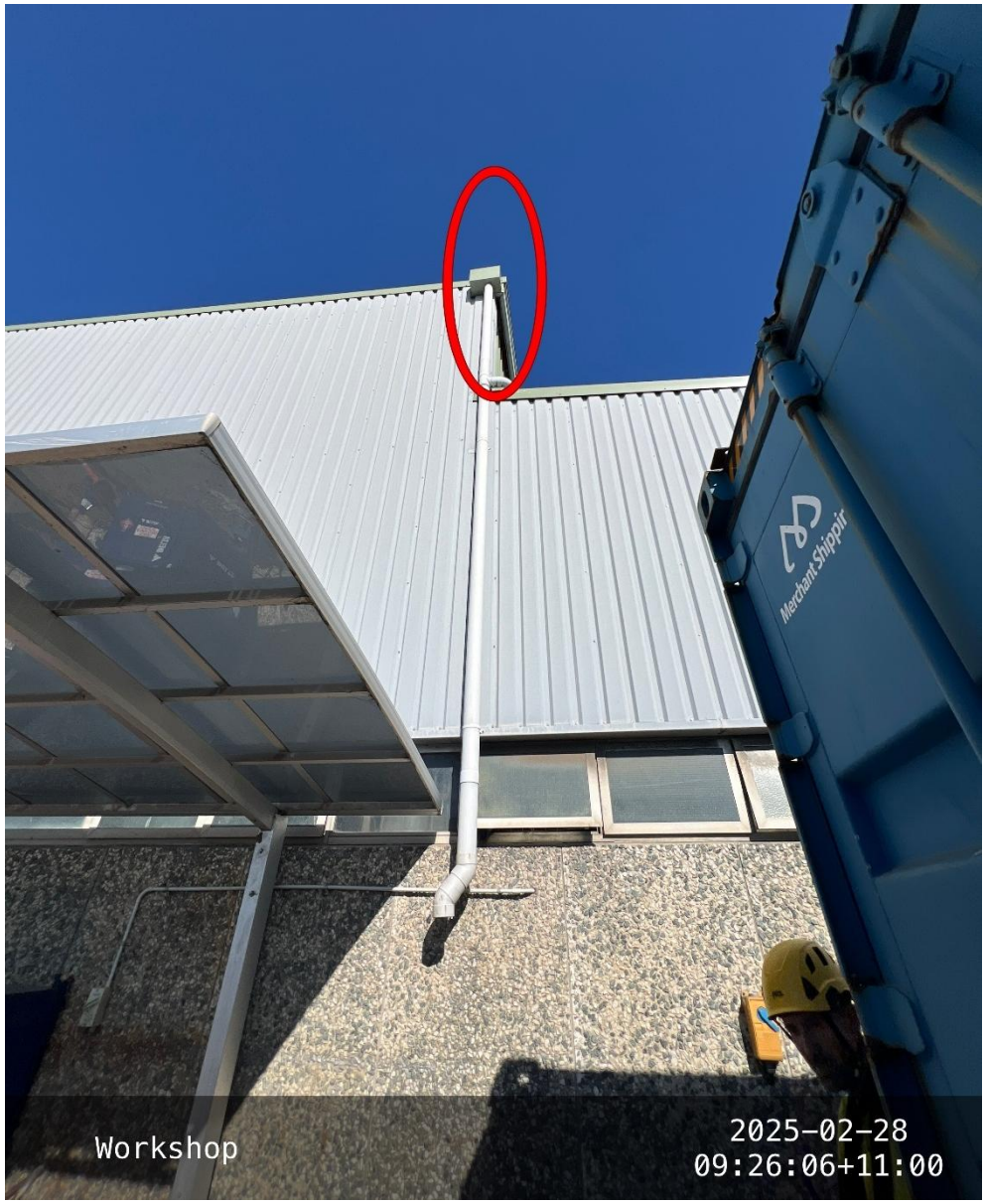
Zone 7





Photograph 15 & 16 - Potential entry points to rear exterior of large workshop just south of the Power Station (Zone 7).

Zone 7





Photograph 17 & 18 - Potential entry points to front exterior of large workshop just south of the Power Station (Zone 7).

Zone 7



Photograph 19 - Internal dark voids in ceiling around perimeter of the workshop (Zone 7).



Photograph 20 - Metal shed directly south of large workshop, no signs of microbat activity (Zone 7).

Zone 7



Photograph 21 - Fairy Martin nests located underneath the verandah on the southern side of the Social Club building (Zone 7).



Photograph 22 - Rotting timber fascia and eaves of the Social Club building providing potential access points (Zone 7).

Zone 7



Photograph 23 - The sub-floor of the Social Club is accessible in certain places, providing access to a dark void underneath parts of the building (Zone 7).

Zone 8



Photograph 24 - Fairy Martin nests underneath the eaves of an old, brick building near the coal conveyors and outlet canal (Zone 8).



Photograph 25 - Rotting fascia and eaves of the same brick building near the coal conveyors and outlet canal (Zone 8).

Zone 8



Photograph 26 - One of two small buildings near the southern section of the outlet canal with potential entry points where the metal roof is lifting from the wooden fascia (Zone 8).

Zone 8





Photographs 27 & 28 - Second small building near the southern section of the outlet canal. Exterior and interior condition shown – suspected bat scats found below timber corner join (Zone 8).

Zone 11



Photograph 29 - Fairy Martin nests under the eaves of an old brick building near the Cool Water Pumping Station (CWPS) (Zone 11).



Photograph 30 - Rotting timber fascia and eaves providing access to the roof cavity in old buildings near the CWPS. Welcome Swallow nests inside these buildings (Zone 11).

Zone 11



Photograph 31 - Another example of lifted roof sheeting, rotting timber fascia and eaves providing access to the roof cavity in old buildings near the CWPS. Some discolouration of the timber at potential access points can also be seen.



Photograph 32 - CWPS infrastructure with view toward dark voids below the pipe intakes. Potential Southern Myotis roosting habitat but was not inspected during site visit as would require water vessel access.

Zone 11



Photograph 33 - Another old brick building near the CWPS infrastructure with internal roof access (Zone 11).

Hunter Valley Gas Turbines (HVGT)



Photograph 34 - Infrastructure at the HVGT site with ‘low’ potential roosting habitat in small, concealed spaces.



Photograph 35 - Metal hopper structure at HVGT site with some ‘low’ potential for roosting in concealed spaces.

Hunter Valley Gas Turbines (HVGT)



Photograph 36 - Small brick building part of the HVGT infrastructure with some potential access points into roof and wall cavities.



Photograph 37 – A second brick building part of the HVGT infrastructure with similar potential access points.

Hunter Valley Gas Turbines (HVGT)



Photograph 38 - Interior of one of two small brick buildings at HVGT site with limited suitability for microbat roosting inside the building. Considered more likely that bats may roost in the wall or roof cavity, accessing the buildings from exterior entry points.

Appendix B – Daily bat inspection checklist

Inspection details			
Project name		Project number	
Project location			
Inspected area (e.g., pier/span number)			
Inspector's name			
Inspector's role			
Inspection date	DD MMM YY	Inspection time	

	Inspection	Check	Comments
1	Look in all areas containing microbat habitat e.g., between gaps in the cross decking above the girders, in grab holes of culverts etc.	☐ No ☐ Yes	
2	Look for any guano (bat faeces) around work area.	☐ No ☐ Yes	
3	Listen for any microbat chatter/calls.	☐ No ☐ Yes	
4	Any other dark or protected areas that bats might be?	☐ No ☐ Yes	

Bat presence?		Comments
Any bats or evidence of bats found?	☐ No ☐ Yes	
If 'Yes' work MUST stop. PDM or Work Supervisor MUST be contacted immediately.		

Certification

.....	.....	.....
Inspected by	Signature	Date
.....	.....	.....
Sighted by (Site Supervisor)	Signature	Date

Source: Microbat Management Guidelines (TfNSW, 2023).

Appendix C – Timing restrictions for microbats

Months coloured red are affected by timing restrictions. Months coloured orange may be indirectly affected and green-coloured months present no restriction:

		J	F	M	A	M	J	J	A	S	O	N	D
When are microbats present in structures?	Myotis	Any time of year											
	Bent-winged Bats	Not present		Outside of breeding period									Not present

Myotis can be present at any time of year. Bent-winged bats breed in maternity caves from November to February.

		J	F	M	A	M	J	J	A	S	O	N	D
When are target microbats breeding?	Myotis	Breeding period				Non-breeding					Breeding period		
	Bent-winged Bats	Breeding period		Non-breeding									Breeding period

Myotis breed in structures from October to April. Bent-winged bats breed from November to February, but not in structures.

		J	F	M	A	M	J	J	A	S	O	N	D
When can they be surveyed?	Myotis	Any time of year											
	Bent-winged Bats	Not present		Outside of breeding period									Not present

Myotis roosting in structures can be surveyed at any time of year but Bent-winged bats will breed outside of structures and cannot be surveyed at that time. See also Appendix E for BAM survey guidelines and how they apply to Transport projects.

		J	F	M	A	M	J	J	A	S	O	N	D
When do seasonal restrictions apply?	Myotis	Breeding period				Seasonal restrictions do not apply					Breeding period		
	Bent-winged Bats	Seasonal restrictions do not apply											

Seasonal restrictions only apply to Myotis, and only in the breeding period. Bent-winged bats are not present in structures while breeding.

		J	F	M	A	M	J	J	A	S	O	N	D
When do daily activity restrictions apply?	Myotis	Breeding period				Timing restrictions					Breeding period		
	Bent-winged Bats	No timing restrictions		Timing restrictions									No timing restrictions

When Myotis is present, daily activity restrictions only apply outside of the breeding periods from May to September.

If ONLY Bent-winged bats are present, timing restrictions are in place from March to October. No timing restrictions apply during Bent-winged bats' breeding seasons, as they are not present in structures.

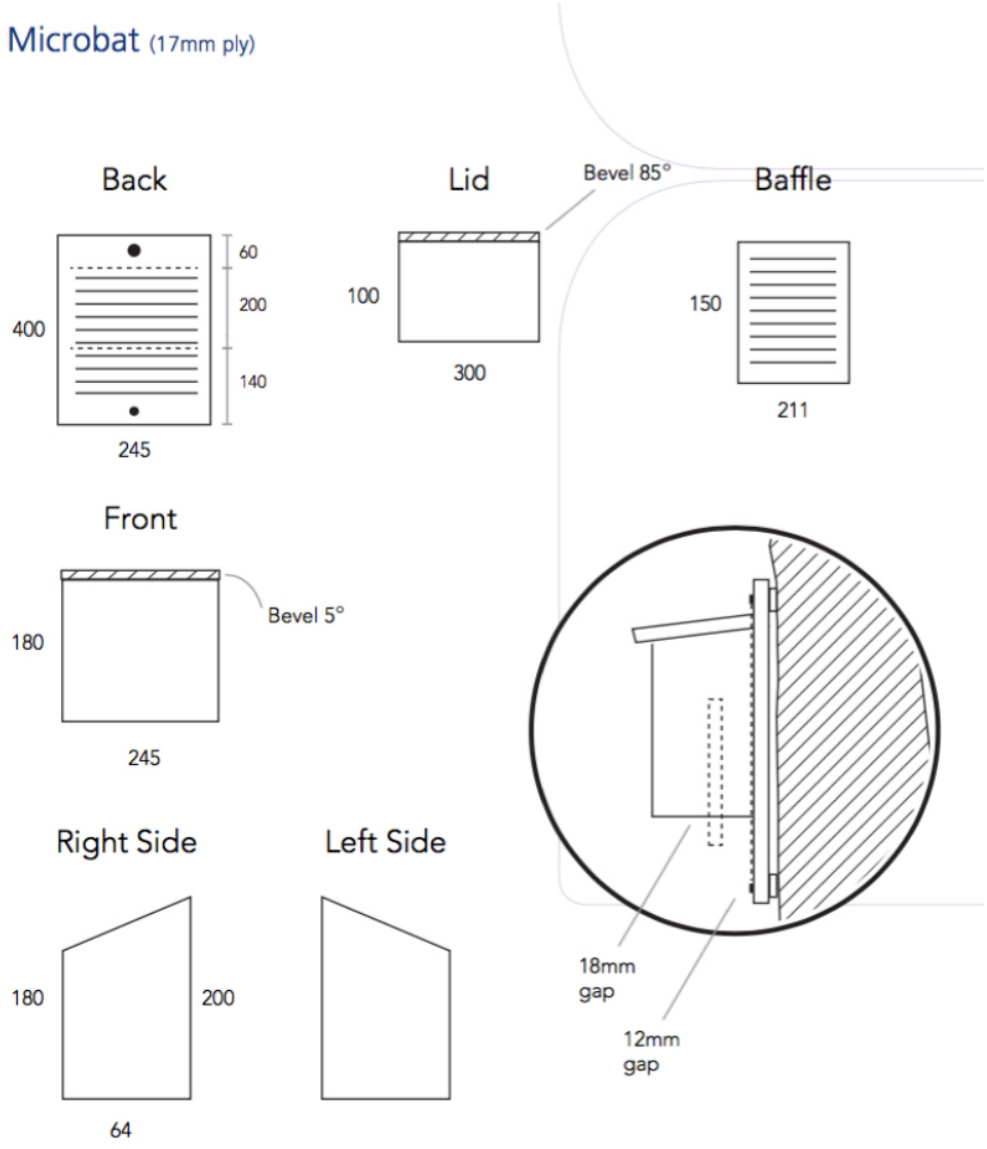
Source: Microbat Management Guidelines (TfNSW, 2023).

Appendix D – Bat box installation guidelines

Resources for nest box designs, installation and monitoring guidance are available at:

- Australasian Bat Society Install a Microbat House - Ausbats
- Nest Box Tales Microbats – Nest Box Tales
- Greater Sydney LLS Build your own Wildlife Nest Box: A guide for Western Sydney

A commonly installed and commercially available design diagram for microbat boxes is provided below.



Source: Greater Sydney Local Land Services (2017) - Build your own Wildlife Nest Box: A guide for Western Sydney.

Australia

SYDNEY
Level 10 201 Pacific Highway
St Leonards NSW 2065
T 02 9493 9500

NEWCASTLE
Level 3 175 Scott Street
Newcastle NSW 2300
T 02 4907 4800

BRISBANE
Level 2 95 North Quay
Brisbane QLD 4000
T 07 3648 1200

CANBERRA
Suite 2.04 Level 2
15 London Circuit
Canberra City ACT 2601

ADELAIDE
Level 4 74 Pirie Street
Adelaide SA 5000
T 08 8232 2253

MELBOURNE
Suite 9.01 Level 9
454 Collins Street
Melbourne VIC 3000
T 03 9993 1900

PERTH
Suite 3.03
111 St Georges Terrace
Perth WA 6000
T 08 6430 4800

Canada

TORONTO
2345 Yonge Street Suite 300
Toronto ON M4P 2E5
T 647 467 1605

VANCOUVER
2015 Main Street
Vancouver BC V5T 3C2
T 604 999 8297

CALGARY
700 2nd Street SW Floor 19
Calgary AB T2P 2W2

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