Annexure B

Clearing Protocol

HumeLink West

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1. Introduction

1.1. Context

This Clearing Protocol (the protocol) forms part of the Biodiversity Management Sub-plan (BMP) of the HumeLink West project (HLW) Construction Environmental Management Plan (CEMP). The protocol has been prepared to outline and describe how the UGL Limited and CPB Contractors Joint Venture (HLWJV), during the construction of HLW, will comply with the Minister's Conditions of Approval (MCoA), the Updated Environmental Management Measures (UMM), and undertake its duties in accordance with the Planning Approval Documentation listed under MCoA A2.

1.2. Purpose and objective

This protocol describes the HLWJV protocol for clearing works during construction of HLW to reduce the immediate impact of habitat loss caused to flora and fauna. The strategy aims to address relevant actions and mitigation measures outlined in the following documents:

- Updated mitigation measures B1, B3, B4, B13, B20, B21, B33, B34 and B35 of the *HumeLink Biodiversity Development Assessment Report Rev 0* (Revised BDAR; Niche Environment and Heritage Pty Ltd, June 2024).
- Minister's Conditions of Approval (MCoA) A2.
- Federal Minister for Water and Environment Condition of Ministerial Approval.

1.3. Permits and licences

The permits and licences relevant to this protocol include:

- All Project Ecologists must, at a minimum, hold a Scientific Licence under Part 2 of the *Biodiversity Conservation Act 2016* (including Animal Ethics Approval) for fauna handling, rescue and all additional survey works.
- Where rescued fauna requires rehabilitation and care, only wildlife rehabilitation centres authorised under Part 2 of the *Biodiversity Conservation Act 2016* may be utilised.
- Clearing works to be managed and monitored using internal HLWJV Clearing Permits.

1.4. Consultation

Consultation undertaken in preparation of this protocol is summarised in Annexure J: Consultation Summary and Section 4 of the HLW BMP. If consultation with relevant stakeholders or regulators is required to assess the efficacy of mitigation strategies detailed in this protocol, these will be undertaken in accordance with Section 8.3 of the HLW BMP.

2. Preparation

2.1. Key Fish Habitat Assessment

In the event that any further or alternative waterway crossings are required in areas mapped as Key Fish Habitat (KFH) or indicative threatened species distribution mapping, a KFH Assessment will be undertaken at the proposed crossing location. The assessment approach will be consistent with that used for the EIS and will address any potential impacts to threatened aquatic species or KFH. This assessment may be desktop based if suitable levels of information are available but may also recommend a field inspection if threatened aquatic species or sensitive aquatic habitat features are considered to have a moderate or higher likelihood of occurring, in order to guide micro-siting and design/mitigation measures to minimise impacts to aquatic environments.

Aquatic biodiversity surveys will be conducted at Class 1 crossing locations and Key Fish Habitat prior to construction commencing (pending landowner approval). Data obtained during pre-construction aquatic surveys will assess habitat quality and health of the aquatic and riparian environment, including:

- Channel morphology and general habitat value.
- Type and condition of riparian vegetation.
- Presence, type and condition of aquatic macrophytes.
- Flow types (pools, riffles, runs).
- Type of riverbed substrate and presence of bars.
- Bed and bank stability.
- Count and description of habitat features such as snags, woody debris, vegetation and undercuts.
- Visible signs of habitat disturbance.
- Presence/absence of exotic or pest flora.

An Aquatic Biodiversity Survey Report will be completed following pre-construction surveys. Data obtained during the consultation and pre-construction survey period will be utilised to identify the potential for threatened species to be present within impacted waterways and mitigate impacts where possible.

The report will include at minimum:

- Findings of the pre-construction aquatic biodiversity surveys, including aquatic habitat quality and waterway health
- A summary of the likelihood threatened aquatic entities potentially occurring at each site (flora, fauna and Threatened Ecological Communities).
- Completion of an updated 7-part test or Significant Impact Assessment, as relevant.
- Appropriate timing recommendations for works to occur to avoid breeding seasons of threatened aquatic species (where possible).
- Recommendations for the requirement for an Ecologist to undertake supervision or dam dewatering works (if necessary).
- Recommendations on temporary installations to mitigate disruptions in habitat connectivity. Examples include fish passages or other structures to facilitate the movement of aquatic species through waterway diversion.
- Recommendations as to micro-siting and design in order to minimize potential impacts to threatened aquatic entities.

The report will be supplied to DPI Fisheries, DCCEEW – Cwth (where required) and FCNSW (for

works on their land) for consultation and consideration, with any recommendations associated with KFH crossing design to be incorporated where relevant.

2.2. Pre-clearing Scoping Assessment

To ensure pre-clearing procedures are risk-based and efficient, a Pre-clearing Scoping Assessment will be undertaken by the Project Ecologist prior to pre-clearing surveys. This desktop process will identify areas of ecological sensitivity, assess recent bushfire history and determine relevant threatened species including their status on-site (i.e., assumed or known). Relevant features up to 100m from the disturbance zone will be considered or recorded during this assessment.. The scoping assessment will form the foundation for specialist pre-clearing methods that will be required at a specific clearing permit area (or smaller survey area).

Clearing permit areas (or smaller survey areas) relevant to each scoping assessment will be assigned unique identifiers such as HLW line and tower centres, for example: L1, 5C3/5C1-1 to 5C3/5C1-30. Clearing permit areas will include all proposed disturbance sites including the Total Clearing Zone (TCZ), Easement Clearing Zone (ECZ) and Hazard Tree Zone (HTZ), further detailed in Section 4.1.

The Project Ecologist will overlay the relevant clearing permit area with up-to-date spatial data, environmental datasets and previous survey findings including:

- BioNet species records (previous 20 years).
- Revised BDAR data:
    - Threatened flora and fauna species polygons, including assumed vs. known status.
    - Identified threatened species records.
    - Hollow-bearing tree mapping.
    - Karst and cave mapping.
    - Weed points and polygons.
    - Connectivity corridors.
    - Severely burnt lands.
- Superseding data arising from supplementary surveys, including that obtained in pre-clearing and clearing procedures of adjoining clearing permit areas.

Considerations for the Pre-clearing Scoping Assessment are provided in Attachment 1 Pre-clearing scoping assessment checklist, and will inform pre-clearing survey methods within a clearing permit area. Species-specific pre-clearing methods are further detailed in Section 3.1, however additional methods may be deemed necessary by the Project Ecologist following this scoping assessment.

2.3. Boundary delineation protocol

Unique identifying colours for boundary delineation will be finalised prior to enabling works and communicated to all relevant employees, contractors and utility staff, including sub-contractors (in accordance with Section 7.4 of the HLW BMP). Boundary delineation methods are provided in Table 2-1 to help ecological and construction teams ensure that clearing is confined to approved areas, exclusion zones are visible and consistently marked, and inadvertent impacts to fauna as a result of entanglement with flagging is minimised.

Routine inspections and maintenance of all delineations will occur as follows:

- Daily visual checks – inspect markers/flagging along active work fronts, particularly clearing limits, no-go zones, and threatened fauna and flora buffers.
- Weekly (or after major weather events) alignment walkover – traverse active or upcoming work zones to inspect condition of all boundaries.

- Replacement/repair of damaged markers, flagging and/or signage as necessary.

Toolboxes/pre-starts will occur for operators and other relevant HLW workforce of the boundary delineation and tree removal methodology per Table 2-1. The project induction would include general requirements of clearing.

Table 2-1 Boundary delineation protocol

Zone	Purpose	Delineation method and material
Clearing limit boundary	Defines the clearing limits for each disturbance zone (i.e., Total Clearing Zone, Easement Clearing Zone, Hazard Tree Zone) with their relevant clearing methodologies. Permits safe movement of fauna.	Marker posts at incremental distances (line of sight or maximum distance of 20 m) between disturbance zones. Markers may involve star pickets or any other post material, coloured either side to distinguish between disturbance zones, while allowing safe movement of fauna, machinery and personnel. Where marker posts can't be detected by plant operators due to vegetation cover, flagging tape can be tied to trees instead to delineate the clearing boundary. Where individual trees are being cleared, trees for removal will have a painted X on either side of tree, visible to heavy machinery to prevent confusion of edges and trees to be Retained.
No-go zones	Protects sensitive areas (e.g., Threatened Ecological Communities, threatened orchids) from disturbance without prohibiting movement of fauna through the landscape.	Nearby an active work front = fencing constructed by continuous flagging tape or two-strand wire along the outer edge of the no-go zone (as per final GIS layout). This construction method using star pickets would allow animals to pass/break through. After construction ceases in the area = marker posts at incremental distances (maximum distance of 10 m) along the outer edge of the no-go zone. Allows safe movement of fauna and prevents entanglement. Signage will be clear and simple in nature, for example 'Environmentally Sensitive Area – No Entry', and adequately sized so it can be seen from a distance of at least 20 m.
Threatened fauna and flora buffers	Protect fauna breeding habitats and threatened flora from disturbance while permitting safe movement of fauna.	Marker posts at incremental distances (maximum distance of 10 m) along the outer edge of the temporary buffer (minimal disturbance zone). Allows safe movement of fauna and prevents entanglement.

Zone	Purpose	Delineation method and material
Connectivity corridors	Maintain permanent fauna movement in accordance with Annexure F: Connectivity Strategy of the HLW BMP while permitting safe movement of fauna.	Tall marker posts at incremental distances (line of sight or maximum distance of 20 m) along the outer edge, as determined by the Project Ecologist. Allows safe movement of fauna and prevents entanglement while controlling inadvertent impacts from construction. Signage will be clear and simple in nature, for example 'Connectivity Corridor', and adequately sized so it can be seen from a distance of at least 20 m.
Daily clearing limits	Sets daily work front limits to assist with final pre-clearing checks.	Rope. Moved daily to define clearing limits. If works are extending over a weekend/period of non-work, ropes are to be removed and re-installed once daily works resume to prevent fauna entanglement.

3. Pre-clearing surveys

Following boundary delineation in a clearing permit area (refer Section 2.3) and within 4 weeks of clearing works commencing, an experienced Project Ecologist will undertake pre-clearing surveys to a minimum distance of 100 m (or to the outer boundary of the HTZ). The pre-clearing survey will involve the following:

- Identify and mark, with flagging or other suitable visible item, threatened flora habitat (known and assumed) with the partial clearing zones (Easement Clearing Zone & Hazard Tree Zone). Any threatened flora individuals recorded would be marked with GPS coordinates recorded.
- Identify, mark (with flag or other suitable visible item) and record GPS coordinates of key habitat features that are suspected to accommodate fauna for Stage 2 clearing. These features may include:
    - Nests, including platform nests.
    - Hollow-bearing trees (including those containing crevices).
    - Karst roosting habitat for bats.
    - Fallen logs, hollow-bearing tree stumps, rock piles/outcrops (i.e., exposed rock as opposed to surface rock layer) and woody debris.
    - Termite mounds.
    - Dense understorey shrubs.
    - Burrows below groundcover vegetation, runaways and other established fauna routes.
    - Other habitat features for local fauna as determined by the ecologist.
- Formal habitat tree assessment per Annexure C: Hollow and Nest Strategy of the HLW BMP: visual inspection using binoculars or spotting scope to scan tree canopy for visible hollows.

  A tree is considered to contain a hollow if each of the following apply:
    - The entrance can be seen,
    - The hollow appears to have depth (i.e., end of hollow is not visible), and
    - The hollow is at least 1 m above the ground.

  For each hollow bearing tree identified, the following information will be recorded:
    - Tree species.
    - Condition (live or stag).
    - Approximate height.
    - Approximate Diameter at Breast Height (DBH).
    - Location (i.e., limb, trunk, or both).
    - Number of each hollow class (small <5 cm, medium 5-20 cm, large 20-50 cm and extra-large >50 cm).
    - Approximate height of the hollow from the ground.
    - Suitability and/or evidence of fauna and species identification if possible.

  Each habitat tree is to be mapped using a hand-held GPS unit and physically demarcated using a tree tag and number and/or spray paint and flagging tape for future identification.
- Identify and mark any hollows suitable for salvage/relocation as per Annexure C: Hollow and Nest Strategy of the HLW BMP.
- Identify and mark any hollow logs, tree stumps, fallen timber, boulders, or other potential fauna habitats (as deemed by the Project Ecologist) for appropriate salvage and reuse in rehabilitation efforts per Annexure G: Rehabilitation Plan of the HLW BMP.
- Undertake species-specific survey methods in accordance with Section 3.1 below.

- Identify suitable fauna release locations outside of the HLW Area in accordance with the Fauna Handling and Rescue Procedure provided in Section 5. Identify at least 2-3 release sites per clearing permit area, considering the following criteria for target species:
    - Habitat suitability – same vegetation type or PCT is preferred; presence of key habitat features; water availability (if relevant for the species).
    - Proximity – within 500 m to 1 km of the clearing site to minimise stress; avoid crossing major barriers (e.g., roads, rivers, cleared land).
    - Safety from threats/competition – low risk of predation, especially from feral animals; avoid areas with recent burns, active machinery or high human activity; no known territorial individuals of the same species that may exhibit aggression; no over-releasing to the same site with related species (intra/interspecific competition).
- Confirm boundaries, no-go zones and connectivity corridors are clearly delineated prior to clearing (refer Section 2.3).

Where gaps in ecological survey data exist (i.e., Revised BDAR or BAVR data is lacking) due to site access, severely burnt lands or other reasons, the full suite of mitigation measures outlined in this protocol will be applied, particularly in areas of high and very high ecological constraint (per Section 6.1 of the HLW BMP). This includes Pre-clearing Scoping Assessments, Pre-clearing Surveys and species-specific survey methods detailed within this protocol.

3.1. Species-specific methods

In areas of assumed or known threatened species presence (as determined during the Pre-clearing Scoping Assessment detailed in Section 2.2), species-specific pre-clearing methods and mitigation measures will be implemented as necessary for a clearing permit area (or smaller survey area) per Table 3-1. Surveys are to occur within 4 weeks of clearing commencing and are to extend to a minimum distance of 100 m (or to the outer boundary of the HTZ) from applicable locations. CPHR must be notified within three (3) days of any observations of breeding threatened species.

Table 3-1 Species-specific pre-clearing methods and associated mitigation measures

Species	Pre-clearing survey method (if species is assumed or known in a clearing permit area)	Mitigation measures
Amphibians		
• Booroolong Frog. • Sloane's Froglet. • Yellow-spotted Tree Frog.	Threatened frog habitats will be delineated in known or assumed habitats.	• Threatened frog habitat will be clearly identified on construction planning maps. • Project Ecologist to supervise installation of waterway crossings to relocate any individuals present per Section 4.3.
Cockatoos		
• Gang-gang Cockatoo (breeding season = Oct-Jan). • South-eastern Glossy Black-Cockatoo (breeding season = Apr-Aug).	Identification of suitable roost (i.e., hollow-bearing) trees will occur in known or assumed habitat. Hollow identification will include endoscopic cameras (or similar) to confirm large or greater hollows that may provide nesting habitat for threatened cockatoos. Where potential nest trees are identified, the species will be monitored during the breeding season (see left) to confirm the presence of any actual nest trees on site via diurnal bird surveys:	• Potential roost trees will be clearly identified on construction planning maps. • If actual nest trees (i.e., trees that birds of the species are known to have used for nesting) are identified, a 100 m temporary buffer (minimal disturbance zone) will be established until follow-up surveys confirm the individuals (adults and chicks) have left the hollow. The purpose of the buffer is to minimise construction impacts to breeding pairs and their chicks. The buffer can be removed outside of the breeding season. • Activity in the buffer would be limited to low impact works such as use of existing tracks.

Species	Pre-clearing survey method (if species is assumed or known in a clearing permit area)	Mitigation measures
	• Dawn and dusk visual observations for cockatoos entering/exiting over at least 2 days, OR • Endoscopic camera to detect nest contents.	
Forest Owls		
• Barking Owl (breeding season = Oct-Jan). • Masked Owl (breeding season = Apr-Nov). • Powerful Owl (breeding season = May-Oct). • Sooty Owl (breeding season = Mar-Sep).	Identification of suitable roost (i.e., hollow-bearing) trees will occur in known or assumed habitat. Where potential nest trees are identified, the species will be monitored during the breeding season (see left) to confirm the presence of any actual nest trees on-site. Monitoring is only required if clearing is proposed in the breeding season and would involve: • Songmeters will be placed at maximum 200 m spacing, set to record at night. • If potential nest trees are identified based on songmeter data or other physical signs of tree use (i.e., observed entrance, whitewash, pellets, feathers), nocturnal stag watching and call playback will occur to confirm nest trees.	• Potential roost trees will be clearly identified on construction planning maps. • If actual nest trees (i.e., trees that birds of the species are known to have used for nesting) are identified, a 100 m temporary buffer (minimal disturbance zone) will be established until follow-up surveys confirm the individuals (adults and chicks) have left the hollow. The purpose of the buffer is to minimise construction impacts to breeding pairs and their chicks. The buffer can be removed outside of the breeding season. • Activity in the buffer would be limited to low impact works such as use of existing tracks.
Parrots		
Superb Parrot (breeding season = Sep-Nov).	Identification of suitable roosts (hollow-bearing) trees will occur in known or assumed habitat. Where potential nest trees are identified (refer to Annexure C: Hollow and Nest Strategy for survey methods), this species will be monitored during the breeding season (see left) to confirm the presence of any actual nest trees on site via	• Potential roost trees will be clearly identified on construction planning maps. • If actual nest trees (i.e., trees that birds of the species are known to have used for nesting) are identified, a 100 m temporary buffer (minimal disturbance zone) will be established until follow-up surveys confirm the individuals (adults and chicks) have left

Species	Pre-clearing survey method (if species is assumed or known in a clearing permit area)	Mitigation measures
	diurnal bird surveys.	the hollow. The purpose of the buffer is to minimise construction impacts to breeding pairs and their chicks. The buffer can be removed outside of the breeding season. • Activity in the buffer would be limited to low impact works such as use of existing tracks.
Raptors		
• Little Eagle (breeding period = Aug-Oct). • Square-tailed Kite (breeding period = Sep-Dec). • White-bellied Sea-eagle (breeding period = Jul-Dec).	Pre-clearing surveys will identify trees with large stick nests or any adult with nesting material in known or assumed habitat. Where trees with stick nests are identified on-site, diurnal nest watching will occur during the breeding season (see left) to confirm presence of breeding activity (eggs or chicks).	• Nest trees will be clearly identified on construction planning maps. • If breeding activity is recorded on-site during construction, a 100 m temporary buffer (minimal disturbance zone) will be established around the active nest until follow up surveys confirm the individual (adults and chicks) have left the nest. The purpose of the buffer is to minimise construction impacts to breeding pairs and their chicks. The buffer can be removed once chicks have fledged. • Activity in the buffer would be limited to low impact works such as use of existing tracks.
Passerines and ground-dwellers		
• Australian Painted Snipe. • Black-chinned Honeyeater (eastern subspecies). • Bush-stone Curlew. • Diamond Firetail. • Dusky Woodswallow.	Pre-clearing surveys will occur per Section 3 to record nests in known or assumed habitat.	• Potential nest trees or relevant ground-dwelling species mounds will be clearly identified on construction planning maps. • If utilised nests are identified on-site, the Project Ecologist will determine a suitable buffer relevant to the identified species; to be established until follow up surveys confirm the individuals (adults and chicks) have left the nest. The purpose of the buffer is to minimise construction impacts to breeding

Species	Pre-clearing survey method (if species is assumed or known in a clearing permit area)	Mitigation measures
• Flame Robin. • Freckled Duck. • Gilbert's Whistler. • Grey-crowned Babbler. • Hooded Robin. • Malleefowl. • Olive Whistler. • Painted Honeyeater. • Pink Robin. • Scarlet Robin. • Speckled Warbler. • Varied Sittella.		pairs and their chicks. The buffer can be removed once chicks have fledged. • Activity in the buffer would be limited to low impact works such as use of existing tracks.
Arboreal mammals		
Koala.	Per Section 3.3, final pre-clearing checks will occur in known or assumed habitat within 24 hours of clearing commencing to check for individuals in trees.	• If individuals are recorded on-site during pre-clearing surveys or construction, a 50 m temporary buffer (minimal disturbance zone) is to be established around the individual until follow up surveys confirm the individual has relocated. The purpose of the buffer is to allow for safe egress of the individual from the construction site. • Activity in the buffer would be limited to low impact works such as use of existing tracks. • Construction involving clearing or moving plant / earthworks within 50 m of Koalas traversing the site (on the ground) will be ceased until the Koala has safely left the area.

Species	Pre-clearing survey method (if species is assumed or known in a clearing permit area)	Mitigation measures
		• Ground corridors will be established per Annexure F: Connectivity Strategy to allow safe Koala movement. • CHPR are to be notified of Koala observations within 3 days of detection.
Hollow-dependent arboreal mammals		
• Brush-tailed Phascogale (breeding period = Dec-Jun). • Eastern Pygmy-possum (breeding period = Oct-Apr). • Squirrel Glider (breeding period = Jun-Jan). • Southern Greater Glider (breeding period = Mar-May). • Yellow-bellied Glider (breeding period = Aug-Dec).	Identification of suitable nest or sap feed trees will occur in known or assumed habitat. Hollow identification will include endoscopic cameras (or similar) to confirm large or greater hollows that may provide nesting habitat for these mammals. Where potential nest trees / den trees are identified during pre-clearing surveys, and clearing is occurring during the breeding season, hollow occupancy will be confirmed using either climbers or with a nocturnal stag watch. Further details on Pre-clearing Scoping Assessment can be found in Section 4.1 of the HLW BMP Annexure C.	• Potential nest trees will be clearly identified on construction planning maps. • If actual nest trees (i.e., trees that the species are known to have used for nesting) are identified, a 100 m temporary buffer (minimal disturbance zone) will be established until follow-up surveys confirm the individual (adults and joeys) have left the hollow. The purpose of the buffer is to minimise construction impacts to breeding individuals and their young. The buffer can be removed outside of the breeding season. • Activity in the buffer would be limited to low impact works such as use of existing tracks.
Terrestrial mammals		
• Broad-toothed Rat. • Smoky Mouse. • Spotted-tailed Quoll	• Surveys in known or assumed habitat will record observations of burrow systems (Smoky Mouse); potential ground nests and distinctive scats (Broad-toothed Rat); and fallen logs, other animal burrows, small caves and rock outcrops (Spotted-tailed Quoll).	• Rock outcrops will be retained within partial clearing zones. • Hand clearing will occur within 50 m buffer of recorded burrows/nests/dens unless camera surveys confirm burrows are not from target species.

Species	Pre-clearing survey method (if species is assumed or known in a clearing permit area)	Mitigation measures
	• Motion cameras (IR white-light cameras) will be used over 5 survey nights to confirm suspected burrows/nests/dens.	• Link confirmed burrow/nests/den sites in the ECZ or HTZ to adjoining vegetation on each side of the disturbance zone by ground corridors consisting of a hand clearing zone and retention of ground refugia over a minimum 20 m width.
Microbats		
• Corben's Long-eared Bat. • Eastern False Pipistrelle. • Greater Broad-nosed Bat. • Little Pied Bat. • Large Bent-winged Bat. • Large-eared Pied Bat. • Southern Myotis. • Yellow-bellied Sheathtail-bat.	• Pre-clearing surveys in known or assumed habitat will identify hollow-bearing trees or known roost trees. • Inspection of existing culverts, bridges or other structures near waterways for known or assumed Southern Myotis (or other bat) roosts prior to demolition or modification. Inspection will utilise thermal detectors to confirm presence/absence.	• A 50 m temporary buffer (minimal disturbance zone) is to be established around any individuals identified. • Evidence of bats in culverts or other structures will trigger adaptive response – if structures are to be retained, maintain a 50 m temporary disturbance buffer around them; if they are to be removed or modified, provision of new roosting substrates will be required, as per Transport for NSW guidelines and in consultation with CPHR.
Reptiles		
Alpine She-oak Skink.	Pre-clearing surveys in known or assumed habitat will target beneath litter, rocks, logs, other ground debris, and within grass tussocks.	• Rock outcrops will be retained within partial clearing zones. • In areas of known or assumed habitat, the Project Ecologist will supervise all vegetation clearing activities as this species preferring tree-less or very lightly treed areas that contain tussock grasses, low heath or a combination of both.

Species	Pre-clearing survey method (if species is assumed or known in a clearing permit area)	Mitigation measures
		• Works are to cease if individuals are observed until they are confirmed to have relocated or fled by the Project Ecologist.
Pink-tailed Legless Lizard.	Pre-clearing surveys in known or assumed rocky habitat will include turning over suitably sized rocks (300 mm wide and 50 mm deep).	• Rock outcrops will be retained within partial clearing zones. • If the species is confirmed to be present in a rocky outcrop within the TCZ that cannot be avoided, a relocation plan is to be prepared in consultation with CPHR. The plan should identify how individuals will be relocated to other areas of suitable habitat with rocky outcrops, including location of recipient site, capture and transport protocols and name and qualifications of the individuals to complete the relocation. • If the species is confirmed to be present in a rocky outcrop within the ECZ, a 50 m temporary buffer (minimal disturbance zone) around the areas of habitat is to be established and clearly delineated. Any vegetation clearing within the buffer must be completed by hand with heavy machinery excluded.
Striped Legless Lizard.	Pre-clearing surveys in known or assumed habitat will include active searches of individuals on the ground surface, under partially imbedded rocks, ground debris, soil cracks and within grass tussocks.	• In areas of known or assumed habitat, the Project Ecologist will supervise all vegetation clearing activities as this species prefers grasslands. • Works are to cease if individuals are observed until they are confirmed to have relocated or fled by the Project Ecologist.

Species	Pre-clearing survey method (if species is assumed or known in a clearing permit area)	Mitigation measures
Rosenberg's Goanna (breeding period = Nov-Mar).	Pre-clearing surveys will include the demarcation of termite mounds suspected of breeding.	• Termite mounds will be retained within partial clearing zones. • Potential breeding termite mounds will be clearly identified on construction planning maps. • If nest termite mounds are identified, a 100 m temporary buffer (minimal disturbance zone) will be established until follow-up surveys confirm the hatchlings have left the mound. The purpose of the buffer is to minimise construction impacts to hatchlings. The buffer can be removed outside of the breeding season. • Activity in the buffer would be limited to low impact works such as use of existing tracks.
Insects		
Key's Matchstick Grasshopper	Pre-clearing surveys will identify areas of assumed or known habitats for rehabilitation, to be demarcated by the Project Ecologist	• In areas of known or assumed habitat, the Project Ecologist will supervise all vegetation clearing activities as this species prefers grasslands. • Ecologists to sweep grasslands in such areas with nets to capture any potential individuals. Works are to cease if individuals are observed until they are captured and relocated by the Project Ecologist.
• Flora		
• *Acacia ausfeldii.* • *Ammobium craspedioides.* • *Bossiaea fragrans.*	Individuals will be identified within known or assumed habitats subject to partial clearing (i.e., ECZ/HTZ), including those detected during Revised BDAR and Biodiversity Assessment Verification surveys.	• Known threatened flora locations will be clearly identified on construction planning maps.

Species	Pre-clearing survey method (if species is assumed or known in a clearing permit area)	Mitigation measures
• *Caesia parviflora* var. *minor.* • *Caladenia concolor.* • *Caladenia montana.* • *Calotis glandulosa.* • *Calotis pubescens.* • *Cullen parvum.* • *Diuris tricolor.* • *Glycine latrobeana.* • *Grevillea wilkinsonii.* • *Leucochrysum albicans* subsp. *tricolor.* • *Persoonia marginata.* • *Pimelea bracteata.* • *Pomaderris cotoneaster.* • *Prasophyllum bagoense.* • *Prasophyllum innubum.* • *Prasophyllum keltonii.* • *Prasophyllum petilum.* • *Pterostylis alpina.* • *Pterostylis foliata.* • *Pterostylis oreophila.* • *Pultenaea humilis.* • *Senecio garlandii.* • *Swainsona recta.* • *Swainsona sericea.* • *Thelymitra alpicola.*		• A 30 m buffer will be delineated around known records of threatened flora in partial clearing zones (i.e., ECZ/HTZ). Within this buffer, vegetation clearing will be limited to hand clearing, with no machinery or vehicle movement permitted outside existing tracks. **Hand-Clearing Exemption Protocol** • A specific exemption to the 30m hand clear buffer has been agreed with CPHR (dated 3 August 2026) at 4 locations: ◦ Tower Pad 2 ◦ Tower Pad 5 ◦ Tower Pad 32 ◦ Tower Pads 80-81 • Photographs will be taken to demonstrate that the methodology is effective and minimises risks to threatened species. These will include: ◦ Before-and-after photographs of individual threatened species plants or patches, including surrounding vegetation where necessary, to demonstrate that they were not impacted. ◦ Before-and-after photographs of machinery access tracks outside the TCZ. ◦ Before-and-after photographs of flagging or marking used to delineate the 5 m exclusion zones, including the general condition of

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Species	Pre-clearing survey method (if species is assumed or known in a clearing permit area)	Mitigation measures
• *Thesium australe.* • *Xerochrysum palustre.*		surrounding vegetation, to demonstrate that machinery did not enter or impact these zones. ◦ All photographs must be included in the relevant post-clearing reports for that location. • The greatest practicable distance must be maintained between machinery and threatened species. While a minimum 5 m exclusion zone is proposed, machinery should remain more than 5 m away wherever practicable. • Partial-clearing monitoring must be undertaken within hand-clearing buffers where machinery has operated outside the TCZ to identify any adverse impacts. Additional vegetation monitoring plots may be required if the plots specified in Table 4-5 of the Biodiversity Monitoring Program do not adequately cover these areas. Additional plots are not required where the existing number can provide adequate coverage while maintaining consistent monitoring of affected PCTs across the alignment. • Areas affected by machinery beyond the level expected from standard ECZ clearing must be rehabilitated. • HLW will develop and implement appropriate measures, in consultation with CPHR where there is high risk of unintended impacts to threatened species habitat, if this hand-clearing exemption approach impacts a threatened species and that impact would likely have been avoided under the original hand-clearing protocol.

Species	Pre-clearing survey method (if species is assumed or known in a clearing permit area)	Mitigation measures

3.2. Pre-clearing report

At the completion of pre-clearing surveys for a clearing permit area (or smaller survey area), a Pre-clearing Report will be compiled with all pre-clearing survey data and activities. This will be provided to CPHR prior to commencement of clearing at that location. This will also be issued to FCNSW for works in their land. The report will include (at a minimum):

- Name and qualifications of Project Ecologists involved.
- Dates and survey extents (i.e., clearing permit area, survey area).
- Maps of assumed and known threatened species habitats (i.e., species polygons).
- Confirmation of clearing zone, no-go zone and connectivity corridor delineation
- Details of survey method and effort carried out at each location.
- Results of pre-clearing surveys, including maps, temporary buffers established and demarcation techniques for:
    - Known records from BioNet (DCCEEW NSW - 2025), Revised BDAR and results of Biodiversity Assessment Verification Reporting.
    - Threatened fauna habitats.
    - Threatened flora within partial clearing zones.
    - Hollows suitable for salvage/relocation.
    - Priority weeds, including areas of high weed density.
- Recommended mitigation measures per Table 3-1.
- Recommendations on staged clearing (refer Section 4.2).
- Recommendations for unexpected or incidental finds and protection requirements for threatened fauna breeding habitat (if detected).
- Suitable locations for fauna release during clearing works.
- Target species, and estimate the size, type, number and Hollow Replacement Zones per Annexure C: Hollow and Nest Strategy of the HLW BMP (Section 4.1.2).
- Assessment of connectivity corridor establishment in accordance with Annexure F: Connectivity Strategy.
- Any additional recommendations for minimising impacts during clearing works (including noise, vibration, trampling, edge effects, weed incursions, where appropriate timeframes for installation of connectivity poles, reduced connectivity & vehicle strike) which may be deemed necessary.
- Where the area of a post clearing report includes a Glider connectivity corridor an additional report will be provided within 1 month with details of the glider corridors specifications.

3.3. Final pre-clearing checks

All clearing areas (whether containing habitat features/threatened flora or not) will be subject to final pre-clearing checks. Final pre-clearing checks will be undertaken by the Project Ecologist within 24 hours of clearing commencing within the daily clearing limits, using the checklist provided in Attachment 2. Final pre-clearing checks will be repeated daily prior to clearing in a new area and will confirm the staged vegetation clearing methodology detailed in Section 4.2. This will include the following:

- Re-confirm boundaries for clearing zones, daily clearing limits, no-go zones and connectivity corridors are in place. Ensure delineation methods (Table 2-1) have been communicated to construction crews.

- Inspect vegetation within 10 m of the previous day's outer clearing boundary for signs of over-clearing or mechanical damage; recording PCT/species affected, severity of damage and approximate extent (m2 or % foliage).
- Obtain up to date information on fauna and flora habitat that is present, including:
    - Visual (binoculars or similar) inspection of habitat features for evidence of fauna habitation since pre-clearing surveys.
    - Delineate any newly identified habitats.
- Confirm habitat features, threatened flora and temporary buffers have been adequately demarcated.
- Collect and record data on any newly identified threatened species in the area.
- Conduct active searches for Koalas in trees of assumed or known habitats.
- Confirm that nest boxes are in place where required per Annexure C: Supplementary Hollow and Nest Strategy of the HLW BMP.
- Follow-up check of fauna release sites from previous day to ensure animal has fled.

4. Clearing

4.1. Specified disturbance zone clearing methodology

The *HumeLink Vegetation Clearing Method and Management Memorandum* (Rev 1; Transgrid, 2023) was prepared to describe the vegetation clearing methodology proposed for the construction and operation of HLW, as replicated below. Tree protection will be in accordance with the Australian Standard for Protection of Trees on Development Sites (AS4970), where practicable.

The HLWJV protocol has been developed to consider several 'disturbance zones' to accommodate the various specific clearing requirements of the construction and operational maintenance phases. These zones are described with respect to construction clearing/management requirements and methodology. The zones are summarised below and detailed in Table 4-1. with indicative displays provided in Plate 4-1 through Plate 4-4.

1. **Total Clearing Zone (TCZ)** – complete clearing of vegetation. Includes transmission line structures, access tracks, substations and telecommunications connections and construction ancillary facilities. Includes the following:
    a. Trees and shrubs removed/managed by excavator-mulcher.
    b. Removal of vegetation and root balls.
    c. Topsoil will be stripped and stockpiled for re-use. Topsoils from intact-moderate condition low weed cover areas to be translocated to analogous receiver sites.
    d. Tree barrels with habitat features (such as hollows) will be removed and retained in select areas.
2. **Easement Clearing Zone (ECZ)** – partial clearing of vegetation to accommodate 500 kV transmission lines at maximum line operating conditions. This includes:
    a. Clearing of all trees (i.e., live and dead trees of a sufficient height which, if they were to fall, would strike the overhead conductors or the transmission line structures, or come close enough to result in electrical flashover).
    b. Retention of dead trees that are below a sufficient height which, if they were to fall, would strike the overhead conductors or the transmission line structures, or come close enough to result in electrical flashover).
    c. Retention of mid and understorey vegetation (excluding trees) with a mature height up to 5.6 m.
    d. Manual methods may be used in areas of very high ecological sensitivity (e.g., where endangered orchids are present).
3. **Hazard Tree Zone (HTZ)** – partial clearing. Removal of trees outside of the easement which, if they were to fall, would strike the overhead conductors or the transmission line structures or come close enough to cause electrical flashover and infringe on the VCR at maximum conductor sag. Hazard trees will be identified by an appropriately qualified arborist (minimum AQF Level 5) based on health and structure. Lopping branches that could pose a risk to the transmission line will be the preference over removal where possible. These hazard trees pose a potential bushfire risk, risk to the asset, and require management/removal as part of construction. Clearing works will be managed to minimise impacts to mid and understorey vegetation.

Clearing methods will involve the clearing of the TCZ and ECZ to the requirements of the ECZ (the least impacted disturbance zone). Once tall growing vegetation is removed and visibility improves, boundaries of finalised disturbance zones will be clearly marked on-site by a surveyor to protect partial clearing zones in accordance with Section 2.3. Off-easement hazard trees (within the HTZ) will be inspected by a suitably qualified arborist. Trees identified as posing a risk of failure by the arborist will be removed/trimmed. Hazard trees in good condition and dead trees/stags with limited risk of failure

and encroachment on the vegetation clearance requirement may be retained subject to arborist assessment. Rock outcrops will be clearly marked during pre-clearing surveys (refer Section 3) and retained within partial clearing zones.

Works for clearing and construction of access tracks will be carried out in such a manner that the least practicable disturbance to actual ground cover and contours is caused. Trees will be removed as close as possible to ground level and root balls will be left in situ wherever practicable.

Areas of particular focus for minimising ground disturbance include the following:

- Steep or Highly Erodible lands where slopes are in excess of 18 degrees from the horizontal.
- Protected Riparian Land defined as land within 20 m of the bed or bank of a prescribed stream. Generally, named watercourses are classed as protected riparian land; however, some unnamed watercourses may be classed as protected riparian land.
- Waterfront land (40 m from the top of bank).
- In areas where large rock outcrops are prevalent on the easement.

Protocols listed in Annexure G: Rehabilitation Plan of the HLW BMP will be implemented across all disturbance zones to maximise opportunities for salvage and reuse of biological and habitat resources.

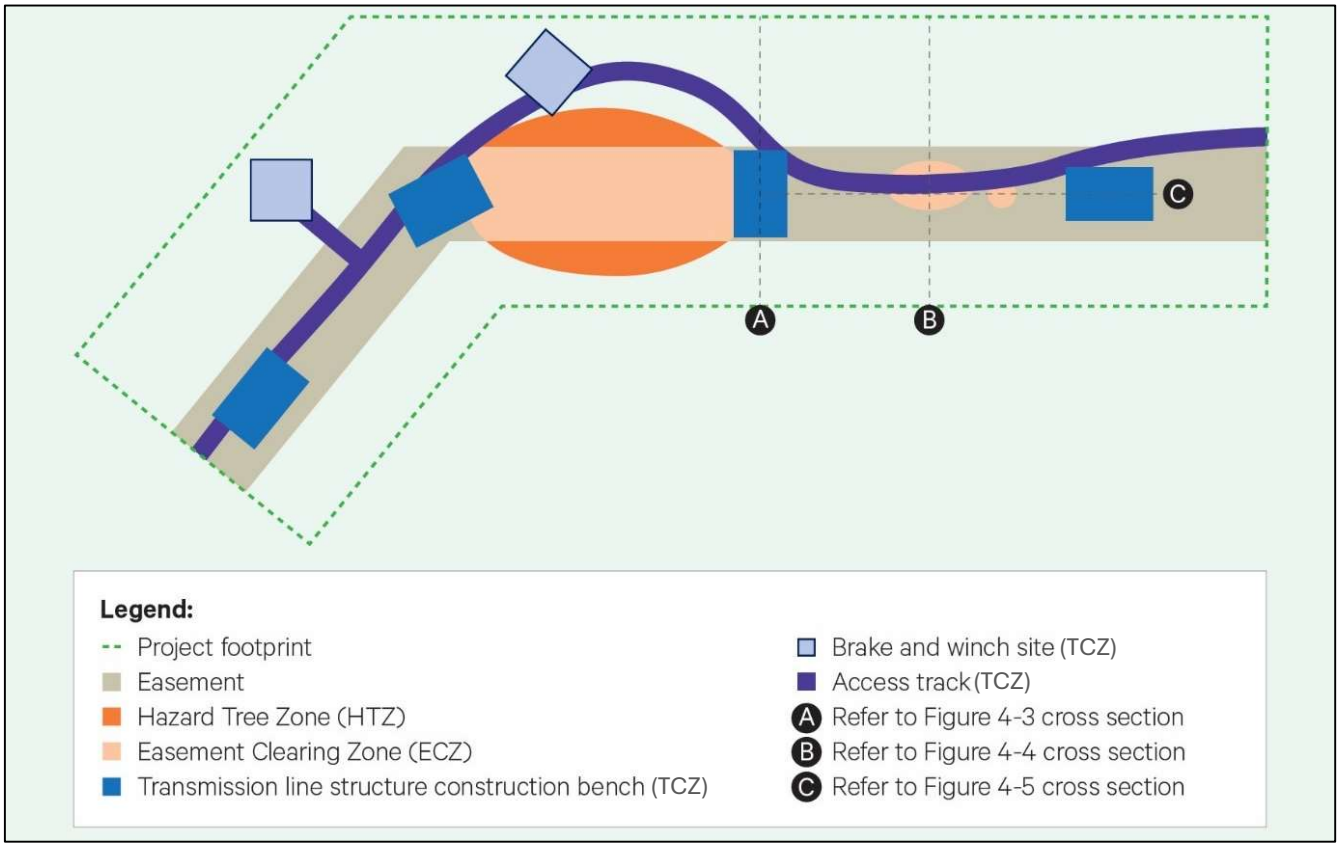


Plate 4-1 Indicative disturbance zones

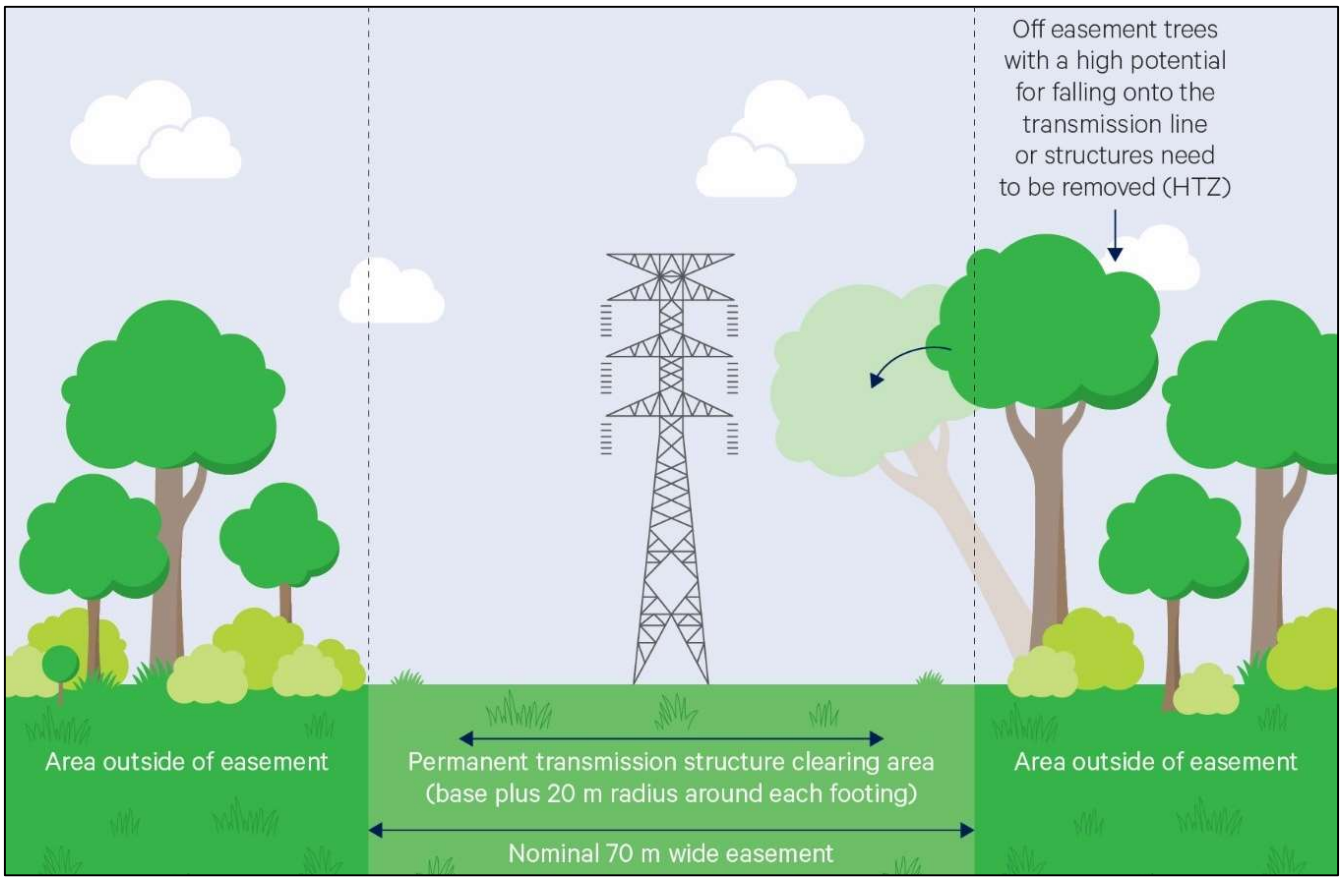


Plate 4-2 Indicative vegetation clearing around a typical transmission line structure

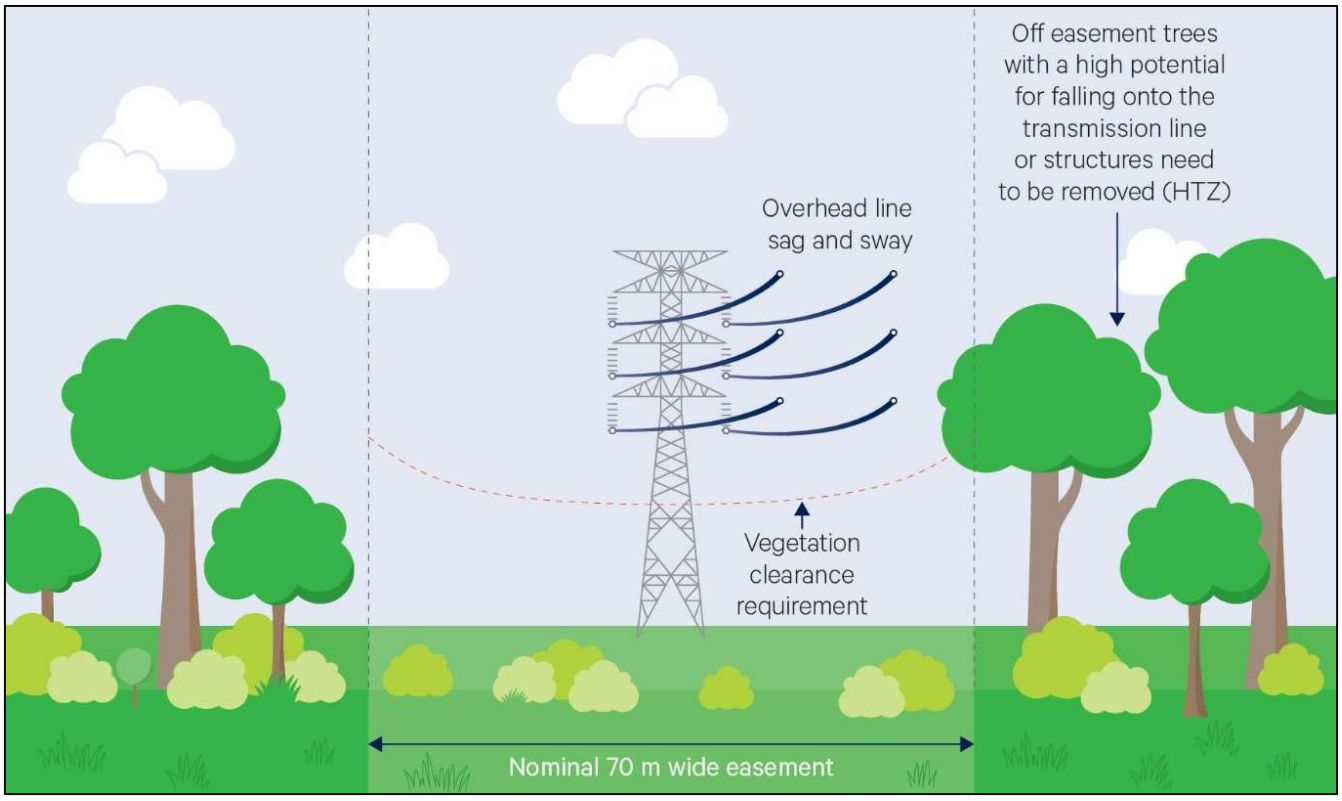


Plate 4-3 Indicative vegetation clearing within the easement

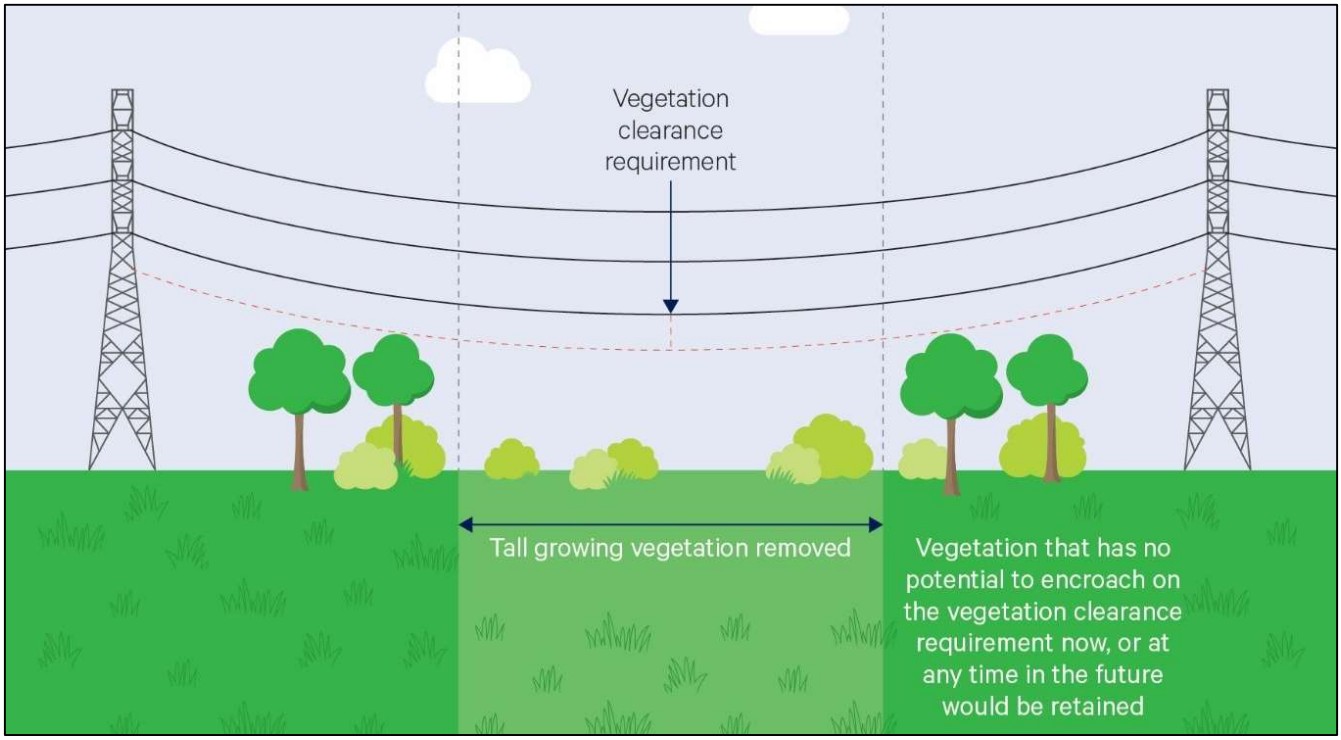


Plate 4-4 Indicative vegetation clearing mid-span

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Table 4-1 Summary of vegetation clearing, impact and debris management during construction (per *HumeLink Vegetation Clearing Method and Management Memorandum* [Rev 1; TransGrid, 2023]).

Disturbance zone	Vegetation clearing method (in order of task)	Impact	Debris management	Minimum mitigation measures
Transmission line structure zone – within civil works areas/construction benches	Trees/ shrubs removed/ managed by excavator-mulcher. Removal of vegetation and root balls. Topsoil will be stripped and stockpiled for re-use. Topsoils from intact-moderate condition low weed cover areas to be translocated to analogous receiver sites. Tree barrels with habitat features (such as hollows) will be removed and retained in select areas.	Complete clearing and loss of habitat.	Vegetation debris would be managed in accordance with Transgrid's *Transmission Line Construction Manual – Major New Build 2020* which stipulates relocating suitable fauna habitat to adjacent woodland where available/ feasible and offering useful timber to landowners for reuse. Mulch debris will either be windrowed or stockpiled for later re-spreading. Material will be tub ground and re-used for erosion /sediment control and rehabilitation. Mulched material will be evenly spread within previously forested areas to avoid suppression of germination and regeneration of native flora, care will be taken to avoid excess debris build up/smothering of existing	Removal of root balls/ root stock will be limited to civil/ construction areas. Assessment of ecological/ habitat values for trees. Staged clearing process. Spreading of mulch on bare earth to stabilise prior to rehabilitation. Relocation of hollow tree barrels as habitat in select areas. Relocation of any fauna by a suitably qualified ecologist. Reinstatement with ground cover (native seed).

Disturbance zone	Vegetation clearing method (in order of task)	Impact	Debris management	Minimum mitigation measures
			vegetation.	
Transmission line structure zone – outside civil works areas / construction benches / access tracks	As for Easement Clearing Zone (refer below).	During the removal of the tall growing trees, there would be disturbance of the grass/ ground cover and shrubs caused by the movement of the tree felling/ clearing machinery. Whilst the shrubs would not be targeted for removal, some damage may also occur from the movement of tree clearing machinery. There is a potential for mulched material being left on the ground surface, with a mulch layer that is greater than 100 mm, which may impede the ability for plant regeneration/recruitment. However, it is considered that a mulch layer of <50 mm in depth would not limit/ restrict the survival / germination / regeneration of retained native vegetation. The retention of some mulch within the easement will also assist in	As for Easement Clearing Zone (refer below).	As for Easement Clearing Zone (refer below).

Disturbance zone	Vegetation clearing method (in order of task)	Impact	Debris management	Minimum mitigation measures
		minimising soil erosion in any areas affected by the use of the clearing machinery. Whilst there will be areas which will not be subject to civil works as described in the transmission line structure zone for the purpose of the Revised BDAR, it has been assumed that this area would be subject to complete clearing and vegetation loss.		
Access track zone	As for transmission line structure zone (refer above).	Assumed complete clearing and loss of habitat within the full ~8 m wide corridor for white tracks, ~10 m wide corridor for green and blue tracks. Complete clearing up to 20 m wide will also be contemplated in some locations to account for steep terrain and the need to construct batters.	As for transmission line structure zone (refer above).	As for transmission line structure zone (refer above).
Substation zone	As for transmission line structure zone (refer above). Outside civil/construction	Complete clearing and loss of habitat.	Material will be tub ground and re-used for erosion/ sediment control and rehabilitation.	As for transmission line structure zone (refer above).

Disturbance zone	Vegetation clearing method (in order of task)	Impact	Debris management	Minimum mitigation measures
	areas smaller trees / shrubs may be removed/ managed. Topsoil will be stripped and stockpiled for re-use. Topsoils from intact-moderate condition low weed cover areas to be placed in analogous receiver sites.		Mulch debris will either be windrowed or stockpiled for later re-spreading.	
Easement Clearing Zone (ECZ) – machine accessible	Removal of trees and vegetation by mechanical methods. Manual methods may be used in areas of very high ecological sensitivity (e.g., where endangered orchids are present). Tree barrels with habitat features (such as hollows) will be removed and retained in select areas. Tree barrels may be relocated to locations identified in consultation with Asset Management.	During the removal of the trees and vegetation, there would be trampling of the grass/ ground cover and shrubs caused by the movement of machinery. Whilst the shrubs would not be targeted for removal, some damage may also occur from the movement of tree clearing machinery.	As for transmission line structure zone (refer above).	Assessment of ecological /habitat values for trees. Site access planning, field identification and communication, to avoid unnecessary impacts to native vegetation. Minimisation of impacts via: appropriate machinery selection; planning/minimisation of access paths. Use of non-lethal temporary, and targeted lethal vegetation removal where practicable. Staged clearing process. Engagement of specialist bush regeneration service

Disturbance zone	Vegetation clearing method (in order of task)	Impact	Debris management	Minimum mitigation measures
				provider to facilitate recovery and rehabilitation of native mid- and understorey vegetation to target condition as specified in the BMP. Mulched material to be spread in a way that minimises suppression of germination and regeneration of native flora from the soil seed bank, as well as existing native groundcover. The retention of some mulch will also assist in minimising soil erosion in any areas affected by the use of the clearing machinery. Relocation of hollow tree barrels as habitat in select areas. The easement would be monitored post completion of construction to measure vegetation integrity attribute scores. Easement attribute scores will be compared to target / predicted future attribute

Disturbance zone	Vegetation clearing method (in order of task)	Impact	Debris management	Minimum mitigation measures
				scores (as defined in the Revised BDAR) and the operational plan reviewed as required.
Easement Clearing Zone (ECZ) – steep / constrained areas	Hand felling of trees will be the preferred method where terrain (or other constraints) preclude management by machine.	Potential trampling and tree fall impacts to understory vegetation during felling; however minimal long-term impact on the integrity of the shrub and grass/ground cover layer is expected.	Felled vegetation will be left in-situ with tree crowns cut/docked and laid flat. Note that some areas within the easement clearing zone may require tree debris to be moved once felled to avoid bushfire and safety risks.	Assessment of ecological /habitat values for trees. Staged clearing process. Timing of clearing to minimise breeding impacts.
Hazard tree zone (HTZ)	Most hazard tree removal would be done by machine. Hand felling of trees would be used where terrain (or other constraints) preclude management by machine.	Partial loss of habitat and vegetation integrity caused from the individual removal/ pruning of identified hazard trees. Mid- and understorey would be retained to the extent practicable.	Removed/felled vegetation will be left in-situ with tree crowns cut/docked and laid flat.	Pre-clearance inspections. Where habitat features are identified pruning will be the preferred approach, unless unsafe to do so
Construction compounds and temporary workforce accommodation facilities	As for transmission line structure zone (refer above).	Complete clearing and loss of habitat.	Mulched material will be evenly spread on bare disturbed areas to assist with the protection of the soil. Spread of mulched material to a depth of >50 millimetres will be avoided	As for transmission line structure zone (refer above). Upon completion of construction, all construction facilities are temporary. They would be

Disturbance zone	Vegetation clearing method (in order of task)	Impact	Debris management	Minimum mitigation measures
			where practicable.	removed, and the site appropriately stabilised and rehabilitated to pre-existing conditions or as agreed with the landowner.
Other ancillary facilities	As for substation zone (refer above).	Complete clearing and loss of habitat.	As for substation zone (refer above).	As for transmission line structure zone (refer above).

4.2. Staged vegetation clearing

Vegetation clearing may be undertaken in stages, depending on whether habitat features are identified within the daily clearing limit. Vegetation clearing requirements may also therefore be different for each day's clearing works and will be determined by the findings and confirmation of the Project Ecologist during the Pre-clearing Scoping Assessment (Section 2.2), Pre-clearing Surveys (Section 3) and associated Pre-clearing Report (Section 3.2).

4.2.1. Stage 1 - Initial vegetation clearance (non-habitat vegetation)

Stage 1 requires that only non-habitat vegetation to be removed. Any habitat features (including specialist fauna habitats detailed in Table 3-1) that are identified in pre-clearing surveys will be retained until the final stage of clearing. This allows respite between the initial disturbance and final removal of habitat. Respite periods should occur for a minimum of 24 hours following the removal of non-habitat vegetation, prior to Stage 2 clearing works detailed below.

The Project Ecologists must be on standby (preferably present on-site) in case of any unexpected ecological finds in accordance with Annexure D: Unexpected Finds Procedure of the HLW BMP.

4.2.2. Stage 2 - Final clearing

During Stage 2, habitat clearing works (including impacts caused by vegetation trimming) will be supervised by the Project Ecologist who will remain on-site during all clearing activities. Supervised clearing will involve the following:

- Relevant mitigation measures listed in Table 3-1 will be followed (as detailed in the Pre-clearing Report), including any necessary temporary buffers and hand clearing requirements.
- All hollows accessible from the ground will be inspected immediately prior to clearing (e.g., binoculars, extendable poles with cameras).
- Demarcated habitat features will be mechanically shaken or 'nudged' prior to felling to encourage any remaining animals to either leave, or attempt to leave and therefore become visible to the Project Ecologist. Fauna will be safely captured in accordance with the fauna handling and rescue procedures outlined in Section 5 below.
- The removal of habitat trees will be undertaken using the following methods (where safe to do so):
    - Soft felling = Habitat trees < 130 cm Diameter at Breast Height (DBH). Gently controlled felling using a forestry harvester. Reduces impact shock that could injure resident fauna and allows for post-felling inspection of intact hollows.
    - Limb by limb felling = Habitat trees ≥ 130 cm DBH. Manual assisted technique using rope access or elevated work platforms. The tree is dismantled incrementally (from the top down), with each limb carefully lowered to the ground via ropes or cranes. Avoids injury to any resident fauna or collapse of hollows, allowing for real-time inspection of limbs/hollows. If no hollows or cavities are present, the limb may be dropped without careful lowering.
- In any habitat removal process, a Project Ecologist with experience in fauna handling should capture any animal that emerges, inspect it for injuries and, if uninjured, relocate it to predetermined fauna release areas. Should any eggs or juveniles be encountered that cannot flee, these will be taken to the nearest wildlife rescue organisation, to be identified by the contractor prior to pre-clearance initiation.
- Ensure that injured wildlife is transported to veterinarian or wildlife carer.
- If fauna cannot be safely extracted from hollows prior to or during hollow removal, the hollows will be blocked to prevent the animal escaping until the hollow is relocated outside of the transmission alignment, allowing safe exit. Further inspection by the Project Ecologist will verify

no fauna is present.

- Where simple nests (not stick nests) can be reasonably relocated outside of the easement, locations are to be determined by the Project Ecologist.
- All felled habitat trees should be left for 48 hours to allow hollow-dependant fauna to flee (predominantly nocturnal species) before stacking or mulching, unless the Project Ecologist has confirmed there are no evidence of occupancy or hollows concealing fauna. Tree hollows and other fallen logs will then be retained and relocated to other areas in accordance with Annexure G: Rehabilitation Plan of the HLW BMP).
- Coarse woody debris and logs will be gently dismantled or rolled by machinery operators under instruction of the Project Ecologist.
- Weed-free vegetation will be retained and mulched on-site for use as groundcover, erosion/sediment controls or stockpiled for later reuse in rehabilitation efforts (refer Annexure G Rehabilitation Plan of the HLW BMP).
- Mulched material will not be applied in depths >50 mm, and over 50% of the application area, to avoid smothering of ground covers, suppression of native vegetation germination and regeneration.

4.2.3. Post-clearing Report

A Post-clearing Report will be prepared following vegetation clearing works to detail both single and second stage clearing (where applicable). Progressive clearing reports will be prepared biannually and a final report will be prepared at the completion of clearing. These will be provided to CPHR as soon as it is available, and FCNSW for works in their land. Reports are to include (at a minimum):

- The name and qualifications of the Project Ecologist present during clearing supervision works.
- Information on habitat assessment methods, clearing operations, dates, procedures, areas.
- Records of all fauna rescue events, including locations to where fauna have been relocated. GPS coordinates will be provided for such events.
- An assessment of the habitat and handling of fauna.
- Live animal sightings, captures, any releases or injured / shocked wildlife (including GPS coordinates).
- Any dead animals located.
- Photographs of rescued fauna.
- Extent of clearing works including disturbance type (full/partial) and impact area (ha) on PCTs and threatened species habitats, measured against approved clearing limits provided in Section 6.2 of the HLW BMP.
- Relevant spatial files (in ArcGIS compatible format), such as locations of threatened species sightings, or fauna release areas.
- Confirmation of all hollows cleared, hollow size and remaining artificial hollow requirements per Annexure C: Hollow and Nest Strategy of the HLW BMP.
- Where gaps in ecological survey data exist (i.e., Revised BDAR or BAVR data is lacking) due to site access, severely burnt lands or other reasons, demonstrated minimisation of impacts to hollow-bearing trees and threatened species will be reported (i.e., against biodiversity conditions MCoA 25 and 30).

All Post-clearing Reports will be summarised and collated in the annual BMP Monitoring Report as detailed in the HLW BMP, including all GIS data collected (GPX files, shapefiles). Ongoing monitoring of the success of release events will be undertaken in accordance with Annexure H Biodiversity Monitoring Plan of the HLW BMP.

4.3. Aquatic works

In addition to standard erosion and sediment control measures per the HLW Soil and Water Management Plan, the following procedures and considerations will be incorporated into construction methodologies for waterway crossings, where practicable:

- Relocation of any impacted aquatic or riparian-dependant species as per Section 5.
- Opportunities to retain felled trees as habitat on-easement will be considered in select areas (i.e., connectivity corridors and riparian lands). The opportunity to stockpile and supply felled trees for waterway rehabilitation or improvement work will be discussed with DPI Fisheries.
- Silt curtains or coffer dams will be deployed around instream work sites where required, to protect against any impacts to water quality or indirect impacts to retained vegetation. These measures will be situated so to avoid blocking fish passage wherever practical and removed as soon as they are no longer required.
- Appropriate erosion and sediment controls that take into account potentially flood prone areas will be employed to manage water quality impacts and indirect impacts to retained vegetation.
- Plant refuelling will occur as far away from streams as possible and appropriate spill prevention measures (such as diversion bunds/cut off drains upslope and drip trays and spill kits) will be implemented when refuelling.

4.3.1. Procedures for stockpiling habitat

Boulders, woody debris and deadwood (aquatic habitat) will be salvaged from waterways where reasonably practicable and stockpiled for future reuse. Following the completion of construction, salvaged aquatic habitat can be re-used within the same area as it was salvaged, at locations where scour risk can be avoided.

Salvaged aquatic habitat will be stockpiled in a designated stockpile area that has previously been assessed for potential impacts by HLW activities. Waterway bed and bank material excavated during construction will be stockpiled outside of the active channel and avoid riparian vegetation.

Any material excavated from the bed of waterways will be stockpiled separately from other materials (i.e. contaminated soil, road-base) and returned to the waterway bed following the completion of construction work.

5. Fauna handling and rescue procedure

This fauna handling and rescue procedure is applicable to the handling of any fauna (threatened or otherwise) which has potential to occur onsite. Handling of fauna may be necessary when they are encountered and need to be relocated or if injured, taken to a vet or wildlife carer. Fauna handling will be undertaken either by the Project Ecologist or a person skilled in handling the species of fauna encountered. Should any threatened species be identified, the Unexpected Threatened Species Find Procedure (Annexure D of the HLW BMP) would be implemented in conjunction with this procedure.

Records must be maintained of all fauna interactions per Attachment 3: Fauna handling record sheet.

5.1. Rescue procedure

If wildlife is discovered in the HLW Area during construction that may harm the animal or pose risk to site personnel, the following steps will be taken.

1. Stop all work in the vicinity of the animal and immediately notify the Site Supervisor who is then to notify the Project Ecologist and/or Site Environmental Advisor.
2. Preferably allow the animal to leave the area without intervention, particularly if it is not injured or in shock, and if safe to do so for the animal (i.e., no machinery in the immediate vicinity). Passive relocation techniques can be used for this, such as isolating the area overnight, apply an egress feature such as a plank, or using diversion or exclusion features to isolate the animal from the works.
3. Use a qualified ecologist or wildlife carer with specific animal handling experience to carry out any fauna handling.
4. Where necessary to minimise stress to the animal and/or remove the risk of further injury before the Project Ecologist or wildlife handler arrives on site, the Site Environmental Advisor may implement the Handling Procedures detailed below.
5. If the animal cannot be handled (i.e., venomous reptiles, raptors, bats), exclude all personnel from the vicinity with barricading and/or signage and record the exact location of the animal(s) to be provided to the Project Ecologist or appropriate wildlife handler.
6. Call the Project Ecologist or appropriate wildlife handler, refer to contact details provided in Table 5-1, and follow any advice provided. Once the Project Ecologist or wildlife handler arrives on site, they are responsible for the animal and any decisions regarding the care of the animal will be made by that person.
7. In the event that wildlife carers, and/or local veterinary services cannot be contacted, the injured animal shall be kept in a quiet, warm and dark place in accordance with the below Handling Procedure, until it can be transferred to a wildlife carer or vet.
8. If any fauna is to be euthanised, it will be undertaken using a suitable technique (e.g., cervical dislocation for small mammals) by a trained and competent person(s) (i.e., suitably qualified Project Ecologist or wildlife handler); or will be taken to a veterinarian for euthanasia. Identified pest species onsite will also be humanely euthanised. The Project Ecologist will consider methods that are humane, painless and rapid.
9. If the fauna is to be released, suitable fauna release locations within or near the HLW Area will be used, the locations for which are best identified during pre-clearing surveys. Suitable release locations should be identified before commencement of activities that may displace fauna (such as for habitat removal like hollow logs or rocky outcrops).
10. Details of captured and relocated fauna (including injury or death) must be recorded on the

Fauna Handling Record Sheet provided in Attachment 3.

Table 5-1 Wildlife carer and vet contact details

Role	Organisation	Location	Contact details
Wildlife carers	WIRES	National service utilising local volunteers	1300 094 734
Vet	Wagga Wagga Veterinary Hospital	132 Urana St, Turvey Park NSW 2650	02 6926 0900
Vet	Adelong Veterinary Clinic	107 Tumut St, Adelong NSW 2729	02 6946 2704
Vet	Tumut Veterinary Clinic	78 Adelong Rd, Tumut NSW 2720	02 6947 3122
Vet	Tumbarumba Veterinary Clinic	3 The Parade, Tumbarumba NSW 2653	02 6948 2100

5.2. General handling procedures

Fauna located in hollows may be extracted by hand, which may require opening of the hollow by chainsaw. If using power tools, including handsaws, while opening the hollow it is advised that a barrier is placed between the area of work and fauna to be salvaged. Suitable material includes towels, cloth capture bags or any other materials that would not put undue pressure on the fauna and could dampen noise and vibration.

Only extract an animal when it can occur without resistance. If an animal is confined to a tree hollow/crevice:

1. Leave for 24 hrs before felling tree. If tree is already felled, leave in hollow, notify workers and allow to flee before processing the tree.
2. If large trees are being cleared limb by limb – block the entrance, cut limb in sections to avoid harm to animals during cutting, safely lower and relocate limb with animal contained.

If nocturnal fauna are required to be kept during the day, they will be kept in either standard pet carrying cages, ventilated cardboard/plastic animal boxes or cloth capture bags. Captive fauna will generally be kept at a cool or ambient temperature and shaded conditions to avoid any heat stress. Water will be provided if necessary. A range of 25 – 27 °C is appropriate for most species and ages, unless specified in the specific fauna handling procedures in Table 5-2. Injured fauna may require external heat. The Project Ecologist is to regularly monitor captive fauna.

All relevant PPE and fauna handling equipment must be utilised for each rescue. At a minimum this would require gators, gloves, safety glasses, cloth capture bags, pet carriers and ventilated boxes, however may include additional instruments (i.e., snake sticks, frog hygiene kits). Project Ecologists that handle fauna will have relevant vaccinations required to do so. Further details on fauna handling equipment are provided in Table 5-2 below.

In the event that fauna are injured during construction, the animal should initially be assessed and first aid rendered by the Project Ecologist and subsequently taken to a Veterinarian for further assessment and treatment, and if necessary, euthanasia. In the event that local wildlife carers are not available, the national WIRES contact number can be used to identify other local qualified wildlife carers. Contact details are provided in Table 5-1.

5.3. Specific handling procedures

Fauna handling and rescue procedures specific to fauna groups are detailed in Table 5-2 below.

Table 5-2 Specific fauna handling and rescue procedures

Fauna group		Rescue approach
Birds		• Where possible and safe to do so, gain access to nests using elevated platform/ladder. Capture and remove any nestlings. • Place nestlings in cotton capture bags and assess for injuries. Store bags in a pet carrying cage or ventilated cardboard box. Birds should generally be kept at a cool or ambient temperature and shaded conditions to avoid any heat stress. Water will be provided, if necessary, The animal container will be covered to reduce stress on the bird. • Deliver to specialist wildlife carer • If adult birds are captured (uninjured), they will be released away from construction activities.
Terrestrial mammals	Echidna	• If Echidnas are encountered during vegetation clearing works, they will need to be captured and relocated. • Carefully dig Echidna out by hand or shovel on the side of the Echidna. Position hand(s) beneath the Echidna and grasp a hind leg(s), lifting the Echidna from the soil. • Place in a dig-proof container, such as a ventilated plastic box. Captive Echidnas will be kept in a cool, well-ventilated location, out of direct sun. • 21°C is considered appropriate for echidnas. • Uninjured Echidnas will be translocated and released as soon as possible. Injured Echidnas will be delivered to a specialist wildlife carer.

Fauna group		Rescue approach
	Native rodents (i.e., Antechinus, mice, rats)	• Capture rodents using a hand net. • Once captured, rodents will be placed into a cloth capture bag, assessed and if not injured, retained until dusk and then released into appropriate habitat outside of the construction area, as far away as practicable.
	Macropods (i.e., kangaroos, wallabies)	• If a macropod is encountered during vegetation clearing works, activities in the area which may impact the macropod may need to cease until the individual has self-relocated. HLW environmental staff are to be notified. • In the event that a juvenile macropod is displaced (i.e., thrown from a pouch) and cannot be re-united with its parent, capture the joey gently in a cloth fauna handling bag. 31°C is appropriate for unfurred joeys, and between 25 – 27°C is appropriate for other ages. Joeys will be deposited with an authorised wildlife shelter within the region for hand rearing.

Fauna group		Rescue approach
	Wombats	• If a wombat is encountered during vegetation clearing works, activities in the area which may impact the wombat should cease until the individual has self-relocated. HLW environmental staff are to be notified. • One-way gates may be installed at identified burrows so wombats can exit burrows but can't re-enter burrows within work areas. • • Do not attempt to remove wombats from burrows as they can cause significant injury by crushing hands against the burrow wall. Leave wombat and re-assess for self-relocation. • If necessary, wombat rescue should be undertaken with a minimum of two Project Ecologists. Throw a blanket over it to cover its head and usher into a transport container. Alternatively, the handler can approach the wombat from behind and grasp it around the chest, just behind the front legs. Lift the animal off the ground and hold the wombat firmly against the handler's chest. Place it into a sturdy transport container as soon as possible. • Dependent joeys are commonly rescued due to the injury or death of the mother or may be found apparently abandoned. The pouch of dead adult female wombats should be checked thoroughly and both nipples examined. If the joey cannot be manipulated off the teat by applying gentle pressure to the sides of the mouth, do not make further effort to do so. Instead, if the mother is dead, the teat can be cut, as close to the mother's body as possible, and the joey removed with the teat. Once out of the pouch, place a large safety pin into the teat to ensure the joey does not swallow it, and place the joey into an artificial pouch. • Wombats should be transported in sturdy, secure transport containers such as purpose-built wooden crates or large dog crates. To reduce stress, the transport container should be covered to prevent the wombat from seeing out of the container. Transport containers should be well-ventilated, and ambient temperatures must be maintained and regularly monitored during transport (<25°C for adults, 28-30°C for joeys).

Fauna group	Rescue approach
Reptiles	• Snakes will be captured by the Project Ecologist (strictly limited to those with snake handling training) or with a person who has skills and experience in snake handling. Snakes disturbed by the development will only be captured and relocated if they present a potential threat to construction personnel or are likely to be harmed by the works. In most cases, snakes will attempt to move away from a disturbed area. • Catch the snake using appropriate equipment (i.e., snake hook, extendable pole, PPE) and place into catch bags suitable for venomous snakes (i.e. dead corners with tabs, suitable size, clean & sterilised black cotton material). Place bag into a storage contained, clearly labelled 'Caution: venomous snake' for transport. Release snake at an identified suitable release site. • Small reptiles, such as small dragons, skinks, legless lizards and geckos can be captured by hand. For animals smaller than an average hand, it is recommended that gloves are not used due to the significant reduction in dexterity and sensitivity. When capturing these reptiles, it is ideal to grip the animal at the base of the neck/upper back with pressure sufficient to restrain the animal. Avoid handling the tail of skink and gecko species as they will drop tails to escape. Once caught, the animal is to be placed in a cloth fauna bag large enough to be tied off. The bag is to be placed in a suitable cool, dark container for holding if immediate release is not possible. • Large reptiles, such as goannas and monitors require additional force due to the strength of the animal. Depending on the size of the animal, capture of large reptiles may be a two-person task. Monitors can be caught by taking hold of the base of tail whilst wearing elbow length welder's gloves. Once the animal is under some control, a towel or fauna handling bag is to be used to cover the head, allowing the handler to take hold of the neck. Place in a suitable cool, dark crate for holding if immediate release is not possible • All reptiles will be released as soon as possible after capture into suitable habitat outside of the construction zone, as far away as practicable.

Fauna group	Rescue approach
Frogs	• Frog searches are to be conducted by the Project Ecologist prior to any excavation/construction activities. • The capture and relocation of frogs require specific attention to avoid disease transmission. The following hygiene protocol applies: ◦ Wear disposable, non-powdered gloves when handling amphibians. ◦ Use new gloves or a new bag for handling each individual amphibian. ◦ Wear well-rinsed (with water) vinyl gloves when handling tadpoles. ◦ If gloves are not available, wash hands with 70% alcohol between handling each animal. Make sure hands are dry before handling amphibians as alcohol exposure may be toxic to them. Rinse hands with potable water (if available) after disinfecting. ◦ Keep individual amphibians in separate containers. ◦ Dispose of containers after use. ◦ Where possible, keep tadpoles in separate containers. If necessary, tadpoles from the same pond or stream section can be grouped in one container but avoid overcrowding. ◦ Never mix amphibians from different sites. ◦ Amphibians should be released where they were captured. ◦ 21 °C is considered appropriate for frogs. • Follow hygiene protocols outlined in Hygiene guidelines Protocols to protect priority biodiversity areas in NSW from *Phytophthora cinnamomi*, myrtle rust, amphibian chytrid fungus and invasive plants (DPIE 2020).

Fauna group	Rescue approach
Arboreal mammals (i.e., gliders, possums)	• The Project Ecologist will be onsite to inspect trees for arboreal mammals that may need to be relocated. • The Project Ecologist will determine if capture and relocation is warranted, otherwise awaiting self-relocation is an option. • Arboreal mammals will be captured either by hand or net and placed into a suitable cage or cloth capture bag. • Captured arboreal mammals will be released at a location deemed suitable by the Project Ecologist, with monitoring to occur in accordance with Annexure H: Biodiversity Monitoring Program of the HLW BMP. • In the event that juvenile arboreal mammals are displaced and cannot be re-united their mother, they will be taken to an authorized wildlife shelter within the region.
Microbats	• There is potential for microbats to carry Lyssavirus, a disease potentially fatal to humans. To reduce the risk of infection, only experienced and vaccinated Project Ecologists will be authorised to handle microbats. • The Project Ecologist is to be on site during the removal of vegetation and to inspect trees for microbats that may need to be relocated. • Microbats will be captured by hand using protective gloves. • Captured microbats must immediately be placed into a cloth bag hung vertically in a quiet, cool, dark place until released. • All captured microbats will be relocated into adjacent suitable habitat. • In the event that a juvenile microbat is displaced and cannot be re-united with its parent, orphaned microbats must be deposited with an authorised wildlife shelter within the region.

Attachment 1 Pre-clearing scoping assessment checklist

Pre-clearing Scoping Assessment date:			
Project Ecologist(s):			
#	Consideration	Response	Resulting pre-clearing method
1	What threatened species have known or assumed habitat?		
2	Are there any habitat constraints associated with these species (e.g., hollow-bearing trees, karsts, rock outcrops) that need confirmation/identification on-site for the adequate implementation of mitigation measures?		
3	Will clearing occur during breeding periods for sensitive species (e.g., nesting birds, owls)?		
4	Are there any areas that were assessed as severely burnt lands which may have resulted in limitations to Revised BDAR and/or Biodiversity Assessment Verification surveys?		
5	Are there any unsurveyed areas (being areas that have not been subject to Revised BDAR or supplementary surveys)?		
6	Are any connectivity corridors present which may require protection per Annexure F: Connectivity Strategy of the HLW BMP?		

#	Consideration	Response	Resulting pre-clearing method
7	Are there any Class 1 Key Fish Habitat (KFH) crossings that require mitigation measures per the KFH Assessment (refer Section 2.1 of this protocol)?		
8	Are threatened frog habitats mapped which may require pre-construction monitoring per Annexure H: Biodiversity Monitoring Program?		
9	Are Key's Matchstick Grasshopper habitats mapped within the clearing area that will require rehabilitation per Annexure G: Rehabilitation Plan of the HLW BMP?		

Environmental Advisor Name	Signature
Project Ecologist Name	**Signature**

Attachment 2 Final pre-clearing checklist

Inspection date:	Time:
Project Ecologist(s):	

#	Control Measure	Status (Y / N / N/A)	Comments / Corrective Action	Verification / Record
1	Has the final pre-clearing check been completed for the daily clearing limit within 24hrs of works commencing?			
2	Are boundaries and relevant signage of clearing zones, no-go zones and connectivity corridors in place?			
3	Has the ecologist completed all relevant species-specific surveys?			
4	Has all fauna encountered been relocated outside the proposed impact footprint?			
5	Have workers been shown the limit of clearing, advised of fauna handling procedures, and any other controls?			
6	Have habitat features been demarcated?			
7	Has the Project Ecologist marked threatened fauna and flora buffers using a recognised delineation protocol?			
8	Have hollow bearing trees been checked for resident animals? Record any species found and action taken.			
9	Has vegetation to be salvaged for re-use been identified per Annexure G: Rehabilitation Plan of the HLW BMP?			
10	Have baseline weed surveys been completed per Annexure E: Biosecurity Management Plan of the HLW BMP?			
11	Have suitable fauna release areas been identified?			

#	Control Measure	Status (Y / N / N/A)	Comments / Corrective Action	Verification / Record
12	Are replacement hollows in place where required per Annexure C Supplementary Hollow and Nest Strategy of the HLW BMP?			
13	Has all equipment been inspected for weed hygiene and cleaned to remove materials and debris prior to entering site?			
14	Have environmental control measures, including erosion and sediment controls, been erected to prevent downstream biodiversity impacts?			
15	Is a suitably qualified person present when necessary to supervise clearing works and relocate or rescue fauna as required?			
16	Have CPHR been contacted and notified about any unexpected finds?			
17	Any other comments/issues?			

Environmental Advisor Name	Signature	Date
Project Ecologist Name	**Signature**	**Date**

Attachment 3 Fauna handling record sheet

Item	Detail
Date and time fauna located	
Photos captured?	
Weather (temperature, wind, cloud cover, precipitation)	
Location (Coordinates and description e.g. in tree hollow; under stockpile, open area etc)	
Fauna type (mammal, bird, reptile etc.)	
Species (if known) and number of individuals	
Observed behaviour	
Condition, general health signs, description of injuries, note if a dead specimen	
Is the fauna injured? (YES/NO)	
If YES - complete Section A. If NO – complete Section B	
Section A: Injured fauna reporting	
What time was a fauna specialist (qualified ecologist or wildlife handler) called?	
What time did the fauna specialist arrive?	
What was the outcome? (e.g. animal euthanized; animal in care; animal taken to vet; treated and relocated)	
Section B: Non-injured fauna reporting	
Where was the fauna relocated? (Coordinates and description) *Note: only qualified fauna ecologist/wildlife handler to relocate fauna*	
Time the fauna was relocated	
Name and qualification of fauna handler	
Observed behaviour on release	
Condition (general health signs) on release	
General	
Name	
Date	
Signature	

Annexure C Hollow and Nest Strategy

A MEMBER OF THE CIMIC GROUP
Official

Annexure C

Hollow and Nest Strategy

HumeLink West

Document Number: HLW-HLJV-PRW-ENM-PLN-000001C

Revision: 4

TransGrid

Date 12/08/2025

Document Control

Approvals

Title	HumeLink West Hollow and Nestbox Strategy
Endorsed by Environment Representative	[redacted] (Wolfpeak Ltd PTY)
Approved on behalf of TransGrid by	[redacted]
Signed	
Dated	

Version Control

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B	3/07/2024	Updates following receipt of UMMs and HLW mapping files	
C	19/08/2024	Updates following TG review	
1	20/12/2024	Updates following receipt of final MCoAs and draft CoMA	
2	4/06/2025	Updates following ER, FCNSW & CPHR review	
3	28/07/2025	Updates following ER & CPHR review	
4	12/08/2025	Updates following CPHR comments	

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Abbreviations

Abbreviation	Expanded text
BC Act	*Biodiversity Conservation Act 2016* (NSW)
BCT	Biodiversity Conservation Trust
BDAR	Biodiversity Development Assessment Report
BMP	Biodiversity Management Sub-plan
CEMP	Construction Environmental Management Plan
CoMA	Commonwealth Conditions of Ministerial Approval
DoE	Department of the Environment
DPE	Department of Planning and Environment (now known as DCCEEW - NSW)
DPI	Department of Primary Industries
DPIE	Department of Planning, Industry and Environment (now known as DCCEEW - NSW)
EIS	Environmental Impact Statement
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999* (Cth)
GIS	Geographic Information System
HLWJV	HumeLink West Joint Venture (UGL Limited and CPB Contractors)
HLE	The HumeLink East Stage of the HumeLink project
HLW	The HumeLink West Stage of the HumeLink project
HLW Area	Approved disturbance footprint of the HumeLink West Stage of the HumeLink project
IBRA	Interim Biogeographic Regionalisation for Australia
KTP	Key Threatening Process
MCoA	NSW Minister's Conditions of Approval
Revised BDAR	*HumeLink Biodiversity Development Assessment Report Rev 0* (Niche Environment and Heritage Pty Ltd, June 2024)
PCT	Plant Community Type
TARP	Trigger Action Response Plan
TBD	To Be Determined
UMM	Updated Environmental Management Measure as outlined in the Planning Approvals Documentation

1. Introduction

1.1. Context

This Hollow and Nest Strategy (the strategy) forms part of the Biodiversity Management Sub-plan (BMP) of the HumeLink West project (HLW) Construction Environmental Management Plan (CEMP). This strategy has been prepared to outline and describe how the UGL Limited and CPB Contractors Joint Venture (HLWJV), during the construction of HLW, will comply with the Minister's Conditions of Approval (MCoA), the Federal Minister for Water and Environment Condition of Ministerial Approval (CoMA), the Updated Environmental Management Measures (UMM), and undertake its duties in accordance with the Planning Approval Documentation listed under the MCoA.

1.2. Purpose

This strategy has been prepared based on current best practices to minimise and mitigate the impacts on hollow and nest habitats associated with HLW. The strategy aims to address relevant actions and mitigation measures outlined in the following documents:

- Mitigation measure B3 and B12 of the *HumeLink Biodiversity Development Assessment Report Rev 0* (Revised BDAR; Niche Environment and Heritage Pty Ltd, June 2024).
- Conditions B25 and B30 of the Minister's Conditions of Approval (MCoA) A2.
- Condition 2 and 7 of the Federal Minister for Water and Environment Condition of Ministerial Approval (CoMA).

1.3. Objective

The objective of this strategy is to assist in mitigating the impacts of clearing required for HLW by identifying target species and prescribing the necessary processes required to manage nests and install/manage fauna habitats (artificial hollows) for threatened species. The scope of this strategy is to identify threatened fauna species that are likely to be adversely impacted by the removal of hollow-bearing trees and nests, and to provide methods for the following:

- Identifying hollow-bearing trees and nests, including characterisation of such habitat resources.
- Identifying hollows suitable for salvage and re-installation.
- Identifying target locations for nest box, hollow hog or salvaged hollow installation.
- Identifying number, type, size and location of artificial hollows (specific to each target species) for compensatory installation.
- Nest box installation, hollow salvage installation and hollow hogs.
- Approach to relocation of nests by suitably qualified ecologist where found within construction work sites.
- Monitoring program to assess the efficacy of hollow replacement.

2. Environmental requirements

2.1. Relevant documents and guidelines

The main documents and guidelines relevant to this strategy include:

- Revised BDAR (Niche Environment and Heritage Pty Ltd, June 2024).
- *Nest boxes for wildlife: A practical guide* (Franks & Franks, 2011).
- *Guideline for Artificial Hollows for Private Land Conservation Agreements* (BCT, 2020).
- *Tree and Hollow Replacement Guidelines* (TfNSW, 2023).

Refer to Section 6 for a full list of references.

2.2. Permits and licences

The permits and licences relevant to this strategy include:

- All Project Ecologists must, at a minimum, hold a Scientific Licence under Part 2 of the *Biodiversity Conservation Act 2016* (including Animal Ethics Approval) for pre-clearing scoping assessments, pre-clearing surveys and fauna handling/rescue during clearing works. The Project Ecologist will demonstrate that they hold appropriate qualifications and all licenses relevant to the work being undertaken, in addition to specific experience with working in environmentally sensitive areas of a similar nature to HLW. All Project Ecologists must be supervised by a suitably qualified ecologist (i.e., minimum two-years' experience). The Project Ecologist will be reviewed and approved by Transgrid, including their role, qualifications and responsibilities.
- Where rescued fauna requires rehabilitation and care, only wildlife rehabilitation centres authorised under Part 2 of the *Biodiversity Conservation Act 2016* may be utilised.
- Clearing works to be managed and monitored using internal HLWJV Clearing Permits.

Prior to commencing works associated with this strategy, a Pre-clearing Scoping Assessment must precede Pre-clearing Surveys conducted by the Project Ecologist in accordance with Annexure B: Clearing Protocol of the HLW BMP.

2.3. Preparation of this strategy

In accordance with MCoA B30a, this strategy has been prepared by suitably qualified and experienced biodiversity experts of RPS AAP Consulting Pty Ltd:

- Polina Zadorojnaya (BSc; BAM Accredited Assessor BAAS 23014).
- Joe Baird (BSc).
- Chelsea Tiller (BSc).
- Heather Duff (BScHons Geology; BSc).

2.4. Consultation

Consultation undertaken in preparation of this strategy is provided in Annexure J: Consultation Report the HLW BMP. If consultation with relevant stakeholders or regulators is required to assess the efficacy of mitigation strategies detailed in this report, these will be undertaken in accordance with Section 8.3 of the HLW BMP.

2.5. Minister's Conditions of Approval

The MCoA relevant to this strategy are listed in Table 2-1. A cross reference is also included to indicate where and how the conditions are addressed in this strategy or other HLW management documents.

Table 2-1 MCoA relevant to this strategy

MCoA No.	Condition Requirements	Document Reference
Restrictions of Clearing and Habitat		
B25	Unless otherwise agreed with the Planning Secretary, the Proponent must: (a) ensure that the vegetation and habitat clearing limits specified in Table 2-1, Table 2-2 and Table 2-3 of Appendix 2 are not exceeded; and	Not addressed in this strategy – refer to the HLW BMP, including Annexure B: Clearing Protocol.
	(b) minimise: (i) The impacts of the development on hollow-bearing trees. (ii) The impacts of the development on threatened flora and fauna populations. (iii) The clearing of native vegetation and key habitat.	This strategy includes provisions for minimising impacts on threatened fauna populations via replacement of impacted hollows (Section 4.2) and nest impact management (Section 4.3).
	(c) not undertake any works that result in ground disturbance within a minimum setback distance of 50 metres from PCT 637 – Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion and 30 metres from known locations of *Prasophyllum bagoense, Prasophyllum keltonii* and *Pterostylis oreophila* as mapped in the BDAR.	Not addressed in this strategy – refer to the HLW BMP, including Annexure B: Clearing Protocol.
Biodiversity Management Plan		
B30	Prior to carrying out any development (excluding Enabling Works, if the relevant requirements of this condition are adequately addressed in the Enabling Works Management Plan of condition B64) that could impact biodiversity values that require offsetting, the Proponent must prepare a Biodiversity Management Plan for the development to the satisfaction of the Planning Secretary. This plan must:	This strategy forms part of the HLW BMP.

MCoA No.	Condition Requirements	Document Reference
	(a) be prepared by a suitably qualified and experienced biodiversity expert/s;	Section 2.3.
	(b) be prepared in consultation with CPHR and FCNSW;	Section 2.4.
	(c) be prepared generally in accordance with the *Revised Biodiversity Development Assessment Report* (Revision 0, dated 21 June 2024);	Section 1 and 2.
	(d) include a description of the measures that would be implemented for: (i) meeting the biodiversity mitigation requirements in condition B25 and as required by condition B29;	Not addressed in this strategy – refer to HLW BMP.
	(ii) minimising: ▪ the amount of vegetation clearing on site; ▪ the loss of key fauna habitat (including tree hollows); ▪ the impacts of fauna on site, including undertaking pre-clearance surveys; and ▪ potential indirect impacts on threatened flora and fauna species;	This strategy includes provisions for minimising direct and indirect impacts to fauna on site via replacement of impacted hollows (Section 4.2) and nest impact management (Section 4.3).
	(iii) ensuring the development does not adversely affect the native vegetation and habitat outside the disturbance footprint;	Not addressed in this strategy – refer Annexure B: Clearing Protocol of the HLW BMP.
	(iv) protocols for unexpected finds of threatened species and threatened ecological communities within the disturbance footprint including the requirements for: ▪ all work in the associated location to stop to prevent further impact, and	Not addressed in this strategy – refer to Annexure D: Unexpected Finds Procedure of the HLW

MCoA No.	Condition Requirements	Document Reference
	▪ notification to the Planning Secretary and CPHR (and AG DCCEEW where relevant) in writing on any additional mitigation measures to be implemented; and ▪ relevant agencies to be consulted and the Planning Secretary to endorse recommencement of work;	BMP.
	(v) connectivity strategy for the potentially impacted species identified in the Revised Biodiversity Development Assessment Report (Revision 0, dated 21 June 2024) and a Supplementary Hollow and Nest Strategy;	Refer to Annexure F: Connectivity Strategy of the HLW BMP. This strategy addresses the requirement for a Supplementary Hollow and Nest Strategy.
	(vi) protecting the conservation values of McPhersons Plain and avoiding impacts to *Prasophyllum bagoensis, Prasophyllum keltonii* and *Pterostylis oreophila;*	Not addressed in this strategy – refer Annexure B: Clearing Protocol of the HLW BMP.
	(vii)rehabilitating temporary disturbance areas to facilitate natural regeneration of suitable native species;	Not addressed in this strategy – refer Annexure G: Rehabilitation Plan of the HLW BMP.
	(viii) progressively monitoring the areas of partial clearance following the commencement of construction and provision of a verification report every three months during construction to confirm the assumptions made in the BDAR regarding partial clearance within the Easement Clearing Zone and whether any changes are required to this plan;	Not addressed in this strategy – refer Annexure H: Biodiversity Monitoring Program of the HLW BMP.

MCoA No.	Condition Requirements	Document Reference
	(ix) maximising the salvage of resources within the approved disturbance area – including vegetative and soil resources – for beneficial reuse (such as fauna habitat enhancement) during the rehabilitation and revegetation of the site;	This strategy includes provisions for salvaging hollows (Section 4.1) and their reuse (Section 4.2.1).
	(x) collecting and propagating seed (where relevant);	Not addressed in this strategy – refer to Annexure G: Rehabilitation Plan of the HLW BMP.
	(xi) controlling erosion, weeds and feral pests;	Not addressed in this strategy – refer to Annexure E: Biosecurity Management Plan of the HLW BMP.
	(xii)bushfire management;	Not addressed in this strategy – refer to Section 7.6 of the HLW BMP.
	(xiii) minimising impacts on entities at risk of a serious and irreversible impact (SAII), including for Box Gum Woodland, Rice Flower (*Pimelea bracteata*) and Sooty Owl (*Tyto tenebricosa*) and other entities that are identified as requiring mitigation measures in the Biodiversity Assessment Verification Report required by condition B29 and the additional mitigation measures outlined in the additional information (Transgrid proposal dated 2 September 2024) within three years of the date of the Project Approval (over and above the relevant credit obligations); and	Not addressed in this strategy. The additional measures for the entities at risk of SAII will be delivered by Transgrid as per the Transgrid proposal dated 2 September 2024. Refer Section 6.14 of the HLW

MCoA No.	Condition Requirements	Document Reference
		BMP.
	(e) include a program to monitor, evaluate and publicly report on the effectiveness of these measures.	Section 5.
	Following the Planning Secretary's approval, the Proponent must implement the Biodiversity Management Plan. *Note: The Biodiversity Management Plan must incorporate all relevant aspects of the development, including Enabling Works consistent with the requirements of condition B67.*	Section 2.3.

2.6. Federal Minister for Water and Environment Condition of Ministerial Approval

The CoMA relevant to this strategy are listed in Table 2-2. A cross reference is also included to indicate where and how the conditions are addressed in this strategy or other HLW management documents.

Table 2-2 CoMA relevant to this strategy

EPBC Condition No.	Condition Requirements	Document Reference
Clearing Limits		
2	To avoid and mitigate harm to protected matters, the approval holder must comply with condition B25 of the NSW approval to the extent that it relates to protected matters.	Refer Table 2-1.
Biodiversity Management Plan		
7	The approval holder must comply with condition B30 of the NSW Approval. The Biodiversity Management Plan must be prepared in accordance with the Environmental Management Plan Guidelines and condition B30 of the NSW Approval.	Refer Table 2-1.

2.7. Updated Environmental Management Measures

UMMs relevant to this strategy are listed in Table 2-3 below. A cross reference is also included to indicate where and how the conditions are addressed in this strategy or other HLW management documents.

Table 2-3 UMMs relevant to this strategy

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
Biodiversity				
B3	A Biodiversity Management Plan (BMP) will be prepared in consultation with NSW DCCEEW Environment and Heritage and approved by DPHI prior to construction. The BMP will be prepared by a qualified ecologist and include a plan for implementing, evaluating and reporting on the effectiveness of all mitigation measures outlined in *Technical Report 1 – Revised Biodiversity Development Assessment Report*, including:	Detailed design and construction	All locations	This strategy forms part of the HLW BMP.
	• Measures to minimise impacts to biodiversity, including measures to reduce disturbance to sensitive flora and fauna procedures for clearing of vegetation, including pre-clearing inspections and procedures for the relocation of flora and fauna.			This strategy includes provisions for minimising impacts on threatened fauna populations via replacement of impacted hollows (Section 4.2) and nest impact management (Section 4.3).
	• Preparation of a fauna handling and rescue procedure to be implemented during construction and operation for the ethical handling of injured or displaced fauna.			Not addressed in this strategy – refer Annexure

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
	Further, the fauna handling and rescue procedure would include an incident reporting protocol for fauna relocations, rescue and rehabilitation, euthanasia and/or fatality.			B: Clearing Protocol of the HLW BMP.
	• Procedures for the demarcation and protection of retained vegetation, including vegetation adjacent to construction areas and during weed management.			
	• Vegetation clearing procedures for a two staged habitat removal process required for removal of key habitat features (hollow-bearing trees, habitat trees, and bushrock) identified in Technical Report 1 – Revised Biodiversity Development Assessment Report and/or pre-clearing inspection. Including procedures to record the effort and outcomes of the habitat removal process.			
	• Retention of habitat features such as rocky outcrops, surface rock, dead wood, logs, wherever practicable.			Not addressed in this strategy – refer Annexure G: Rehabilitation Plan, Annexure B: Clearing Protocol & Annexure F: Connectivity Strategy of the HLW BMP.
	• Proposed rehabilitation of temporary disturbance areas including management and maintenance measures.			Not addressed in this strategy – refer Annexure G: Rehabilitation Plan of the HLW BMP.

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
	• Unexpected species finds protocol to be implemented if threatened ecological communities, flora and fauna species, not assessed in Technical Report 1 – Revised Biodiversity Development Assessment Report, are encountered during pre-clearing inspections.			Not addressed in this strategy – refer Annexure D: Unexpected Finds Procedure of the HLW BMP.
	• A description of biosecurity protocols for plant and equipment movement between sites, including species specific measures.			Not addressed in this strategy – refer Annexure E: Biosecurity Management Plan of the HLW BMP.
	• Education of construction teams regarding the presence of native fauna and risks of vehicle collision, particularly early in the morning and late in the afternoon/at night; implementation of speed limits on sealed and unsealed tracks and roads.			Not addressed in this strategy – refer Section 7.4 of the HLW BMP.
	• Outline monitoring and compliance management requirements.			Section 5
	• Approach to relocation of nests by suitably qualified ecologist where found within construction work sites (ie nests found in hazardous areas will be translocated to nearby safe areas, direct handling of eggs and chicks will be avoided where possible). This could include potentially new poles/nest platforms.			Section 4.3
	• Details on the pre-clearing and clearing supervision process.			Section 4.1. Refer to Annexure B: Clearing of

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
				the HLW BMP for additional measures to address this condition.
	• Procedures for consultation with DPI Fisheries and pre-construction survey (where required) for threatened aquatic species should be established (and Commonwealth DCCEEW for Riek's Crayfish, as required), along with processes for reporting and consideration of recommendations into design and construction methods, as relevant.			Not addressed in this strategy – refer Section 7.7 of the HLW BMP.
	• Procedures for reporting the outcomes of pre-construction aquatic biodiversity surveys (where required under mitigation measure B33) at CLASS 1 crossing locations (new and upgraded tracks) potentially supporting threatened aquatic species and any management measures to be implemented (eg timing construction outside of breeding seasons, crossing type, micro siting).			Not addressed in this strategy – refer Section 7.7 of the HLW BMP.
	• Procedures for the stockpiling and supply of felled trees for KFH rehabilitation or improvement works, including procedures for consultation with DPI Fisheries.			Not addressed in this strategy – refer Annexure G: Rehabilitation Plan of the HLW BMP.

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
	The BMP will include adaptive management measures for uncertain/ indirect/ prescribed impacts and a biodiversity monitoring program. The adaptive management measures would detail procedures for uncertain impacts, risk associated with potential failure of mitigation, circumstances where avoidance may not be achievable and prescribed impacts. The adaptive management measures would be underpinned by monitoring programs, to provide early warning of ineffective measures and/or uncertain impacts occurring. The adaptive management measures would include: • performance criteria to guide monitoring • measurable thresholds to identify when remedial action is triggered • adaptive management response/actions • a trigger for additional credit obligations and/or conservation measures for uncertain, indirect or prescribed impacts, where these impacts cannot be adaptively managed • reporting requirements			Not addressed in this plan – refer Annexure H: Biodiversity Monitoring Program of the HLW BMP.
B12	Develop and implement a Supplementary Hollow and Nest Strategy to provide alternative roosting and/or nesting habitat for threatened fauna displaced during clearing. The strategy should address measures such as nest boxes, hollow re-use / creation, re-use of timber/logs as habitat within the transmission line easement where practicable. The strategy would be captured in the BMP (as per mitigation measure B3) and will address the following requirements:	Construction	All locations where hollow bearing trees are being removed	This strategy has been prepared to address UMM B12, and forms part of the HLW BMP.

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
	• nest boxes and other supplementary measures (such as hollow hogs) to be installed as close to the cleared area as possible (subject to landowner agreement and suitable trees being present)			Section 4.2.4.
	• survey of tree hollows and nests within the proposed clearing extents			Section 4.1.
	• identify the target species, size, type, number and suitable location of nest boxes/hollows required based on the results of the ecological surveys and active hollow resources in adjacent areas			Target species (Section 3.4). Size (Section 4.2.2.4). Type (Section 4.2). Number (Section 4.1 & 4.2.4). Location (Section 4.1 & 4.2.4).
	• the installation of appropriate nest boxes or hollow replacements will be undertaken as early as practicable prior to clearing activities to prevent the use of the nest boxes or hollow replacements by invasive or non-targeted species			Section 4.2.4.1.
	• nest boxes can also include the re-use of existing hollows salvaged prior to or during clearing where practicable			Section 4.2.1.
	• record the type, height, orientation and location of nest boxes installed and provide as spatial data to Transgrid			Section 5.4.3.

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
	• an annual monitoring program to assess the efficacy of supplementary habitat measures throughout the construction phase.			Section 5.4.4.
	• Post construction monitoring and replacement of damaged nest boxes will form part of discussions with individual landowners.			Section 5.4.4.

3. Existing environment

3.1. Hollows

In NSW, at least 46 mammals, 81 birds, 31 reptiles and 16 frogs depend upon the availability of natural hollows for shelter and breeding (BCT, 2020). Hollow-dependent fauna are species that are reliant upon hollows as a key component of their habitat either on a daily or seasonal basis for survival and long-term population viability. This can be either as part of a critical life history component (i.e., breeding events) or as an important component of their natural ecology, behaviour, and ongoing presence within associated and/or preferred habitat such as for intermittent shelter and roosting activities. Hollows as a resource provide shelter and refuge from environmental factors such as exposure to predators and the elements. For several species, the availability of hollows that provide security and protection during periods of vulnerability (e.g., physiological adaptation such hibernation, or bouts of torpor) are crucial for survival (Goldingay, 2009). Many species of fauna require hollows for breeding (e.g., parrots, microbats, and owls) and populations are often limited by the availability of hollows in an area. It is assumed that any decrease in the number of hollows in an area creates the potential to impact on populations of hollow-dependent species.

Natural hollows take a long time to form. As trees experience damage over time, larger, older trees tend to have more hollows per tree, and a greater range of different sized hollows (Whitford, 2002; Goldingay, 2011). Large hollows are particularly rare and occur mostly in trees over 220 years old (Gibbons and Lindenmayer, 2000). As a result, the loss of hollow bearing trees is listed as a Key Threatening Process (KTP) under the *Biodiversity Conservation Act 2016* (BC Act). Valuable hollows for wildlife are generally found in mature and dead trees. This strategy refers to hollows in the following size classes:

- Small hollows: <5 cm (typically used by microbats, small birds and small arboreal mammals).
- Medium hollows: 5-20 cm (typically used by small to medium parrots and medium to large arboreal mammals).
- Large hollows: >20-40 cm (typically used by medium to large parrots, small owls and large arboreal mammals).
- Extra-large hollows: >40 cm (typically used by owls and large arboreal mammals).

A total of 407 hollows were previously recorded within the disturbance footprint of HLW during preparation of the Revised BDAR (Table 3-1; Figure 4-4), including a total of:

- 149 small hollows.
- 153 medium hollows.
- 67 large hollows.
- 38 extra-large hollows.

Hollow-bearing tree removal will be involved during HLW, and will therefore result in direct and indirect impacts to 43 threatened fauna species (see Section 3.4):

- Direct impacts:
    - Removal of roosting, denning and breeding resources.
- Potential indirect impacts:
    - Increased competition for roosting, denning and breeding resources.
    - Displacement or local extinction of hollow-dependent species (e.g., gliders, owls, bats).
    - Disruption of predator–prey relationships and food webs.
    - Reduced recruitment of future hollows due to loss of older trees.
    - Long-term habitat bottlenecks as new hollows take over a century to form.

- Increased use of suboptimal or artificial shelter, raising predation and stress risks.
- Loss of ecological connectivity for arboreal species, limiting movement and gene flow.
- Increased predation due to reduced shelter resources.
- Reduced breeding rates for hollow-dependent species resulting in decreased species richness.

Table 3-1 Recorded hollows (per Revised BDAR [Niche, 2024]) within HLW disturbance areas

Size class	Diameter (cm)	Total
Small (<5 cm)	0 to 5	149
Medium (5-20 cm)	6 to 10	62
	11 to 15	58
	16 to 20	33
Large (>20-40 cm)	20 to 39	67
Extra Large (>40 cm)	>40	38
Total		**407**

3.2. Nests

Fauna, particularly birds, rely on nest building for breeding and raising young. Nests are highly varied and can be comprised of burrows, stick nests, woven nests, mud nests and nests within tree hollows. Nests also vary in location, with many species laying nests on the ground while others build high in the tree canopy. Many species of nest building birds will construct new nests in a different location each year, others such as raptors, egrets, and herons construct large platform nests that they may either reuse each year or rotate use with two or three alternative nests site over multiple years.

Within the HLW Area, a range of nest resources may be encountered and may include:

- Platform nests - typical of many raptors, ravens, magpies, herons, egrets, ibises, and large honeyeaters.
- Simple nests - typical of babblers, fairywrens, grass wrens, and finches found in a range of woodland habitats.

Fauna utilisation of these resources can be categorised as either primary use, directly used by the species constructing the nest, or secondary use which involves opportunistic use of a nest by a different species.

3.3. Vegetation

The HLW Area traverses a range of landscapes which have varying degrees of fauna habitat values. Twenty-seven Plant Community Types (PCTs) have been identified within the HLW Area with potential to provide hollow and nest resources for a variety of threatened fauna species listed in Table 3-2 below.

Table 3-2 PCTs with potential to provide hollow and nest resources

PCT	Hollow-dependent species	Nest-dependent species
5	Superb Parrot, Turquoise Parrot, Barking Owl, Gang-gang Cockatoo, Little Pied Bat, Powerful Owl, Southern Myotis, Spotted-tailed Quoll, Squirrel Glider, Yellow-bellied Sheathtail-bat, Little Lorikeet, Purple-crowned Lorikeet	Black Falcon, Black-chinned Honeyeater (eastern subspecies), Diamond Firetail, Dusky Woodswallow, Flame Robin, Gilbert's Whistler, Hooded Robin, Little Eagle, Painted Honeyeater, Scarlet Robin, Spotted Harrier, Square-tailed Kite, Varied Sittella, White-bellied Sea-eagle
266	Superb Parrot, Turquoise Parrot, Corben's Long-eared Bat, Gang-gang Cockatoo, Glossy Black-Cockatoo, Masked Owl, Spotted-tailed Quoll, Squirrel Glider, Yellow-bellied Sheathtail-bat, Brown Treecreeper (eastern subspecies, Little Lorikeet, Purple-crowned Lorikeet	Black Falcon, Black-chinned Honeyeater (eastern subspecies), Diamond Firetail, Dusky Woodswallow, Flame Robin, Grey-crowned Babbler, Hooded Robin, Little Eagle, Painted Honeyeater, Scarlet Robin, Speckled Warbler, Spotted Harrier, Square-tailed Kite, Varied Sittella, White-bellied Sea-eagle
268	Turquoise Parrot, Barking Owl, Eastern False Pipistrelle, Eastern Pygmy-possum, Gang-gang Cockatoo, Spotted-tailed Quoll, Squirrel Glider, Brown Treecreeper (eastern subspecies)	Black-chinned Honeyeater (eastern subspecies), Diamond Firetail, Dusky Woodswallow, Flame Robin, Hooded Robin, Little Eagle, Painted Honeyeater, Scarlet Robin, Speckled Warbler, Square-tailed Kite, Varied Sittella
277	Superb Parrot, Turquoise Parrot, Barking Owl, Eastern False Pipistrelle, Eastern Pygmy-possum, Gang-gang Cockatoo, Masked Owl, Spotted-tailed Quoll, Squirrel Glider, Yellow-bellied Sheathtail-bat, Brown Treecreeper (eastern subspecies), Little Lorikeet	Black Falcon, Black-chinned Honeyeater (eastern subspecies), Diamond Firetail, Dusky Woodswallow, Flame Robin, Grey-crowned Babbler, Hooded Robin, Little Eagle, Painted Honeyeater, Scarlet Robin, Speckled Warbler, Spotted Harrier, Square-tailed Kite, Varied Sittella, White-bellied Sea-eagle
278	Superb Parrot, Turquoise Parrot, Barking Owl, Eastern False Pipistrelle, Gang-gang Cockatoo, Little Pied Bat, Spotted-tailed Quoll, Squirrel Glider, Brown Treecreeper (eastern subspecies)	Black-chinned Honeyeater (eastern subspecies), Diamond Firetail, Dusky Woodswallow, Flame Robin, Grey-crowned Babbler, Hooded Robin, Little Eagle, Painted Honeyeater, Scarlet Robin, Speckled Warbler, Spotted Harrier, Square-tailed Kite, Varied Sittella, White-bellied Sea-eagle
280	Superb Parrot, Turquoise Parrot, Eastern False Pipistrelle, Eastern Pygmy-possum, Gang-gang Cockatoo, Masked Owl, Spotted-tailed Quoll, Squirrel Glider, Yellow-bellied Sheathtail-bat, Brown Treecreeper (eastern subspecies), Little Lorikeet	Black-chinned Honeyeater (eastern subspecies), Diamond Firetail, Dusky Woodswallow, Flame Robin, Hooded Robin, Little Eagle, Painted Honeyeater, Scarlet Robin, Speckled Warbler, Square-tailed Kite, Varied Sittella, White-bellied Sea-eagle

PCT	Hollow-dependent species	Nest-dependent species
285	Eastern False Pipistrelle, Eastern Pygmy-possum, Spotted-tailed Quoll	Diamond Firetail, Dusky Woodswallow, Flame Robin, Little Eagle, Scarlet Robin, Varied Sittella
287	Turquoise Parrot, Eastern False Pipistrelle, Eastern Pygmy-possum, Gang-gang Cockatoo, Powerful Owl, Spotted-tailed Quoll, Squirrel Glider, Yellow-bellied Sheathtail-bat, Brown Treecreeper (eastern subspecies), Little Lorikeet	Black Falcon, Black-chinned Honeyeater (eastern subspecies), Diamond Firetail, Dusky Woodswallow, Flame Robin, Grey-crowned Babbler, Hooded Robin, Little Eagle, Painted Honeyeater, Scarlet Robin, Speckled Warbler, Square-tailed Kite, Varied Sittella, White-bellied Sea-eagle
290	Turquoise Parrot, Barking Owl, Eastern False Pipistrelle, Eastern Pygmy-possum, Gang-gang Cockatoo, Glossy Black-Cockatoo, Masked Owl, Powerful Owl, Spotted-tailed Quoll, Squirrel Glider, Yellow-bellied Sheathtail-bat, Brown Treecreeper (eastern subspecies), Little Lorikeet	Black-chinned Honeyeater (eastern subspecies), Diamond Firetail, Dusky Woodswallow, Flame Robin, Hooded Robin, Little Eagle, Painted Honeyeater, Scarlet Robin, Speckled Warbler, Square-tailed Kite, Varied Sittella, White-bellied Sea-eagle
295	Barking Owl, Eastern False Pipistrelle, Eastern Pygmy-possum, Powerful Owl, Spotted-tailed Quoll	Diamond Firetail, Dusky Woodswallow, Flame Robin, Little Eagle, Scarlet Robin, Varied Sittella
297	Eastern False Pipistrelle, Eastern Pygmy-possum, Spotted-tailed Quoll	Diamond Firetail, Dusky Woodswallow, Flame Robin, Hooded Robin, Little Eagle, Scarlet Robin, Speckled Warbler, Varied Sittella
299	Eastern False Pipistrelle, Eastern Pygmy-possum, Gang-gang Cockatoo, Southern Greater Glider, Southern Myotis, Spotted-tailed Quoll, Yellow-bellied Glider	Dusky Woodswallow, Flame Robin, Little Eagle, Olive Whistler, Pink Robin, Scarlet Robin, Varied Sittella, White-bellied Sea-eagle
300	Eastern False Pipistrelle, Eastern Pygmy-possum, Gang-gang Cockatoo, Powerful Owl, Southern Greater Glider, Spotted-tailed Quoll, Yellow-bellied Glider	Dusky Woodswallow, Flame Robin, Little Eagle, Olive Whistler, Pink Robin, Scarlet Robin, Varied Sittella
306	Eastern False Pipistrelle, Large Bent-winged Bat, Spotted-tailed Quoll, Brown Treecreeper (eastern subspecies)	Diamond Firetail, Dusky Woodswallow, Flame Robin, Hooded Robin, Little Eagle, Scarlet Robin, Varied Sittella
314	Barking Owl, Eastern Pygmy-possum, Gang-gang Cockatoo, Powerful Owl, Spotted-tailed Quoll, Squirrel Glider, Brown Treecreeper (eastern subspecies)	Diamond Firetail, Dusky Woodswallow, Flame Robin, Hooded Robin, Little Eagle, Scarlet Robin, Varied Sittella, White-bellied Sea-eagle

PCT	Hollow-dependent species	Nest-dependent species
316	Eastern False Pipistrelle, Gang-gang Cockatoo, Southern Greater Glider, Spotted-tailed Quoll, Squirrel Glider, Brown Treecreeper (eastern subspecies)	Dusky Woodswallow, Hooded Robin, Little Eagle, Scarlet Robin, Varied Sittella, White-bellied Sea-eagle
319	Turquoise Parrot, Little Lorikeet	Black-chinned Honeyeater (eastern subspecies), Diamond Firetail, Dusky Woodswallow, Grey-crowned Babbler, Hooded Robin, Painted Honeyeater, Scarlet Robin, Speckled Warbler, Varied Sittella
343	Superb Parrot, Turquoise Parrot, Barking Owl, Eastern False Pipistrelle, Gang-gang Cockatoo. Glossy Black-Cockatoo, Spotted-tailed Quoll. Squirrel Glider, Brown Treecreeper (eastern subspecies), Little Lorikeet	Black-chinned Honeyeater (eastern subspecies), Diamond Firetail, Dusky Woodswallow, Flame Robin, Little Eagle, Painted Honeyeater, Scarlet Robin, Speckled Warbler, Varied Sittella
352	Superb Parrot, Turquoise Parrot, Eastern False Pipistrelle, Eastern Pygmy-possum, Gang-gang Cockatoo, Powerful Owl, Southern Myotis, Spotted-tailed Quoll, Squirrel Glider, Yellow-bellied Sheathtail-bat, Brown Treecreeper (eastern subspecies), Little Lorikeet	Black Falcon, Black-chinned Honeyeater (eastern subspecies), Diamond Firetail, Dusky Woodswallow, Flame Robin, Hooded Robin, Little Eagle, Painted Honeyeater, Scarlet Robin, Speckled Warbler, Square-tailed Kite, Varied Sittella, White-bellied Sea-eagle
637	N/A	Dusky Woodswallow, Olive Whistler
638	Barking Owl, Brush-tailed Phascogale, Eastern False Pipistrelle, Eastern Pygmy-possum, Gang-gang Cockatoo, Masked Owl, Powerful Owl, Sooty Owl, Southern Greater Glider, Spotted-tailed Quoll, Yellow-bellied Glider	Dusky Woodswallow, Flame Robin, Little Eagle, Olive Whistler, Pink Robin, Scarlet Robin, Varied Sittella
679	Eastern False Pipistrelle, Gang-gang Cockatoo, Spotted-tailed Quoll	Dusky Woodswallow, Flame Robin, Little Eagle, Pink Robin, Scarlet Robin, Varied Sittella, White-bellied Sea-eagle
731	Turquoise Parrot, Eastern False Pipistrelle, Eastern Pygmy-possum, Gang-gang Cockatoo, Glossy Black-Cockatoo, Greater Broad-nosed Bat, Powerful Owl, Spotted-tailed Quoll, Squirrel Glider, Yellow-bellied Glider, Yellow-bellied Sheathtail-bat, Brown Treecreeper (eastern subspecies), Little Lorikeet	Black-chinned Honeyeater (eastern subspecies), Diamond Firetail, Dusky Woodswallow, Flame Robin, Hooded Robin, Little Eagle, Painted Honeyeater, Scarlet Robin, Speckled Warbler, Square-tailed Kite, Varied Sittella

PCT	Hollow-dependent species	Nest-dependent species
939	Eastern False Pipistrelle, Spotted-tailed Quoll	Dusky Woodswallow, Flame Robin, Little Eagle, Olive Whistler, Scarlet Robin, Spotted Harrier
953	Barking Owl, Brush-tailed Phascogale, Eastern False Pipistrelle, Gang-gang Cockatoo, Masked Owl, Powerful Owl, Southern Greater Glider, Spotted-tailed Quoll, Squirrel Glider, Yellow-bellied Glider	Dusky Woodswallow, Flame Robin, Little Eagle, Pink Robin, Scarlet Robin, Square-tailed Kite, Varied Sittella, White-bellied Sea-eagle
1196	Eastern False Pipistrelle, Eastern Pygmy-possum, Gang-gang Cockatoo, Southern Greater Glider, Spotted-tailed Quoll, Yellow-bellied Glider	Dusky Woodswallow, Flame Robin, Little Eagle, Pink Robin, Scarlet Robin, Varied Sittella
1224	N/A	Dusky Woodswallow, Flame Robin, Spotted Harrier

3.4. Target species

A total of 25 hollow-dependent species and 18 nest-dependent species listed under the BC Act and/or EPBC Act have been identified for HLW. These species are included as target species in this strategy as a proxy for all fauna with potential to be impacted during clearing works. Hollow use is dependent on variables such as size of entrance, maximum internal space, thermal properties, and distance of entrance from the internal cavity. Size of entrance can be used as an indicator of the dependent species. These have been assessed per hollow size class and nest type in Table 3-3 below.

Hollow-dependent species of different sizes may use medium and large sized hollows (e.g., Cockatoos, Parrots), and so the guidance outlined is indicative only in its categorisation of different species. Similarly, microbats can be included in all hollow size classes discussed. Colonies of microbats are included as a large hollow-dependant species as they may utilise large hollows (with small access holes or holes orientated that prevent use by other hollow-dependant species, i.e., vertical entrance) as larger breeding sites and overwintering roost sites where cavities provide suitable microclimates. During the summer months, colonies may disperse with animals utilising smaller hollow resources throughout the landscape.

Table 3-3 Target species and their preferred hollow size

Hollow class	Indicative target species
Small hollows <5 cm (typically used by microbats, small birds and small arboreal mammals)	• Brown Treecreeper (eastern subspecies; *Climacteris picumnus victoriae*). • Little Lorikeet (*Glossopsitta pusilla*). • Purple-crowned Lorikeet (*Glossopsitta porphyrocephala*). • Brush-tailed Phascogale (*Phascogale tapoatafa*). • Corben's Long-eared Bat (*Nyctophilus corbeni*). • Eastern False Pipistrelle (*Falsistrellus tasmaniensis*). • Eastern Coastal Free-tailed Bat (*Micronomus norfolkensis*)

Hollow class	Indicative target species
	• Eastern Pygmy-possum (*Cercartetus nanus*). • Greater Broad-nosed Bat (*Scoteanax rueppellii*). • Little Pied Bat (*Chalinolobus picatus*). • Southern Myotis (*Myotis macropus*). • Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*).
Medium hollows 5-20 cm (typically used by small to medium parrots and medium arboreal mammals)	• Superb Parrot (*Polytelis swainsonii*). • Turquoise Parrot (*Neophema pulchella*). • Squirrel Glider (*Petaurus norfolcensis*).
Large hollows >20-40 cm (typically used by medium to large parrots, small owls and large arboreal mammals)	• Gang-gang Cockatoo (*Callocephalon fimbriatum*). • Glossy Black-Cockatoo (*Calyptorhynchus lathami lathami*). • Spotted-tailed Quoll (*Dasyurus maculatus*).
Extra-large hollows >40 cm (typically used by owls and large arboreal mammals)	• Southern Greater Glider (*Petauroides volans*). • Yellow-bellied Glider (*Petaurus australis*). • Barking Owl (*Ninox connivens*). • Powerful Owl (*Ninox strenua*). • Masked Owl (*Tyto novaehollandiae*). • Sooty Owl (*Tyto tenebricosa*).
Platform nests Platform of sticks of various sizes lined with leaves on select nest trees (typical of raptors and water birds)	• Black Falcon (*Falco subniger*) – uses abandoned stick nests of other birds. • Little Eagle (*Hieraaetus morphnoides*). • Spotted Harrier (*Circus assimilis*). • Square-tailed Kite (*Lophoictinia isura*). • White-bellied Sea-eagle (*Haliaeetus leucogaster*).

Hollow class	Indicative target species
Simple nests Cup or dome nests built within trees, usually in canopy or in forks of branches (typical of woodland birds)	• Black-chinned Honeyeater (eastern subspecies; *Melithreptus gularis gularis*). • Diamond Firetail (*Stagonopleura guttata*). • Dusky Woodswallow (*Artamus cyanopterus cyanopterus*). • Flame Robin (*Petroica phoenicea*). • Gilbert's Whistler (*Pachycephala inornata*). • Grey-crowned Babbler (*Pomatostomus temporalis temporalis*). • Hooded Robin (*Melanodryas cucullata cucullata*). • Olive Whistler (*Pachycephala olivacea*). • Painted Honeyeater (*Grantiella picta*). • Pink Robin (*Petroica rodinogaster*). • Scarlet Robin (*Petroica boodang*). • Speckled Warbler (*Chthonicola sagittata*). • Varied Sittella (*Daphoenositta chrysoptera*).

4. Hollow and nest strategy measures

This strategy will be carried out during pre-construction, construction, post-construction and throughout the operational phases of HLW as follows:

1. Pre-construction (Pre-clearing Scoping Assessment & Pre-clearing Surveys per Annexure B: Clearing Protocol of the HLW BMP):
    a. Identification of target fauna species, size, type, number and suitable location of artificial hollows required.
    b. Identification of suitable hollows for salvage.
    c. Sourcing of artificial replacement hollows as necessary.
    d. Identification of nests and/or stick nest platforms and potential relocation sites.
2. Construction:
    a. Vegetation clearing per Annexure B: Clearing Protocol of the HLW BMP.
    b. Installation of artificial hollows.
    c. Installation of any stick nest platforms.
3. Post-construction:
    a. Monitoring.
4. Operation:
    a. Ongoing monitoring and maintenance; to be detailed in Transgrid's Operational Biodiversity Management Plan, guided by this strategy.

4.1. Pre-clearing

4.1.1. Pre-clearing Scoping Assessment

To ensure pre-clearing procedures are risk-based and efficient, a Pre-clearing Scoping Assessment will be undertaken by the Project Ecologist prior to Pre-Clearing Surveys (in accordance with Annexure B: Clearing Protocol of the HLW BMP). This desktop process will overlay a relevant clearing permit area with up-to-date spatial data, environmental datasets and previous survey findings including:

- BioNet species records (previous 20 years).
- Revised BDAR data:
    - Threatened flora and fauna species polygons, including assumed vs. known status.
    - Identified threatened species records.
    - Hollow-bearing tree mapping.
    - Constraints mapping of PCTs, Threatened Ecological Communities and threatened species suitable habitat.
- Superseding data arising from supplementary surveys, including that obtained in pre-clearing and clearing procedures of adjoining clearing permit areas.

This scoping assessment will inform pre-clearing survey methods within a clearing permit area to ensure hollow and nest-dependent species are accurately captured and mitigated for. Pre-clearing survey methodologies are further detailed below.

4.1.2. Pre-clearing survey

Pre-clearing surveys will be conducted in accordance with Annexure B: Clearing Protocol of the HLW BMP. The surveys will involve the identification of all hollow-bearing trees and nests within the HLW Area, collectively referred to as habitat trees. Habitat trees are defined as those trees that have at least one hollow and/or one nest. A tree is considered to contain a hollow if each of the following apply:

- The entrance can be seen, and
- The hollow appears to have depth (i.e., end of hollow is not visible).

For each hollow bearing tree identified, the following information will be recorded:

- Hollow bearing tree details:
  - Tree species.
  - Condition (live or stag).
  - Approximate height.
  - Approximate Diameter at Breast Height (DBH).
- Hollow details:
  - Location (i.e., limb, trunk, or both).
  - Number of each hollow class (small <5 cm, medium 5-20 cm, large 20-40 cm and extra-large >40 cm).
  - Depth of hollow.
  - Approximate height of the hollow from the ground.
  - Suitability and/or evidence of fauna and species identification if possible.

Each habitat tree is to be mapped using a hand-held GPS unit and physically demarcated using a tree tag and number and/or spray paint and flagging tape for future identification. Pre-clearing surveys will also include species-specific methods to target areas of assumed or known threatened species presence (as determined during the Pre-clearing Scoping Assessment detailed in Section 4.1), including hollow and nest dependent species.

Results from the Pre-clearing Scoping Assessment and Pre-clearing Surveys will be consolidated and prepared into a Pre-clearing Survey Report to document the target species, and estimate the size, type, number and suitable location of replacement hollows required. This will be used to prepare a preliminary estimate of number of hollows lost and identify hollows appropriate for salvage and reuse.

Given the limitation of assessing hollows from the ground during pre-clearing surveys, the total number and size of hollows to be cleared will be confirmed following clearing supervision and specified the relevant Post-clearing Reports (detailed in Annexure B of the HLW BMP). Any hollows that were not initially recorded during the pre-clearing surveys, and identified during/after the tree is felled, should be treated the same as known hollows and included in the hollow removal count, and offset respectively. Similarly, potential hollows recorded during the pre-clearing survey that are determined not to be hollows after felling (i.e., showing no signs of occupancy following felling) will be removed from the hollow removal and offset count. The replacement commitment is limited to hollows1:1 that show evidence of occupancy. Hollows in fallen trees will be thoroughly inspected for signs of use, including scratch marks, chewed bark, scats, fur, feathers, nesting material, eggs or eggshells, and the presence of young. Any tree containing hollows with evidence of past or current occupation must be replaced. Where evidence is inconclusive, the precautionary principle should apply and the hollow replaced.

Suitable locations will be considered as Hollow Replacement Zones, further detailed in Section 4.2.4.

4.2. Artificial hollow design and installation

Artificial hollows will be implemented within the HLW project following a clear hierarchy of habitat replacement methods, prioritising long-term ecological benefit and species-specific suitability. Data obtained in the pre-clearing and post-clearing surveys will be used to determine the number and type of artificial hollows required at a replacement ratio of 1:1 for all hollows showing evidence of occupation or fauna use. Salvaged hollows will be used as first preference. In the instance that the hollow cannot be salvaged and re-used, 3D-printed nest boxes would be used for certain species (particularly extra-large hollow-dwelling fauna), followed by hollow hogs and wooden nest boxes, as

summarised in Table 4-1.

Table 4-1 Hierarchy of artificial hollow installation

Priority	Method	When preferred
1	Salvaged hollows	Existing natural hollows present and viable. Always the preferred habitat option.
2	3D-printed Nest Boxes	Where replacing hollows for certain species. Provides durability, species-specific designs and improved thermal performance.
3	Hollow Hog Hollows	Long-term habitat needed in healthy standing trees; high thermal stability or canopy placement required. ***Note: no hollow hog use is permitted within NSW Forestry lands.***
4	Nest Boxes	Trees unsuitable for modification; short-term habitat needed; low canopy; temporary offsets; inspection access required.

4.2.1. Salvaged hollows

Felled timber with naturally formed hollows provides a ready-made alternative to standard nest boxes. As natural hollows, they are more likely to produce favourable conditions for target species and provide more suitable habitat with better thermal properties when installed in the host tree compared to manufactured nest boxes (BCT, 2020). However, challenges associated with this method include labour requirement, operational risks, attachment methods and limitations associated with access, weight, etc.

4.2.1.1. Design

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. It is important to retain the functional length of a cut limb to ensure if provides the required architecture for the target species; limbs cut too short are unlikely to be suitable. However, many natural hollows would simply provide the ‘shell’ and require a cap to be installed at either end or an entrance hole to be created (BCT, 2020). Any requirements to modify the salvaged hollows should incorporate design specifications for target species provided in Table 4-2. As per nest boxes, salvaged hollows should be hardwood of an appropriate thickness (>25 mm). Any capping requirements should use marine grade plywood as a minimum and be sealed with waterproofing to reduce warping and splitting, following the design considerations provided in Table 4-3.

4.2.1.2. Installation

The Project Ecologist will determine the potential for relocation of salvaged hollows in consultation with a suitably qualified arborist. This technique is to only be used following an assessment of associated environmental constraints, safety risks, and on a case-by-case basis. It is recommended that a suspension system similar to the Habisure System ® is utilised (refer Section 4.2.2.5). More elaborate mechanisms may be required for larger hollows (i.e., galvanised strapping or cables/turnbuckles), however this is not recommended for this project due to operational risks and potential impacts on host-trees.

If the hollow is not suitable for re-installation, it will be replaced by an artificial structure to compensate for the loss. Additionally, salvaged hollows may be placed on the ground to create habitat for ground-dwelling fauna, and this will be determined by the Project Ecologist. All salvaged hollows will be marked with a unique identification number for ongoing monitoring.

4.2.2. Nest boxes

4.2.2.1. Best practice implementation

Effective nest box programs must be underpinned by scientifically validated design principles to ensure high levels of habitat suitability, thermal regulation, and occupancy by target species. Best practice implementation requires that nest boxes are designed to mimic the natural structural and thermal characteristics of tree hollows, including internal dimensions, entrance orientation, and placement height.

The Office of Environment and Heritage (OEH, 2017) recommends tailoring box design to the specific requirements of threatened fauna, particularly hollow-dependent birds and mammals. For example, gliders require insulated, deep cavities to retain heat, while parrots and cockatoos need larger entrance diameters and vertical depth for safe nesting.

Placement is critical: boxes should be positioned at heights and orientations that reduce exposure to direct sunlight in summer (typically south- or southeast-facing in NSW), while maximising structural stability and predator avoidance (Goldingay et al., 2020). It is also recommended to install boxes on mature trees in areas with confirmed or suitable foraging habitat nearby (OEH, 2017).

Internal thermal buffering should be achieved through the use of thicker walls (minimum 20 mm timber), or advanced construction materials. Incorrect box placement and design can expose wildlife to lethal temperatures, or result in low occupancy rates, even where habitat quality is otherwise suitable (Rowland et al., 2020).

4.2.2.2. Thermal performance

Research highlights the importance of thermal dynamics in nest box success. Ridley et al. (2022) investigated thermal performance under extreme temperatures and concluded that insulation materials, box wall thickness, shading, and ventilation all contribute significantly to survivability, particularly for hollow-roosting mammals like gliders and microbats.

Their findings reinforce that standard timber boxes may not be adequate under projected climate extremes. Nest boxes with internal insulation layers, ventilation slits, and reflective roofing materials are more effective at preventing heat stress, which is especially important for arboreal marsupials in NSW's hotter inland regions.

4.2.2.3. 3D-Printed hollows

Innovative artificial nesting solutions such as 3D-printed hollows are emerging as promising tools for conservation. These hollows can be custom designed using ecological and engineering inputs to better replicate natural hollow microclimates, offering superior thermal stability and weather resistance.

Projects such as the Powerful Owl conservation program have trialled prosthetic hollows developed by the University of Melbourne (2023), showing promising results in terms of both occupancy and structural integrity. These 3D hollows mimic natural tree cavities but are lighter, more durable, and easier to install in targeted locations.

Charles Sturt University (2024) has also contributed to this field by studying the applications of additive manufacturing in wildlife conservation. Their research suggests that 3D-printed hollows are particularly beneficial in post-fire landscapes, where dead or unstable trees limit traditional nest box placement. 3D designs can be rapidly adapted and mass-produced to meet specific dimensions and entrance requirements of hollow-dependent species.

These systems are already available through commercial suppliers and could be integrated as part of this strategy (Inland Rail, 2025). Currently, the leading provider for 3D-printed nest boxes is Habitat Innovation & Management based out of Orange NSW, developing modular plastic next boxes up to four units per configuration. Consultation with this provider will occur early in HLW construction to organise bulk supply and recommended models. Use of 3D-printed nest boxes will be considered for

the following species:

- Eastern Pygmy-possum.
- Squirrel Glider.
- Brush-tailed Phascogale.
- Gang-gang Cockatoo.
- Superb Parrot.
- Greater Glider.
- Yellow-bellied Glider.
- Owls.

4.2.2.4. Selection and design

Nest boxes are to be specifically designed and selected for the target fauna species/groups identified in Section 3.4. Species specific nest box design considerations are provided in Table 4-2 below. Although consideration has targeted threatened species associated with HLW, the target species groups allow for the concurrent consideration of non-threatened native species that provide similar biodiversity values.

Key design components and considerations for artificial nest boxes, tailored to specific target species groups are outlined in Table 4-3. Specifications for features, box access and internal furnishing, materials for thermoregulation, and weatherproofing ensuring nest boxes are functional, species-appropriate, and durable, with emphasis on reducing non-target use, maintaining internal microclimates, and minimising tree damage during installation.

Table 4-2 Species-specific nest box design

Hollow class	Species	Artificial hollow description	Recommended specifications			References
			Dimensions (cm)	Entrance size (cm)	Installation height (m)	
Small hollows <5 cm (typically used by microbats, small birds and small arboreal mammals)	Brown Treecreeper (*Climacteris picumnus victoriae*)	Vertical timber box with sloped roof, mimicking tree fork hollows; mounted on trunks in dry woodlands.	15 x 15 x 20	3 (oval)	1.5–2	Gibbons & Lindenmayer, 2002; OEH, 2017
	Little Lorikeet (*Glossopsitta pusilla*)	Small parrot-style box with recessed floor and drainage holes; placed in canopy eucalypts.	15 x 15 x 25	3 (round)	>3	Higgins, 1999; OEH, 2017
	Purple-crowned Lorikeet (*Glossopsitta porphyrocephala*)	Compact parrot nest box with narrow interior and top opening for inspection; suitable for dry open forests.	12 x 12 x 20	2.5–3	>3	Higgins, 1999
	Brush-tailed Phascogale (*Phascogale tapoatafa*)	Narrow arboreal mammal box with entry tunnel and hinged lid for inspection; mounted on tree limbs.	15 x 15 x 30	3	>4	Soderquist, 1995; OEH, 2017
	Corben's Long-eared Bat (*Nyctophilus corbeni*)	Crevice-style bat roost box with multiple narrow chambers; rear entry to avoid predators.	40 x 25 x 8	1.5–2 (slits)	>4	Churchill, 2008; DECC, 2007
	Eastern False Pipistrelle (*Falsistrellus*	Vertical timber box with internal baffles for roosting; painted for	35 x 20 x 10	1.5–2	>4	Churchill, 2008

Hollow class	Species	Artificial hollow description	Recommended specifications			References
			Dimensions (cm)	Entrance size (cm)	Installation height (m)	
	tasmaniensis)	thermal control.				
	Eastern Coastal Free-tailed Bat (*Micronomus norfolkensis*)	High-mounted multi-chamber bat box, placed in riparian zones; mimics bark roosting structures.	40 x 30 x 10	2	>5	Churchill, 2008
	Eastern Pygmy-possum (*Cercartetus nanus*)	Hollow log mimic box with insulation; entrance tube to deter predators; placed in dense shrub layer.	15 x 15 x 15	5 (tube)	1–2	Turner, 1984; OEH, 2017
	Greater Broad-nosed Bat (*Scoteanax rueppellii)*	Wide bat box with multiple vertical slits; roughened interior for grip; placed on mature eucalypts.	45 x 25 x 10	1.5	>4	Churchill, 2008
	Large Bent-winged Bat (*Miniopterus orianae oceanensis*)	Large bat roost module replicating cave crevices; installed in shaded areas near water.	Module	Crevice	>5	DECC, 2007
	Little Pied Bat (*Chalinolobus picatus*)	Crevice-style roost box with internal temperature buffering; placed in warm woodland zones.	40 x 30 x 10	1.5–2	>3	Churchill, 2008
	Southern Myotis (*Myotis macropus*)	Water-adjacent bat box with moisture-resistant material and shaded installation site.	35 x 20 x 10	1.5–2	>2	Churchill, 2008

Hollow class	Species	Artificial hollow description	Recommended specifications			References
			Dimensions (cm)	Entrance size (cm)	Installation height (m)	
	Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*)	Tall vertical box with high thermal mass; wide entry for gliding species; mounted on tall trees.	40 x 25 x 12	3–4	>4	Churchill, 2008
Medium hollows 5–20 cm (typically used by small to medium parrots and medium to large arboreal mammals)	Superb Parrot (*Polytelis swainsonii*)	Habitech 3D printed modular box.	20 x 20 x 60	6–8	>4	DECC, 2008
	Turquoise Parrot (*Neophema pulchella*)	Medium-sized parrot box with metal-lined entrance to prevent chew damage; installed in open woodland.	15 x 15 x 30	5	>3	OEH, 2017; Higgins, 1999
	Squirrel Glider (*Petaurus norfolcensis*)	Glider-specific den box with secure lid, rear ventilation, and internal ledge; rope bridge connectivity preferred.	20 x 20 x 30	4–5	>4	Van der Ree & Bennett, 2003; OEH, 2017
Large hollows >20-40 cm (typically used by medium to large parrots, small owls and large arboreal mammals)	Gang-gang Cockatoo (*Callocephalon fimbriatum*)	Cockatoo nest tube with ladder entrance, rear clean-out door, and thick timber walls for insulation.	25 x 25 x 60	8–10	>4	OEH, 2017; Higgins, 1999
	Glossy Black-Cockatoo (*Calyptorhynchus lathami lathami*)	Large vertical deep nest box replicating natural eucalypt hollows. Preference for large stags with hollows ~20 m high with minimal surrounding	30 x 30 x 100	10–12	>4	Courtney & Marchant, 1979; OEH, 2017

Hollow class	Species	Artificial hollow description	Recommended specifications			References
			Dimensions (cm)	Entrance size (cm)	Installation height (m)	
		canopy.				
	Spotted-tailed Quoll (*Dasyurus maculatus*)	Ground-based tunnel box with dual chambers and predator-resistant entrance; placed under log cover.	50 x 50 x 100	Tunnel	Ground	Belcher, 2000
	Southern Greater Glider (*Petauroides volans*)	Large glider den box with insulation, rear access lid, and positioned in mature canopy trees. Cockatoo nest tube with ladder entrance, rear clean-out door, and thick timber walls for insulation. Habitech 3D printed modular box.	30 x 30 x 60	10–12	>8	OEH, 2017; Lindenmayer et al., 1991
	Yellow-bellied Glider (*Petaurus australis*)	Horizontal glider box with waterproof lid and deep nesting chamber; entry hole shielded from wind.	30 x 30 x 60	10	>8	Goldingay et al., 2004
	Barking Owl (*Ninox connivens*)	Owl box with perch, drainage, and thermal mass; positioned on tall, isolated trees near open	30 x 30 x 80	12	>6	OEH, 2017

Hollow class	Species	Artificial hollow description	Recommended specifications			References
			Dimensions (cm)	Entrance size (cm)	Installation height (m)	
		habitat.				
	Powerful Owl (*Ninox strenua*)	Large vertical owl nest box, tall internal chamber and restricted entrance; located near prey-rich gullies. Habitech 3D printed modular box.	30 x 30 x 100	12–15	>6	OEH, 2017; Higgins, 1999
	Masked Owl (*Tyto novaehollandiae*)	Timber nest box with large overhang and thermal lining; installed in dense woodland habitat.	35 x 35 x 90	12–15	>6	OEH, 2017
	Sooty Owl (*Tyto tenebricosa*)	Owl-specific deep cavity box with rear access and predator guard; installed in tall forest stands.	30 x 30 x 100	12–15	>6	OEH, 2017; Higgins, 1999

Table 4-3 Nest box design considerations

Design	Component	Applicable target species group	Considerations
Entrance holes	Size	All	The entrance hole should be no larger than that required for the target species to reduce the unwanted species use.
	Location	Arboreal mammals	Rear/side entrances should be used adjacent to trunk/branch to encourage target species.
		Microbats	Entrance gap located at bottom of box to avoid competition with other species. Gap size applied to include/exclude target microbat species.
Box access	Exterior	All	Design to include grips for target animal access (i.e., grooves).
	Interior	All	Design to include grips for target animal egress (i.e., grooves or mesh).
Furnishing	Interior	All	Padding may be included dependent on target species (i.e., wood chips, shavings, sawdust).
	Interior	Microbats	Hanging support installed (i.e., shade cloth, grooves).
Thermoregulation	Roof/lid	All	No use of metal lids or plates.
	Material	All	Milled timber 25 mm thick (minimum) or exterior grade plywood 18 mm thick (minimum).
	Microclimate	All	To promote microclimate stability, the following is to be incorporated into internal box design: • Small nest box – minimum of 2 compartments. • Medium nest box – minimum of 3 compartments. • Large nest box – minimum of 4 compartments. • Extra-large next box – minimum of 5 compartments or internal false walls.
General	Roof/lid	All	Lid to overhang all sides of box by 25 mm (minimum) to prevent water damage. Consideration should be given to a built-in overhanging lip on the outer roof layer to drip water off before reaching the seams or insulation.
	Joinery	All	Joints sealed to reduce drafts and provide structural stability. Screws/nails should be inert and/or exterior grade.

Design	Component	Applicable target species group	Considerations
	Finishing	All	No sharp edges or exposed screws/nails.
	Material	All	Timber is the preferred material; durable hardwood (preferably recycled or sustainably sourced plantation timber). Exterior grade plywood may be used (preferably with FSC certification) No MDF or chipboard used.
	Weather proofing	All	Exterior paint (if used) is non-toxic, neutral coloured, exterior grade water based acrylic paint. Do not use dark colours as these increase temperatures. Interior left natural (i.e., not painted or treated with oil).
	Drainage	All	Drain holes to be installed at base.
	Identification	All	A unique nest box identification number will be placed on the nest box (stamped on the side or bottom of the nest box).
Installation	Mounting	All	Installation to minimise damage/impact to host tree. Method of installation should be one that allows for growth of tree. Nest box must be mounted in a way that allows for the removal of the nest box for maintenance and/or replacement as required without subsequent damage/impact to host tree.
Pests	Management	All	Anti-pest devices (i.e., buffalo fly ear tags, artificial grass) installed to deter European Honeybees in areas where they could become a problem

4.2.2.5. Installation

The Habisure System ® is the preferred method for nest box installation. This method allows for tree growth, minimises impacts to the host tree and is very durable. A length of plastic-coated soft wire is passed through the holes of the nest box and around the tree trunk/branch. The wire is bent in a zigzag shape for the first 200-300 mm then runs straight afterwards, allowing for the growth of the tree. Where the wire is in contact with the tree trunk/branch, it is threaded through a length of garden hose to protect the tree. The garden hose section is not required for trees that are not in early growth stages (i.e., immature, DBH generally <15 cm, lacks typical woody structure) and where the expected increase in trunk diameter is unlikely to result in any constriction of the trunk on which the wire is installed. Refer to Figure 4-1 for an illustration of this method.

Additional requirements for nest box installation include:

- Nest box dimensions will be designed for the target fauna species/groups as detailed in Table 4-2 reflecting the size class distribution of impacted hollows. The ratio of nest box size classes

and types should be determined by Pre-clearing and Post-clearing Reports (e.g., if 50% of the hollows removed are 50 mm - then 50% of the nest boxes to be installed will be 50 mm entrance diameter).

- The ratio of target species/hollow dimension to be installed will reflect the results of Pre-clearing and Post-clearing Reports (replacement ratio of 1:1 for all hollows showing evidence of occupation or fauna use).
- Nest boxes should be installed as early as practically possible prior to clearing activities, with at least 30% installed prior to clearing.
- All remaining required artificial hollows to be installed within 2 months of clearing at a particular location.
- Nest boxes should be installed on trees with an opposing branch to support the installation attachments (as displayed in Figure 4-1).
- Nest boxes for birds are to be orientated between north-west and east of tree trunks to avoid hot afternoon sun and dominant direction of severe storms.
- Nest boxes for bats are to be placed in a variety of orientations which should comprise of some shaded boxes and some sun-exposed boxes to generate a variety of thermal conditions, allowing for use as both summer and winter roosts.
- Nest boxes should be installed at the recommended heights for target species/nest box type detailed in Table 4-2.
- Installation of each nest box will include ensuring the box is labelled with a unique identifier to aid in monitoring.

A summary of this information will be included in the Nest Box Installation Report (further detailed in Section 5.4). Subject to landowner agreement and suitable existing trees being present, compensatory nest boxes will be installed no less than two weeks prior to clearing.

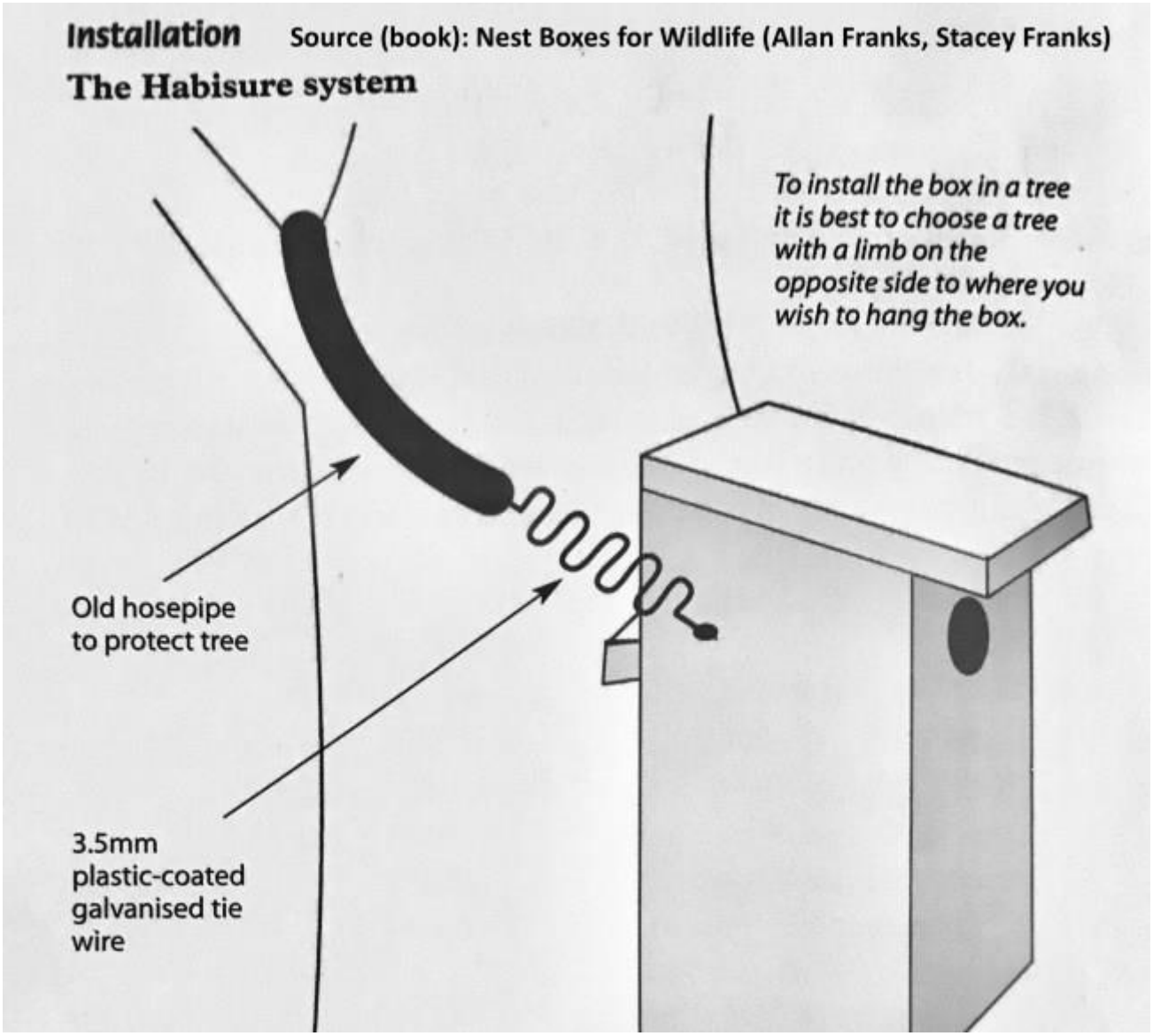


Figure 4-1 Habisure System ® illustration (Franks and Franks, 2011)

4.2.3. Hollow Hog Technology

Historically, “chainsaw hollows” have been created in living trees by arborists using conventional tools. However, best practice has shifted toward the use of specialised equipment such as the “Hollow Hog” system, which allows for more precise, repeatable, and less damaging creation of artificial hollows.

Hollow Hog is an Australian-designed arborist tool developed by biologist Matt Stephens to create internal artificial hollows within living or dead trees. These hollows are designed to replicate the nesting and denning functions of natural tree cavities, which can take over 100 years to form (Biodiversity Conservation Trust, 2020). The tool is powered by an angle grinder and used to carve out a concealed hollow chamber via a small external entry hole, typically around 50 mm in diameter (Hollowhog, 2024).

Ecologists can be trained and certified to use Hollow Hog equipment, allowing them to create hollows themselves, rather than relying solely on arborists. This ensures greater integration with habitat assessments and monitoring programs.

4.2.3.1. Design

Hollow Hog cavities are most appropriate for targeting small to medium-sized hollow-dependent species such as gliders, microbats, and small parrots (e.g. lorikeets and rosellas), particularly where long-term, thermally stable habitat is required. Unlike traditional nest boxes, Hollow Hog hollows are mechanically carved into standing, healthy trees using a rotary tool, enabling the creation of internal cavities without the need for external materials or box structures.

The Project Ecologist should advise on cavity dimensions and entry size to suit the target species, while the Project Arborist must assess tree health and suitability to ensure structural integrity is not compromised during installation. Entry hole modifiers (e.g., Tec-Spouts) may be used to maintain appropriate access dimensions over time. Trees selected for this method should allow for vertical or side-entry hollows at suitable heights, consistent with known species requirements outlined in Table 4-2 (Biodiversity Conservation Trust, 2020; Treetec, 2023). Hollow Hog installation aligns with best practice guidance for artificial hollow creation in NSW, providing a durable and low-maintenance alternative to fabricated nest boxes.



Figure 4-2 Hollow Hog installation (Treetec, 2023)

4.2.3.2. Installation

To prevent tree failures and ensure safe working conditions, hollow hogs are only to be created by adequately qualified arborists (AQF Level 5 or equivalent) or ecologists trained in Hollow Hog creation, with only mature or dead trees >40 cm DBH suitable as host-trees.

4.2.4. Location (Hollow Replacement Zones)

Artificial hollow installation locations will be determined by the Project Ecologist following Pre-clearing Surveys and surveys of available nearby habitat. Should there be no suitable areas adjacent to the HLW Area, artificial hollows can be installed at the nearest suitable area pending landowner approval. Once confirmed, location of hollow replacement zones will be presented as spatial data to CPHR as part of the Pre-clearing Survey Report for approval. This information will also be provided to and agreed with the appropriate landowners before artificial hollow installation can occur.

It is acknowledged that no hollow hog installation will occur on NSW Forestry Estate, with all replacement hollows limited to salvaged hollows (preferred), 3D-printed nestboxes, and finally

traditional nest boxes. Refer Annexure J: Consultation Report the HLW BMP for details on consultation with NSW Forestry Estate.

The density and quantity of each nest box type should reflect the proportion of tree hollow types being removed, the proportion of tree hollow types to be retained in adjacent habitat, the availability of adjacent food resources and the assemblage of hollow-dependant fauna known or likely to occur in the project locality.

To strategically identify locations where artificial hollows should be installed to offset the loss of natural hollows during vegetation clearing, Pre-clearing Reports will designate final Hollow Replacement Zones. Desktop data obtained during the Pre-clearing Scoping Assessment will be combined with field-based Pre-clearing Survey results and documented in Pre-clearing Reports. This will include advice on recommended installation e.g. tree attachment, suitable height, density, location, aspect and timing of artificial hollow installation (refer to Section 5.4 for more details). Locations for potential installation areas will be considered in order of preference:

1. Within the outer edge of the easement.
2. Adjacent to the HLW Area on private property, with landowner agreement to access installation and ongoing monitoring.

Final Hollow Replacement Zones will consider the following (Figure 4-3):

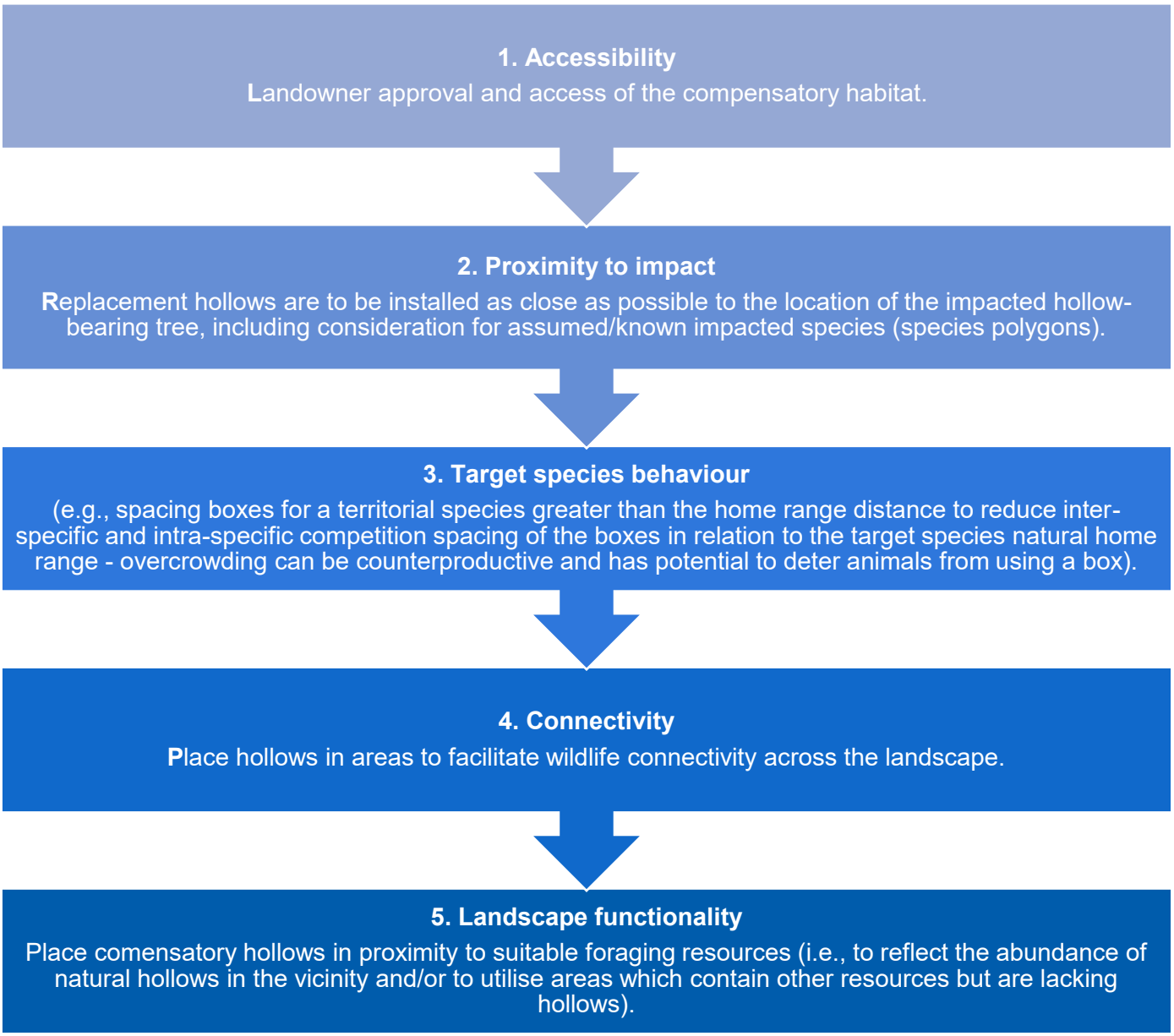


Figure 4-3 Hollow-replacement zone decision making key

4.2.4.1. Indicative Hollow Replacement Zones

Indicative Hollow Replacement Zones have been prepared as part of this Strategy, as displayed in Figure 4-4. Indicative Hollow Replacement Zones have been organised by hollow-classes and target species, mapped to replace impacted hollow-bearing trees per the Revised BDAR in adjacent and continuous habitats (i.e., same vegetation zones). All disturbance zones relevant to HLW would involve tree clearing for the project. Therefore, hollow-bearing tree data obtained in the Revised BDAR was analysed within the disturbance footprint for HLW to provide preliminary artificial (replacement) hollow calculations in Table 4-4, assuming a replacement ratio of 1:1.

Note: Hollow Replacement Zones and associated replacement hollow calculations are indicative only. These have been identified prepared based on Revised BDAR data only, particularly hollow-bearing tree data, vegetation zone mapping and fauna species polygons. Final Hollow Replacement Zones will require formal assessment during the pre-clearing process, including input of any post-BDAR survey data (i.e., Biodiversity Assessment Verification Report surveys, pre-clearing survey results).

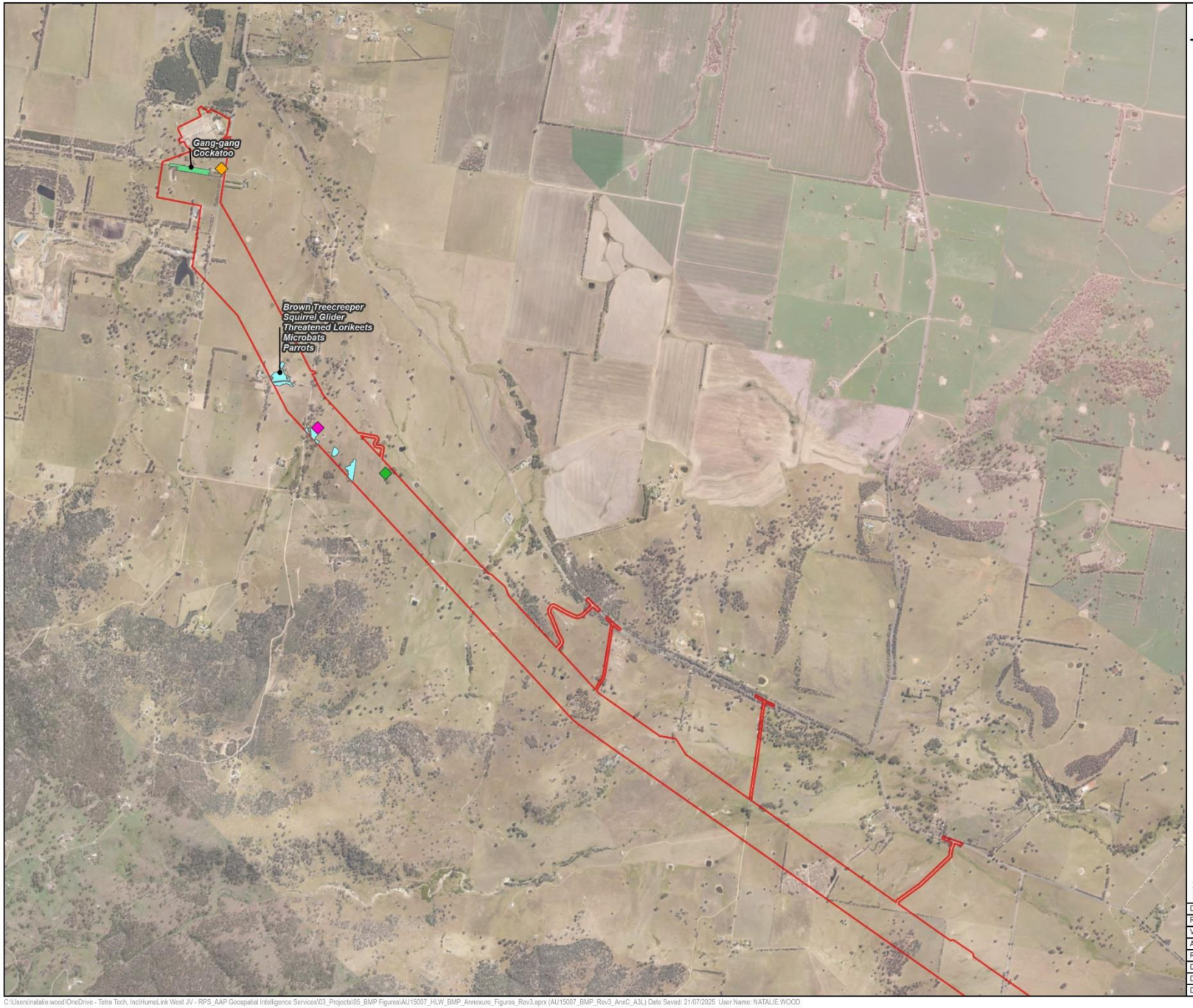
Table 4-4 Indicative Hollow Replacement Zone estimates (based on Revised BDAR vegetation zone, hollow-bearing tree and species polygon data)

Hollow Replacement Zone PCT	Hollow class and target species*							
	S	Target species	M	Target species	L	Target species	XL	Target species
5	9	• Little Lorikeet. • Purple-crowned Lorikeet. • Little Pied Bat. • Southern Myotis. • Yellow-bellied Sheathtail-bat.	2	• Superb Parrot. • Turquoise Parrot. • Squirrel Glider.	-	-	-	-
266	5	• Little Lorikeet. • Purple-crowned Lorikeet. • Brown Treecreeper (eastern subspecies). • Corben's Long-eared Bat. • Yellow-bellied Sheathtail-bat.	1	• Superb Parrot. • Turquoise Parrot. • Squirrel Glider.	-	-	-	-
268	7	• Brown Treecreeper (eastern subspecies). • Eastern False Pipistrelle. • Yellow-bellied Sheathtail-bat. • Eastern Pygmy Possum.	13	• Turquoise Parrot. • Squirrel Glider.	1	• Gang-gang Cockatoo.	-	-

Hollow Replacement Zone PCT	Hollow class and target species*							
	S	Target species	M	Target species	L	Target species	XL	Target species
277	18	• Little Lorikeet. • Eastern False Pipistrelle. • Yellow-bellied Sheathtail-bat.	27	• Superb Parrot. • Turquoise Parrot. • Squirrel Glider.	2	• Gang-gang Cockatoo.	-	-
299	-	-	0	N/A – no mapped or associated medium hollow dwelling species	-	-	0	N/A – no mapped or associated extra-large hollow dwelling species
300	3	• Eastern Pygmy-possum.	0	N/A – no mapped or associated medium hollow dwelling species	4	• Gang-gang Cockatoo. • Spotted-tailed Quoll.	1	• Powerful Owl. • Southern Greater Glider. • Yellow-bellied Glider.
343	-	-	6	• Superb Parrot. • Turquoise Parrot • Squirrel Glider.	-	-	-	-
638	3	• Brush-tailed Phascogale. • Eastern False Pipistrelle. • Eastern Pygmy-possum.	16	• Squirrel Glider.	1	• Gang-gang Cockatoo. • Spotted-tailed Quoll.	3	• Barking Owl. • Masked Owl. • Powerful Owl. • Sooty Owl. • Southern Greater Glider. • Yellow-bellied Glider.

Hollow Replacement Zone PCT	Hollow class and target species*							
	S	Target species	M	Target species	L	Target species	XL	Target species
679	-	-	-	-	6	• Gang-gang Cockatoo. • Spotted-tailed Quoll.	-	-
953	60	• Brush-tailed Phascogale. • Eastern False Pipistrelle.	69	• Squirrel Glider.	21	• Gang-gang Cockatoo. • Spotted-tailed Quoll.	23	• Barking Owl. • Masked Owl. • Powerful Owl. • Southern Greater Glider. • Yellow-bellied Glider.
1196	25	• Eastern False Pipistrelle. • Eastern Pygmy-possum.	0	N/A – no mapped or associated medium hollow dwelling species	18	• Gang-gang Cockatoo. • Spotted-tailed Quoll.	8	• Southern Greater Glider • Yellow-bellied Glider.
Total estimates	**130 small hollow-class replacements**		**134 medium hollow-class replacements**		**53 large hollow-class replacements**		**35 extra-large hollow-class replacements**	

* S = small; M = medium; L = large; XL = extra-large



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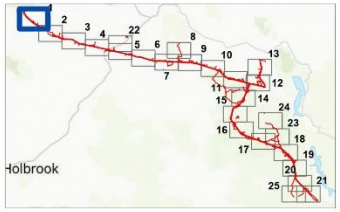
- HLW Area

Indicative Hollos Replacement Zones

- Small & Medium
- Large

Impacted Hollow-bearing Trees

- hollows 0-5cm
- hollows 11-15cm
- hollows 20-39cm



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RoadSegment:

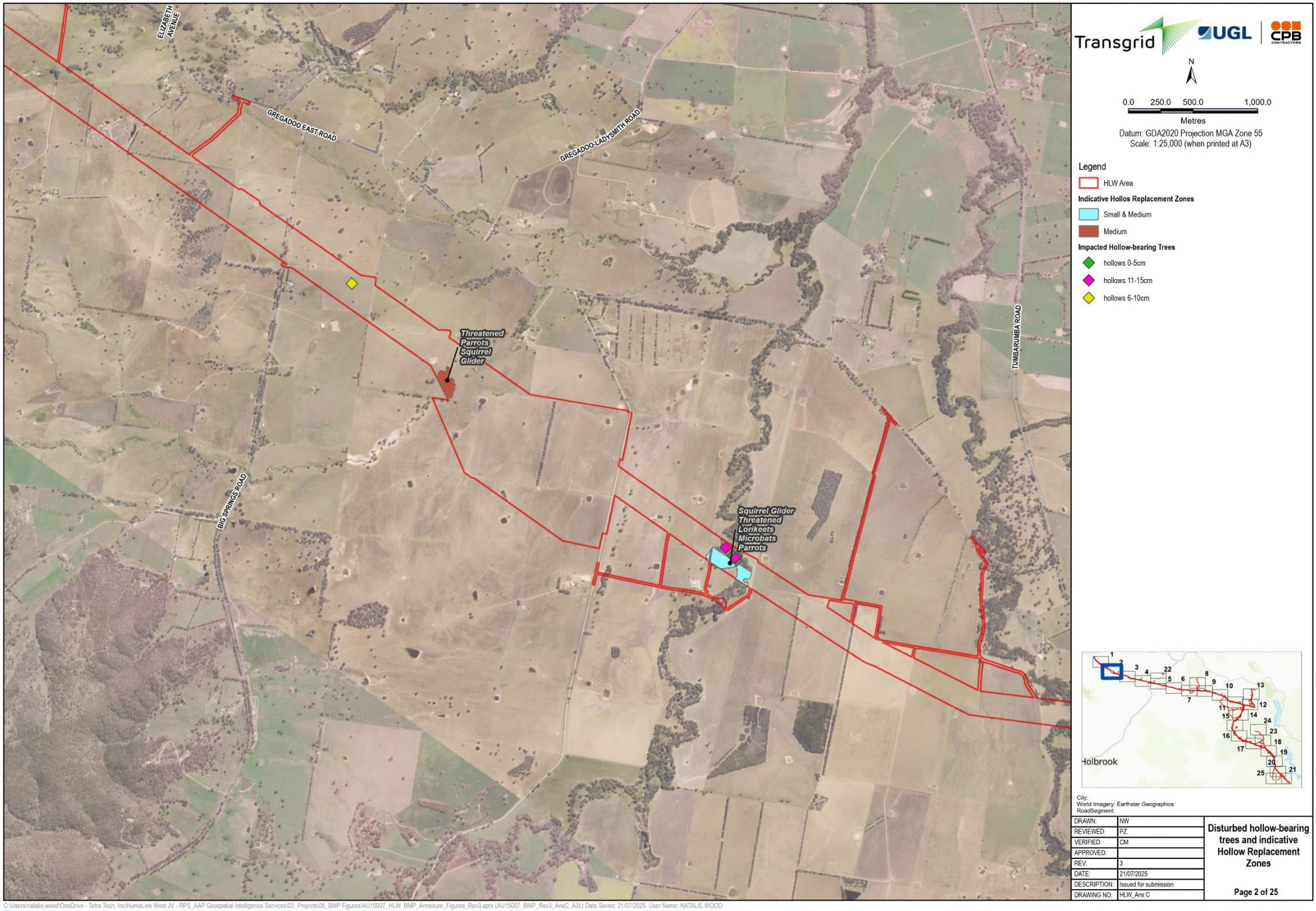
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Disturbed hollow-bearing trees and indicative Hollow Replacement Zones

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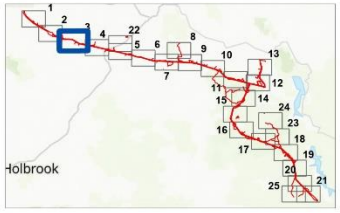
- HLW Area

Indicative Hollos Replacement Zones

- Medium

Impacted Hollow-bearing Trees

- hollows 11-15cm
- hollows 16-20cm



City:
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RoadSegment:

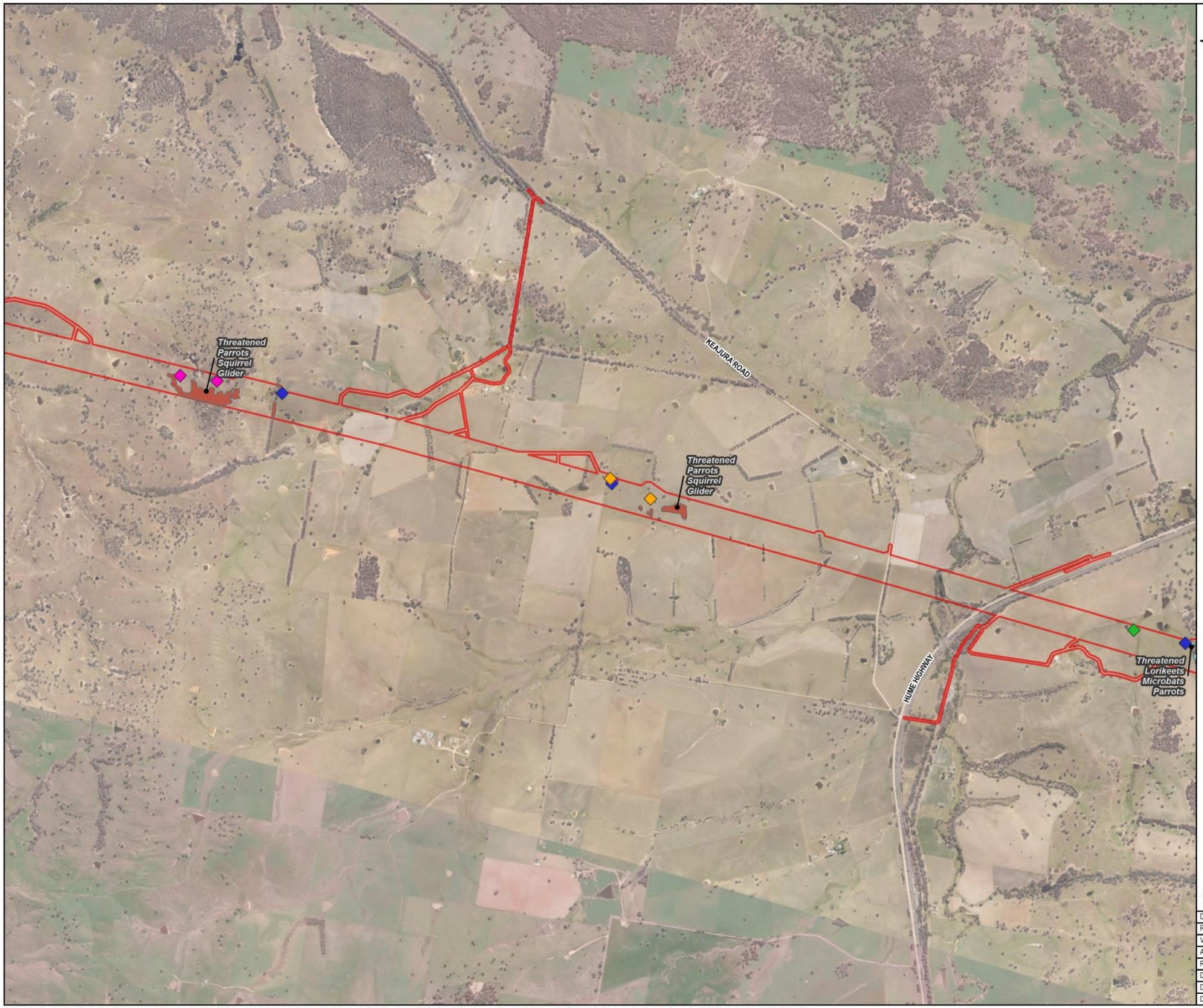
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Disturbed hollow-bearing trees and indicative Hollow Replacement Zones

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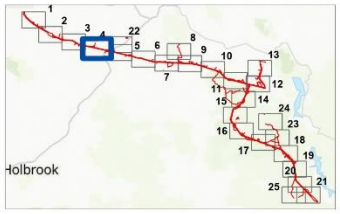
- HLW Area

Indicative Hollos Replacement Zones

- Small & Medium
- Medium

Impacted Hollow-bearing Trees

- hollows 0-5cm
- hollows 11-15cm
- hollows 16-20cm
- hollows 20-39cm



City:
World Imagery: Earthstar Geographics
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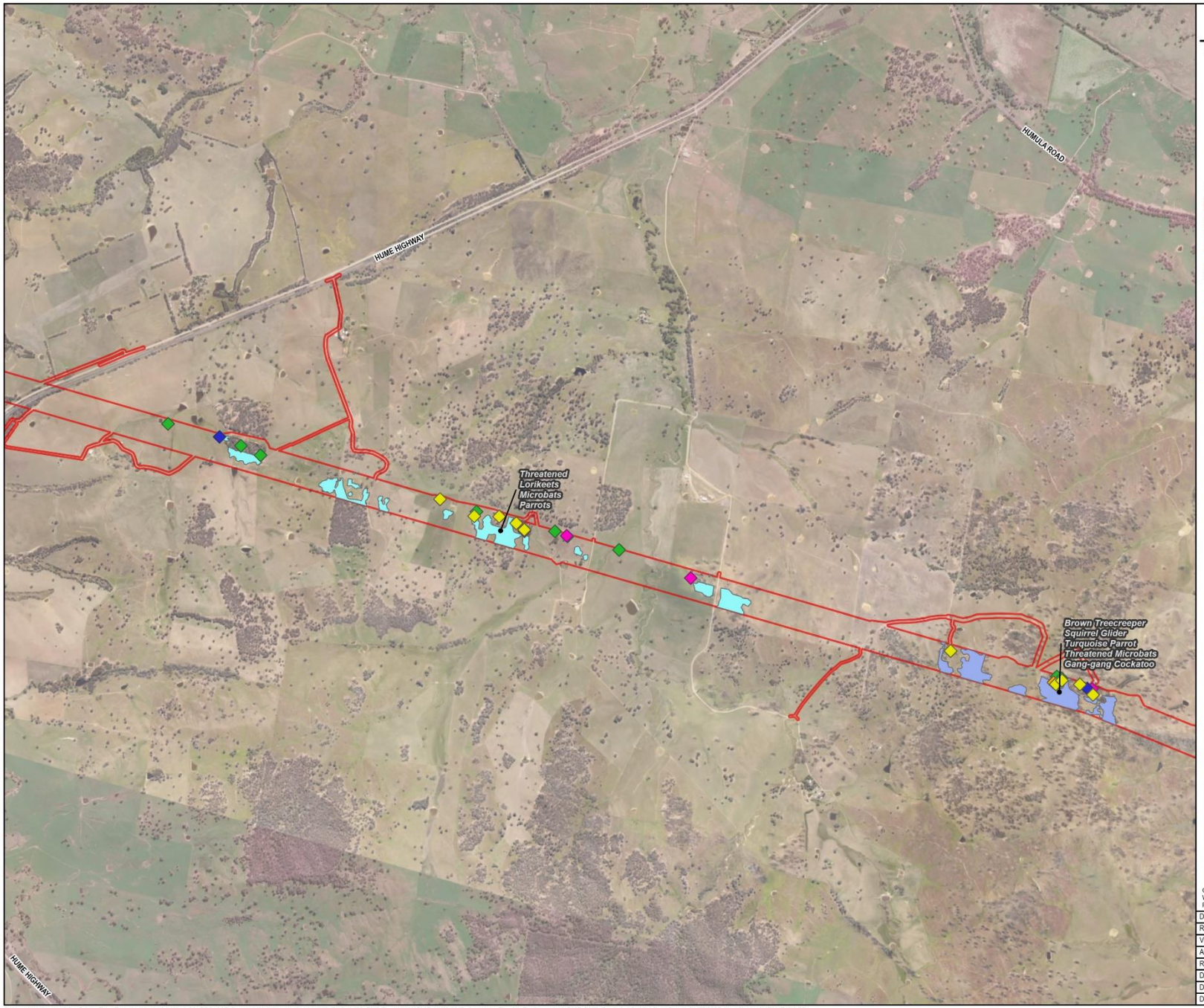
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Disturbed hollow-bearing trees and indicative Hollow Replacement Zones

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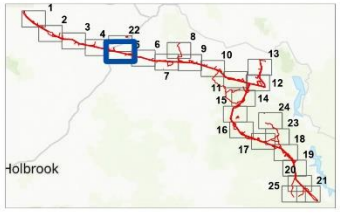
- HLW Area

Indicative Hollos Replacement Zones

- Small & Medium
- Small, Medium & Large

Impacted Hollow-bearing Trees

- hollows 0-5cm
- hollows 11-15cm
- hollows 16-20cm
- hollows 20-39cm
- hollows 6-10cm



City:
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RoadSegment:

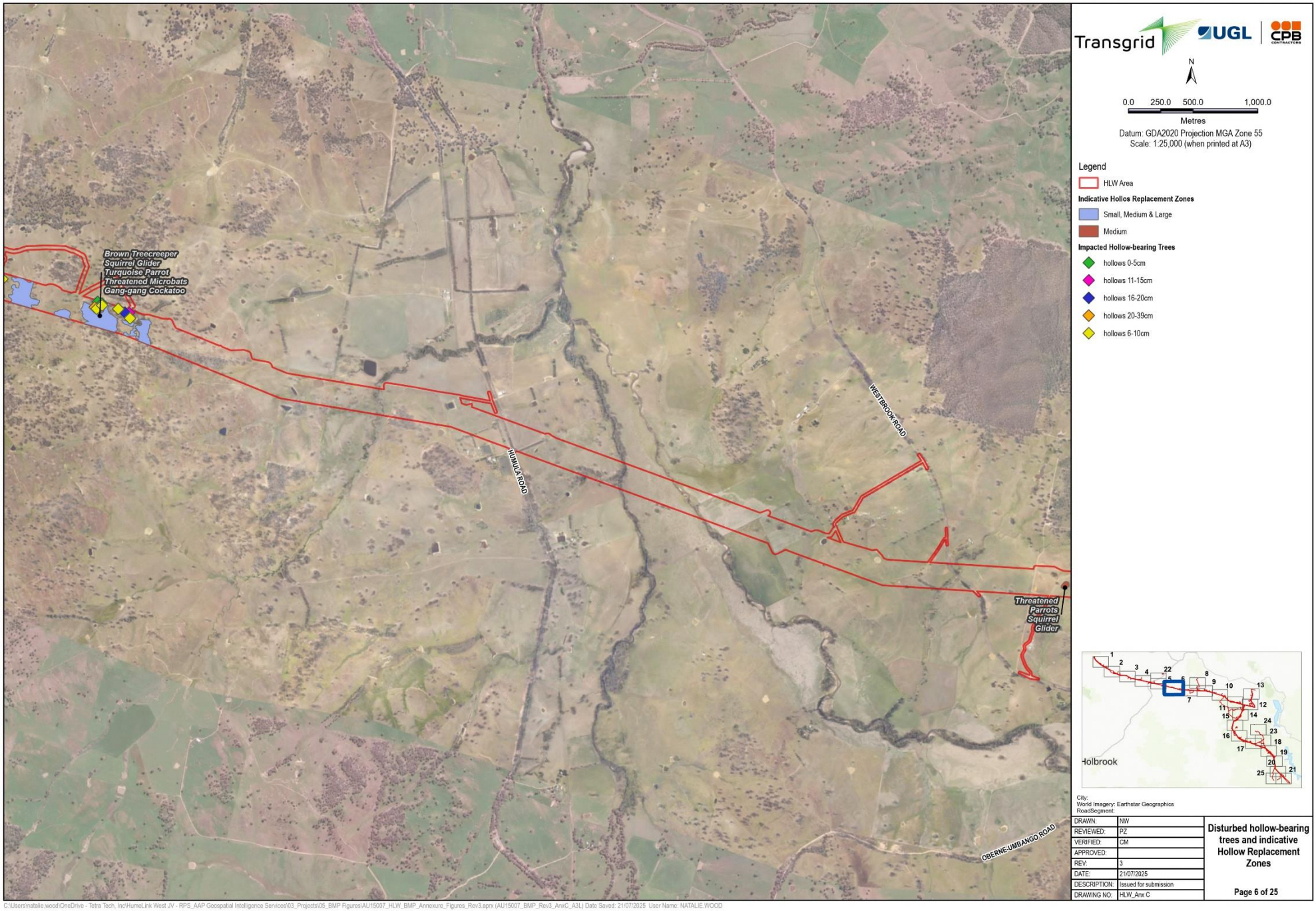
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Disturbed hollow-bearing trees and indicative Hollow Replacement Zones

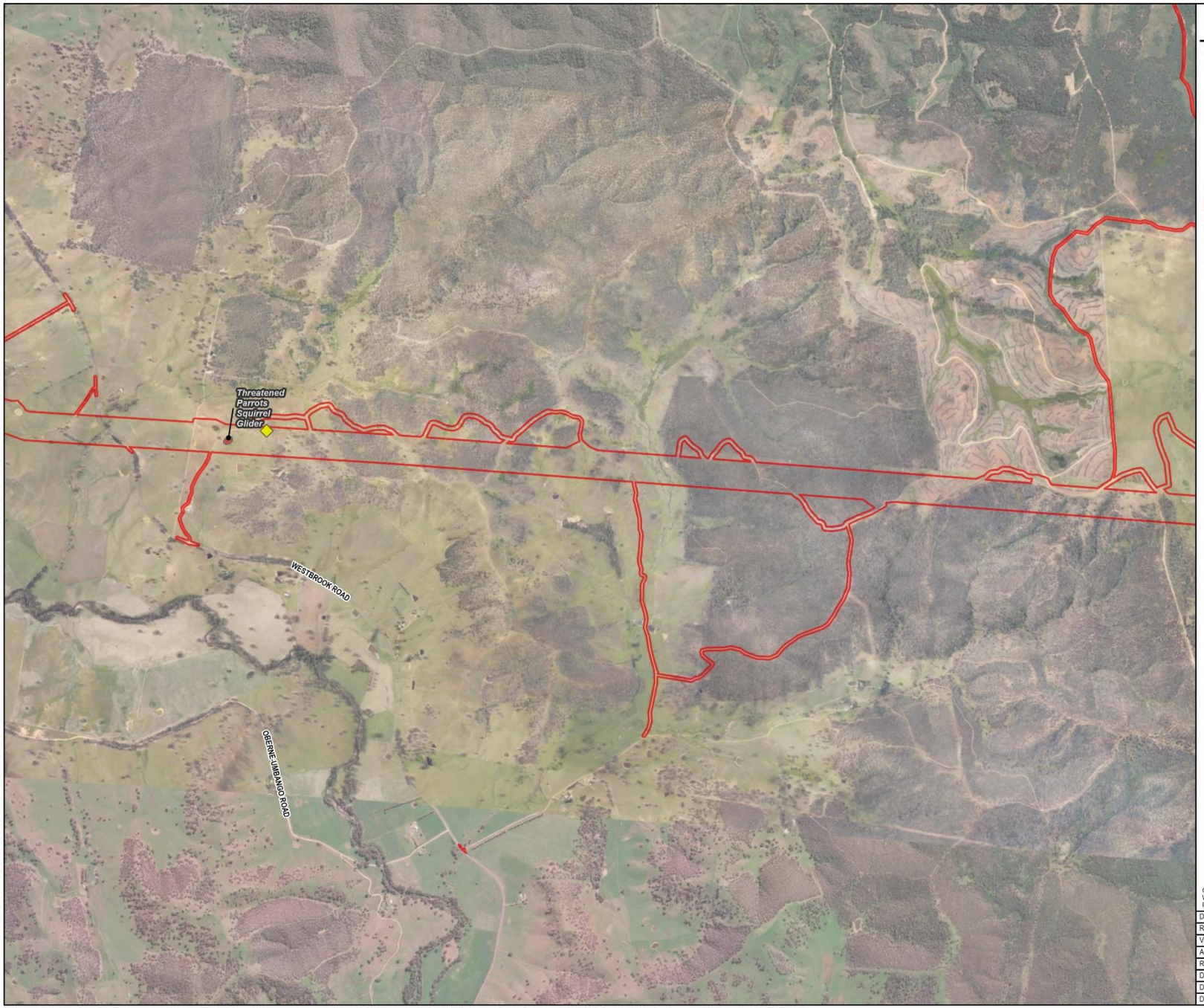
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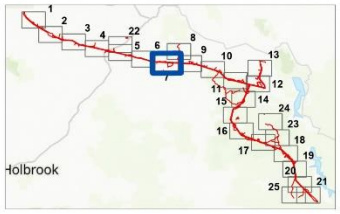
HLW Area

Indicative Hollos Replacement Zones

Medium

Impacted Hollow-bearing Trees

hollows 6-10cm



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Disturbed hollow-bearing trees and indicative Hollow Replacement Zones

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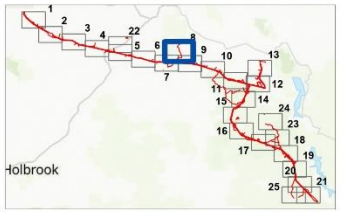
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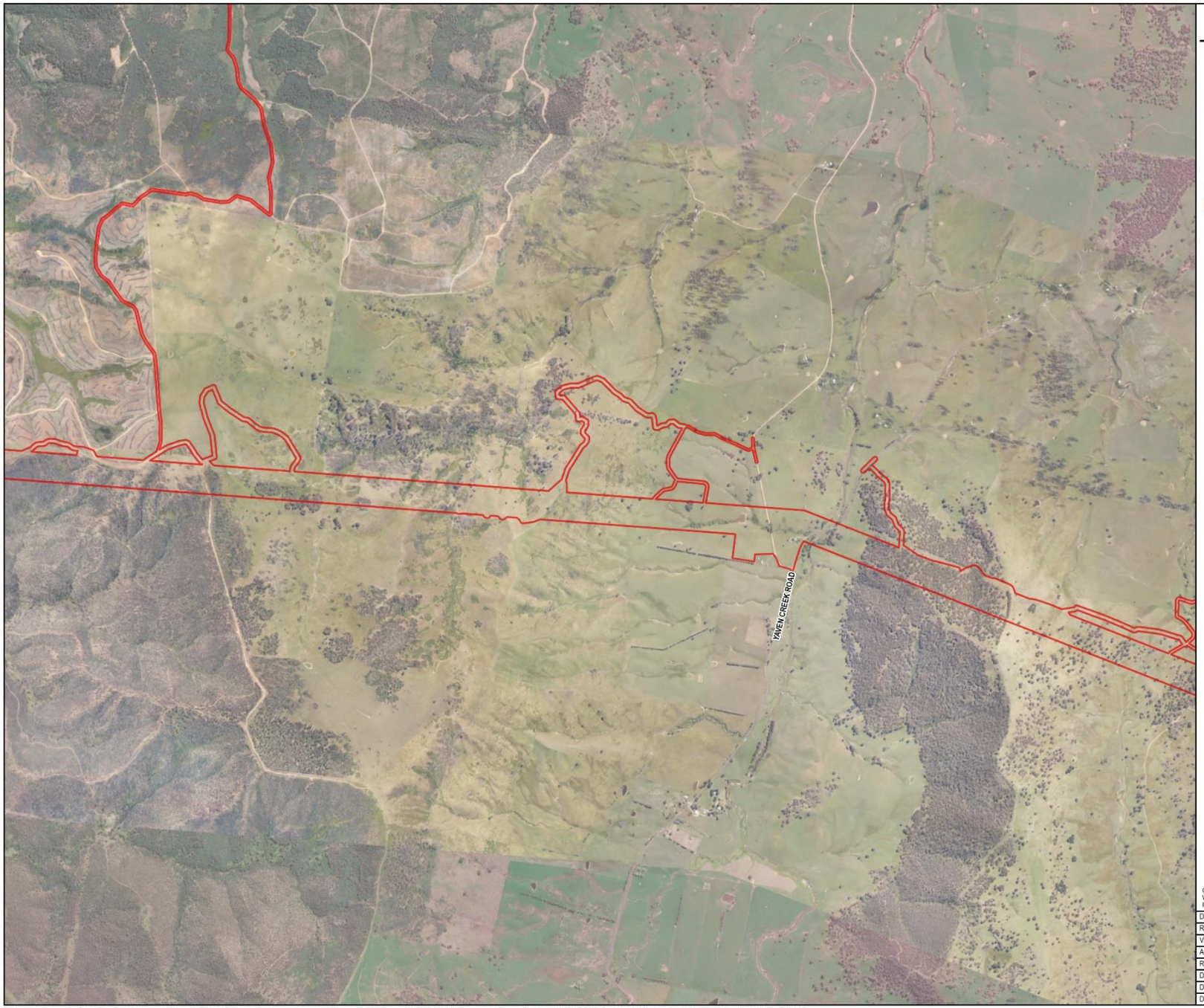
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Disturbed hollow-bearing trees and indicative Hollow Replacement Zones

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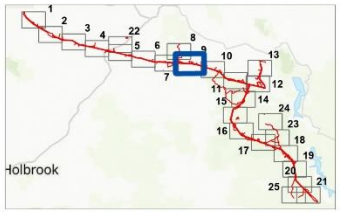
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HLW Area



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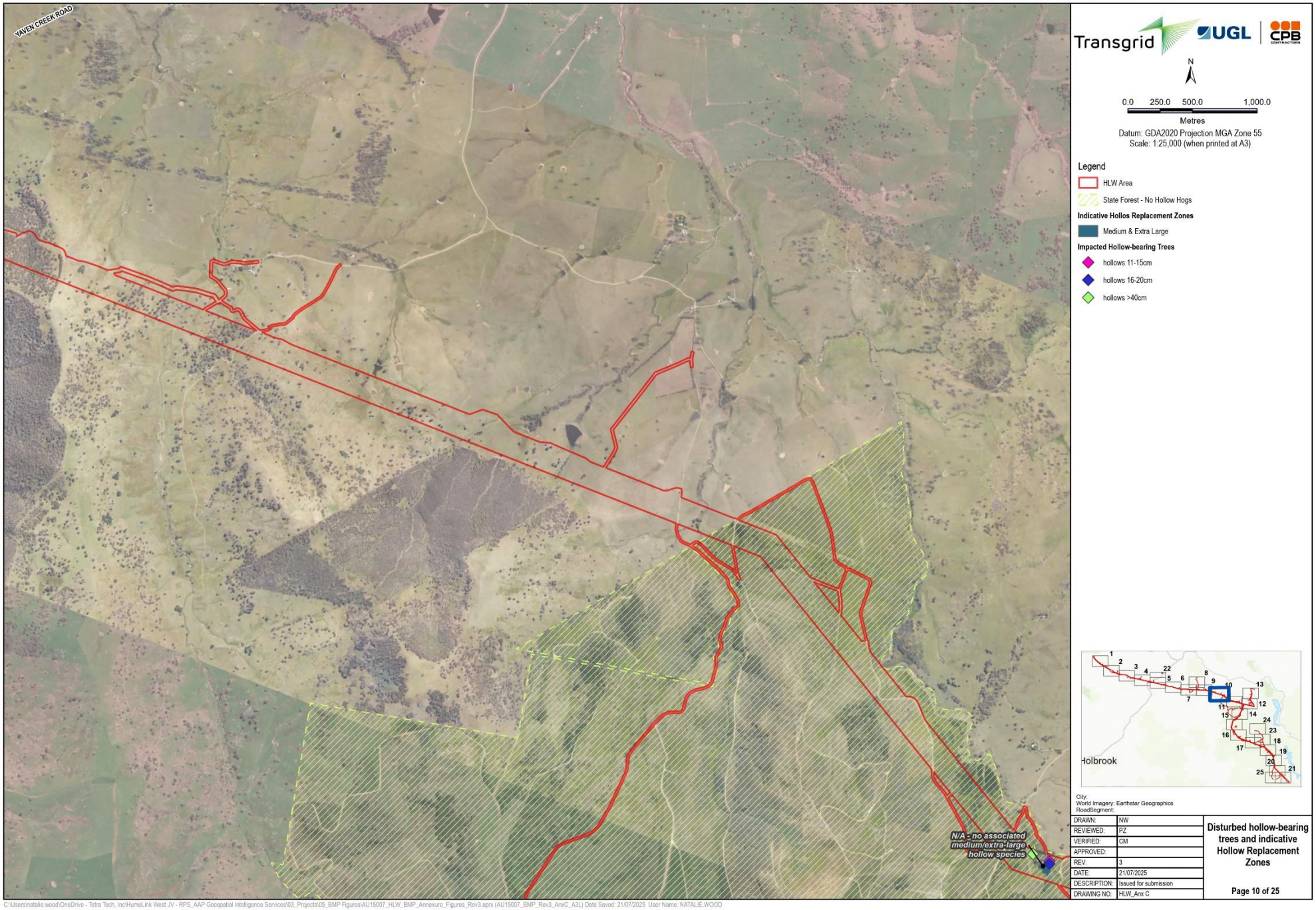
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Disturbed hollow-bearing trees and indicative Hollow Replacement Zones

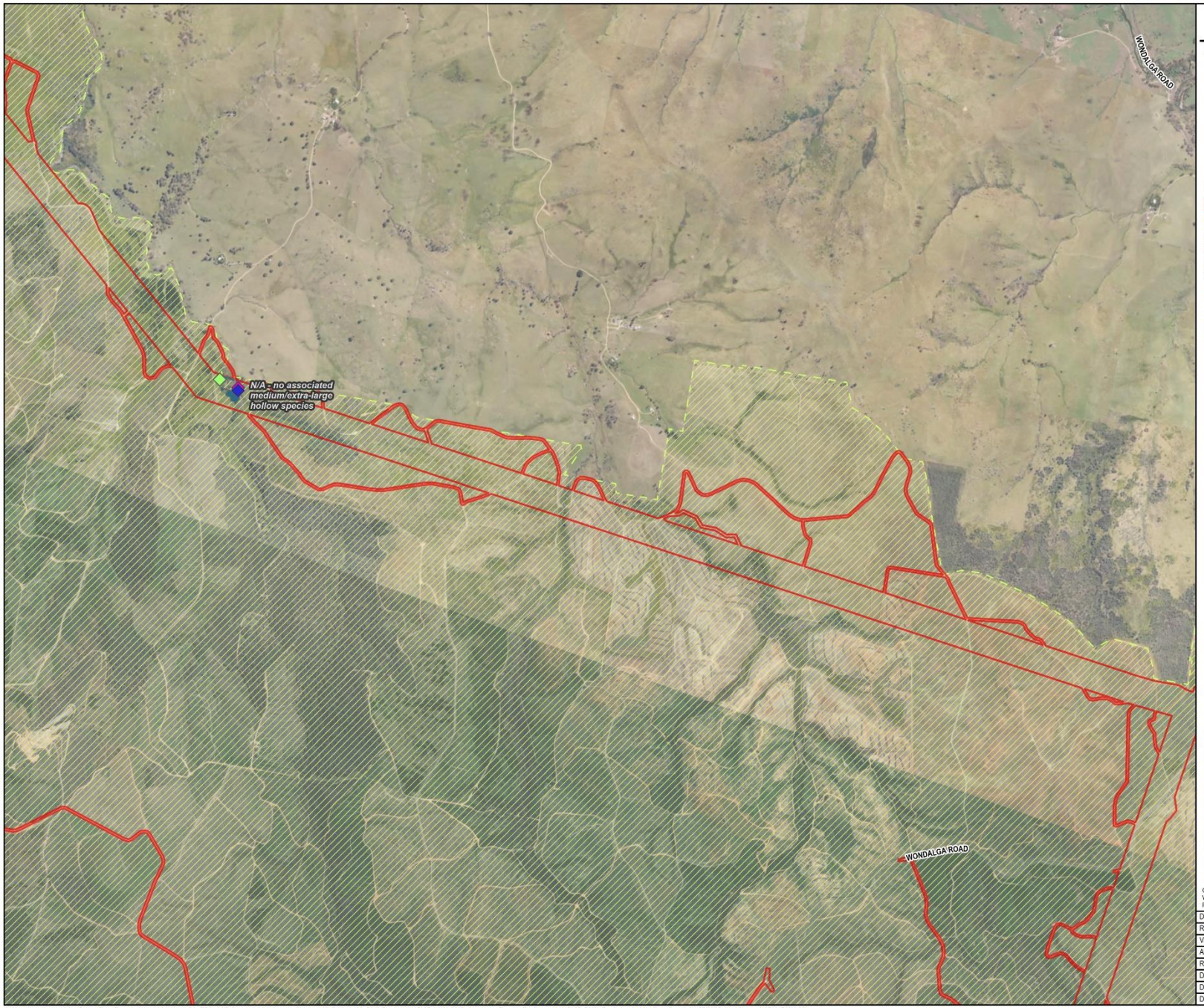
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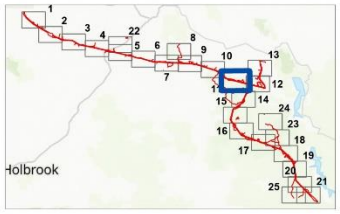
- HLW Area
- State Forest - No Hollow Hogs

Indicative Hollos Replacement Zones

- Medium & Extra Large

Impacted Hollow-bearing Trees

- hollows 11-15cm
- hollows 16-20cm
- hollows >40cm



City:
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RoadSegment:

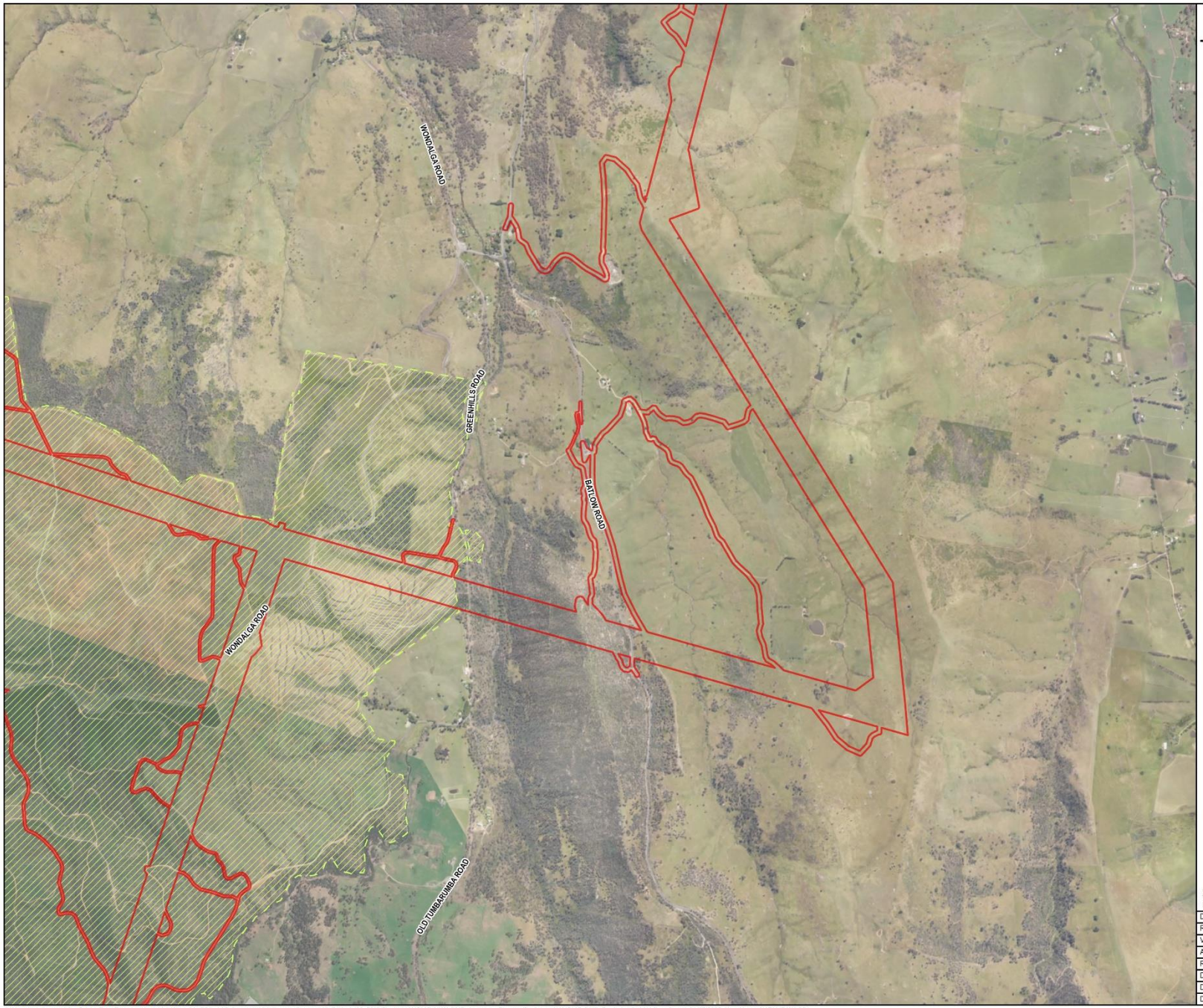
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Disturbed hollow-bearing trees and indicative Hollow Replacement Zones

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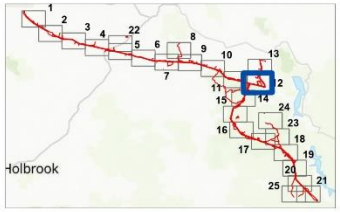
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- HLW Area
- State Forest - No Hollow Hogs



City:
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Disturbed hollow-bearing trees and indicative Hollow Replacement Zones

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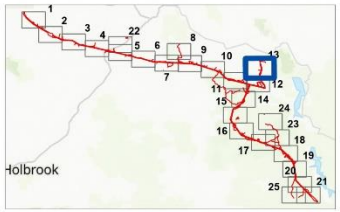
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HLW Area



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Disturbed hollow-bearing trees and indicative Hollow Replacement Zones

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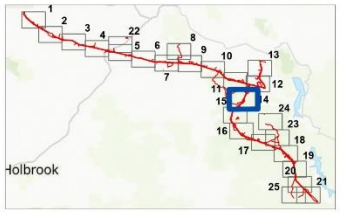
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Legend

- HLW Area
- State Forest - No Hollow Hogs



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Disturbed hollow-bearing trees and indicative Hollow Replacement Zones

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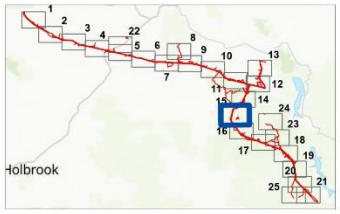
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State Forest - No Hollow Hogs



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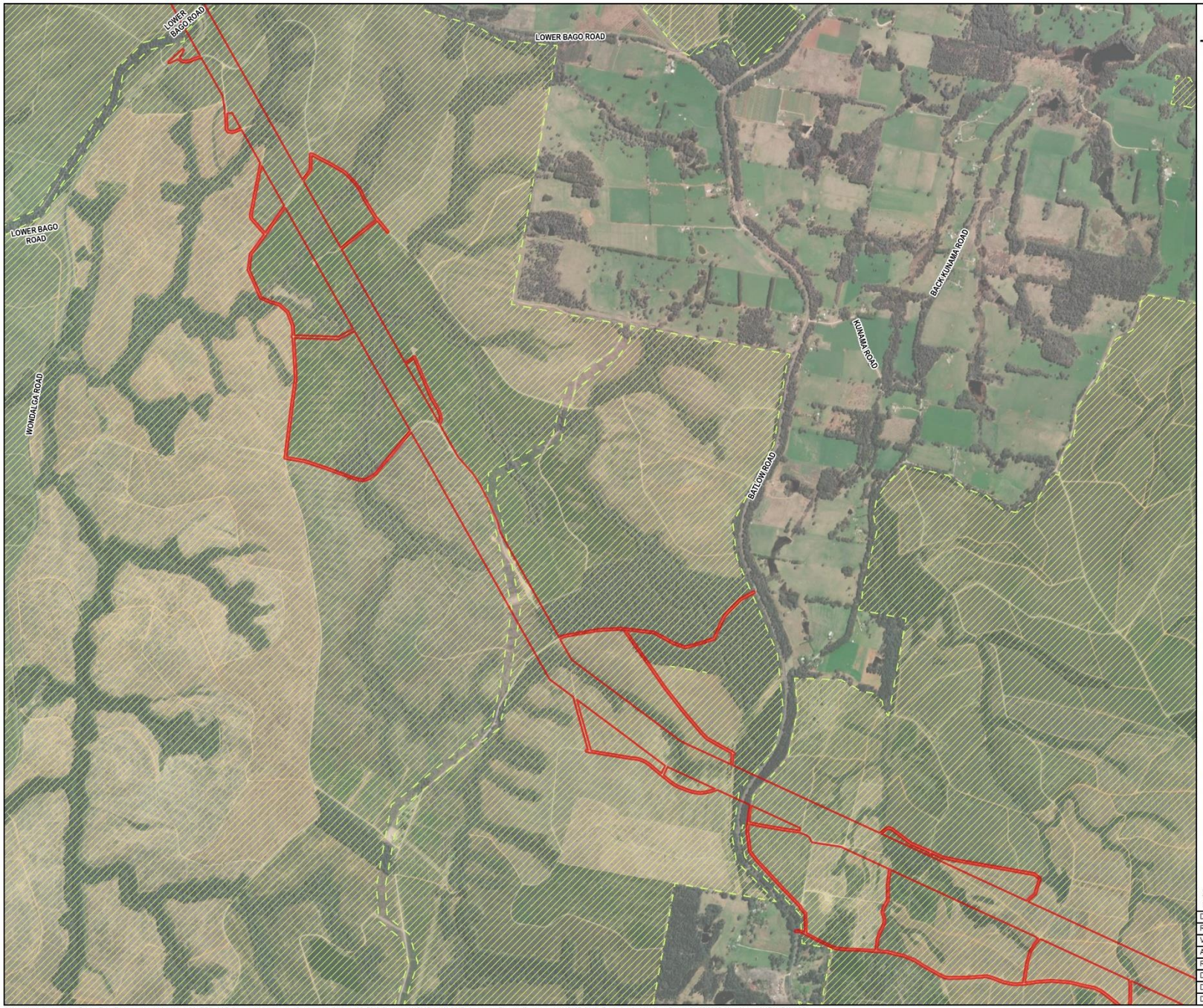
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Disturbed hollow-bearing trees and indicative Hollow Replacement Zones

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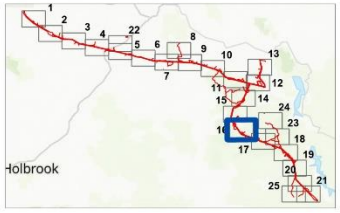
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HLW Area

State Forest - No Hollow Hogs



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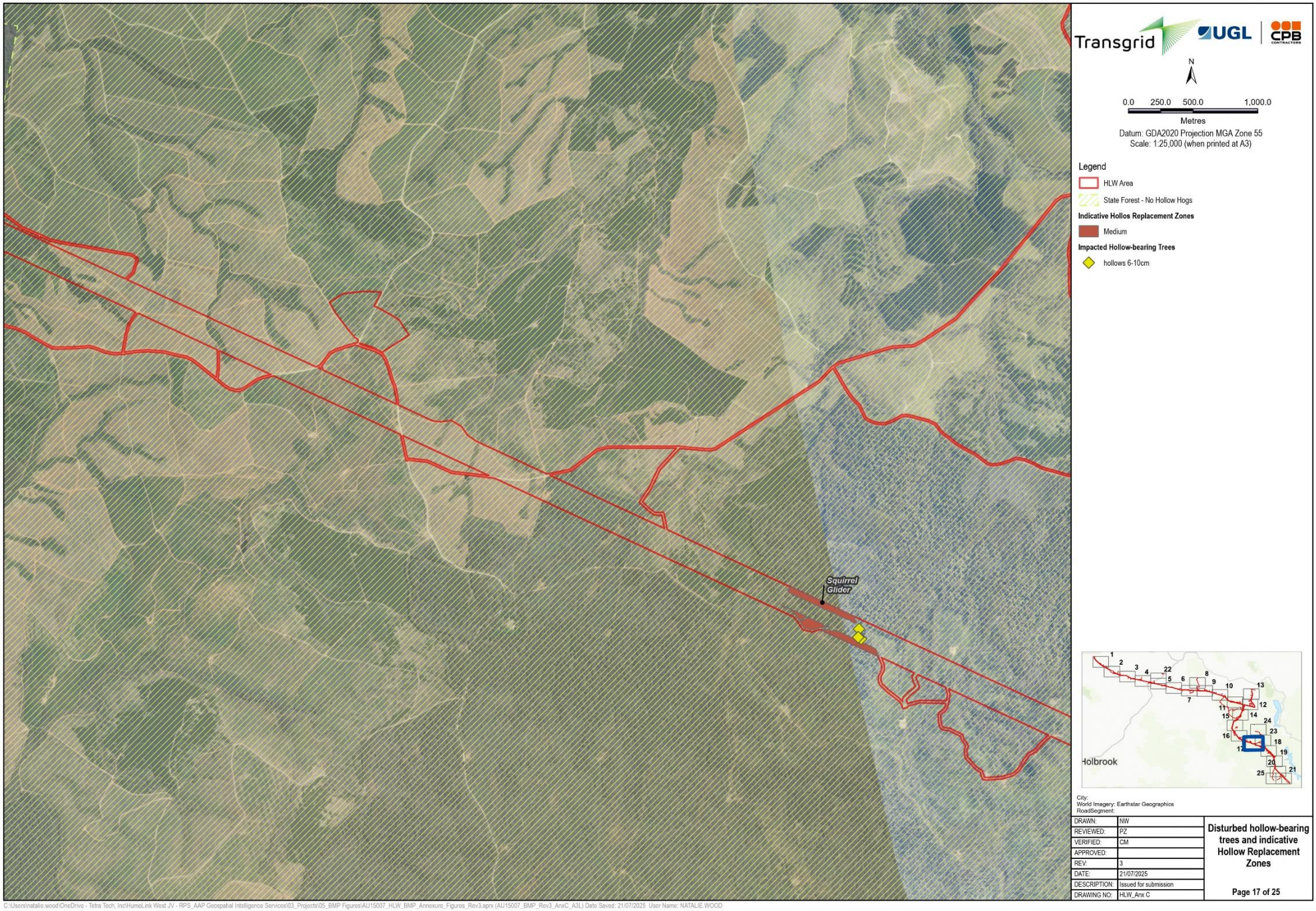
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DRAWING NO:	HLW_Anx C

Disturbed hollow-bearing trees and indicative Hollow Replacement Zones

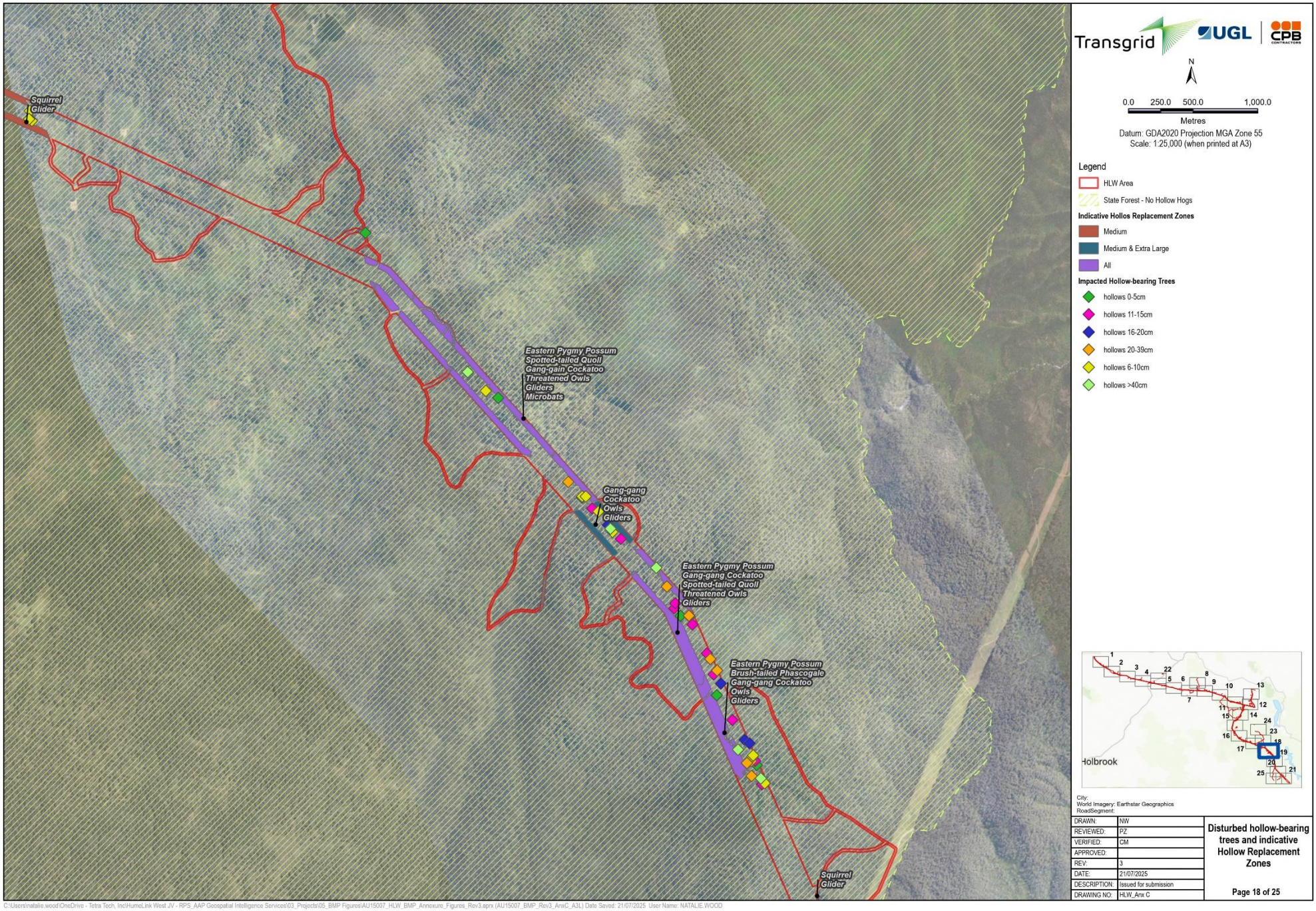
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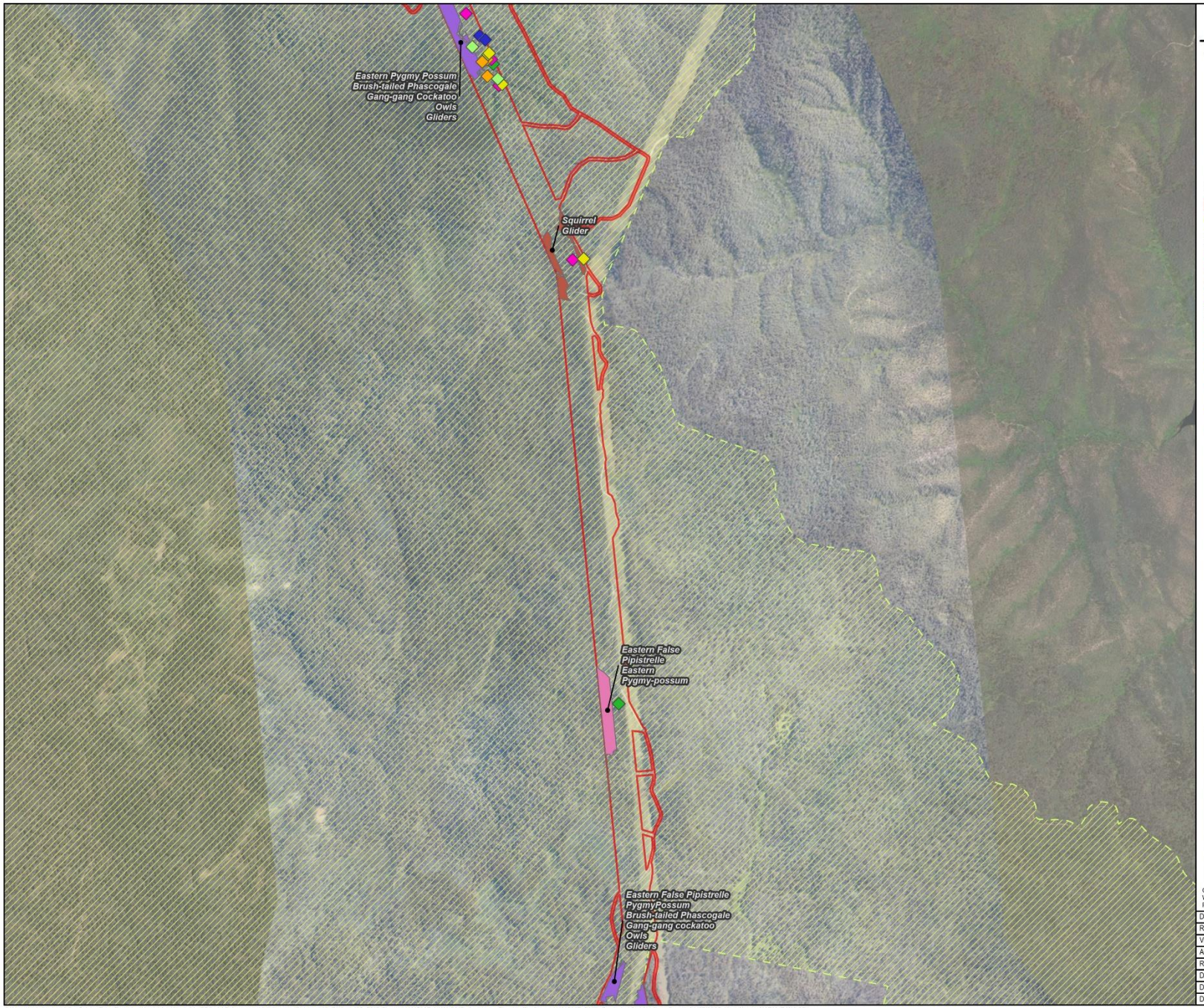
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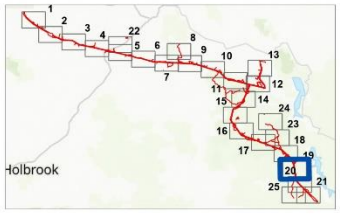
- HLW Area
- State Forest - No Hollow Hogs

Indicative Hollos Replacement Zones

- Small
- Medium
- All

Impacted Hollow-bearing Trees

- hollows 0-5cm
- hollows 11-15cm
- hollows 16-20cm
- hollows 20-39cm
- hollows 6-10cm
- hollows >40cm



City:
World Imagery: Earthstar Geographics
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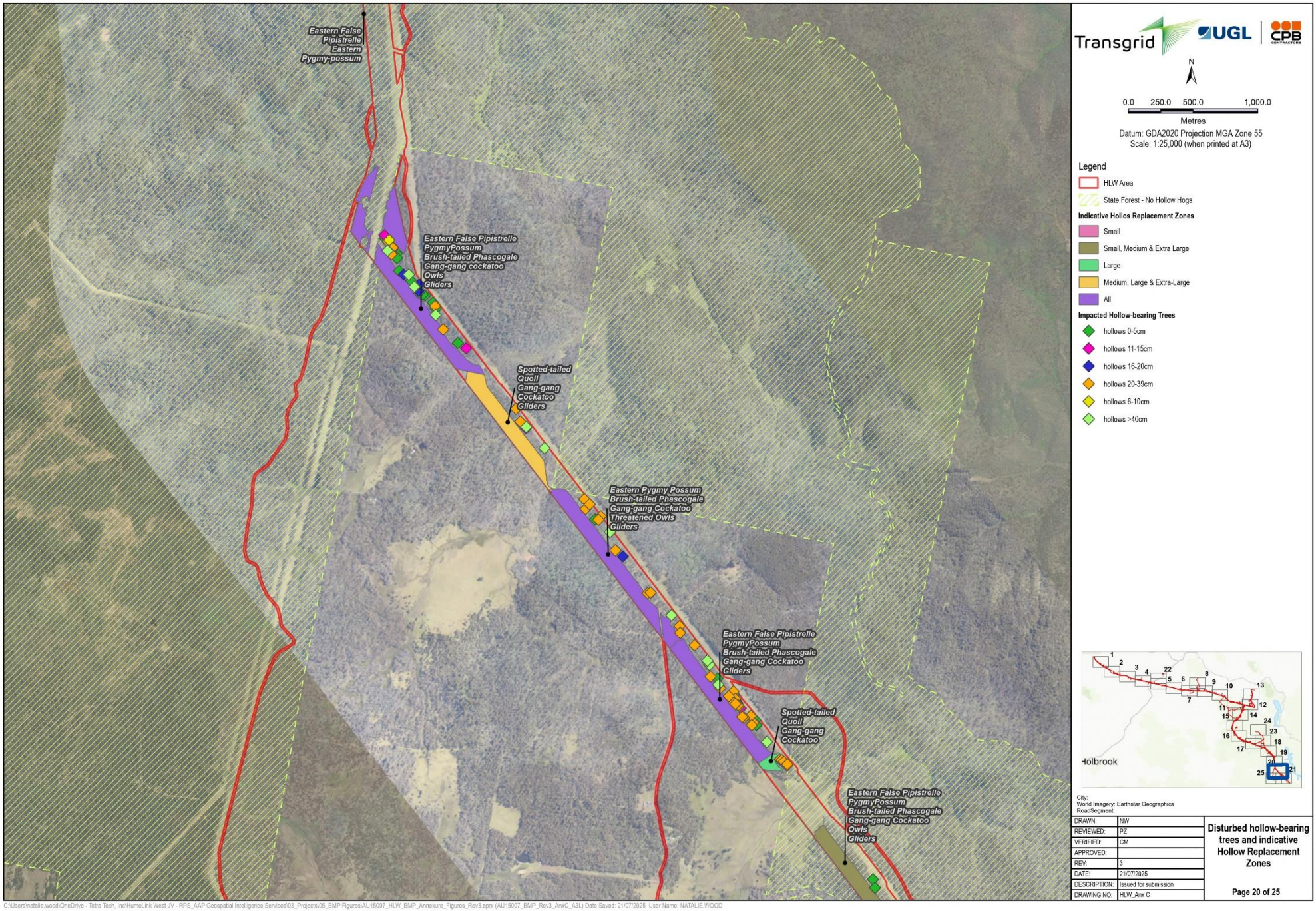
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Disturbed hollow-bearing trees and indicative Hollow Replacement Zones

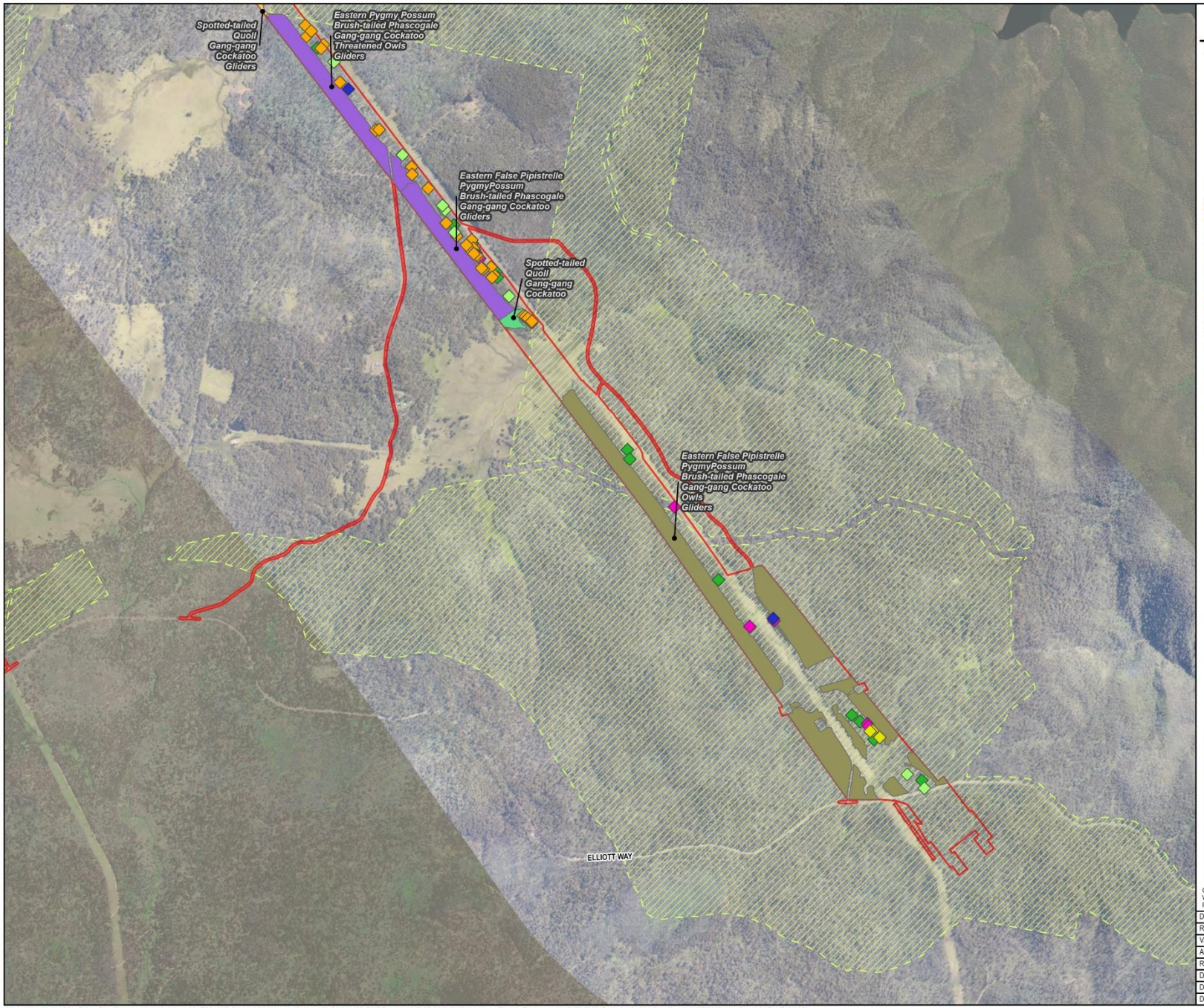
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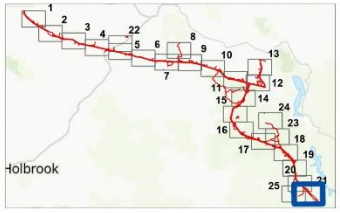
- HLW Area
- State Forest - No Hollow Hogs

Indicative Hollos Replacement Zones

- Small, Medium & Extra Large
- Large
- Medium, Large & Extra-Large
- All

Impacted Hollow-bearing Trees

- hollows 0-5cm
- hollows 11-15cm
- hollows 16-20cm
- hollows 20-39cm
- hollows 6-10cm
- hollows >40cm



City:
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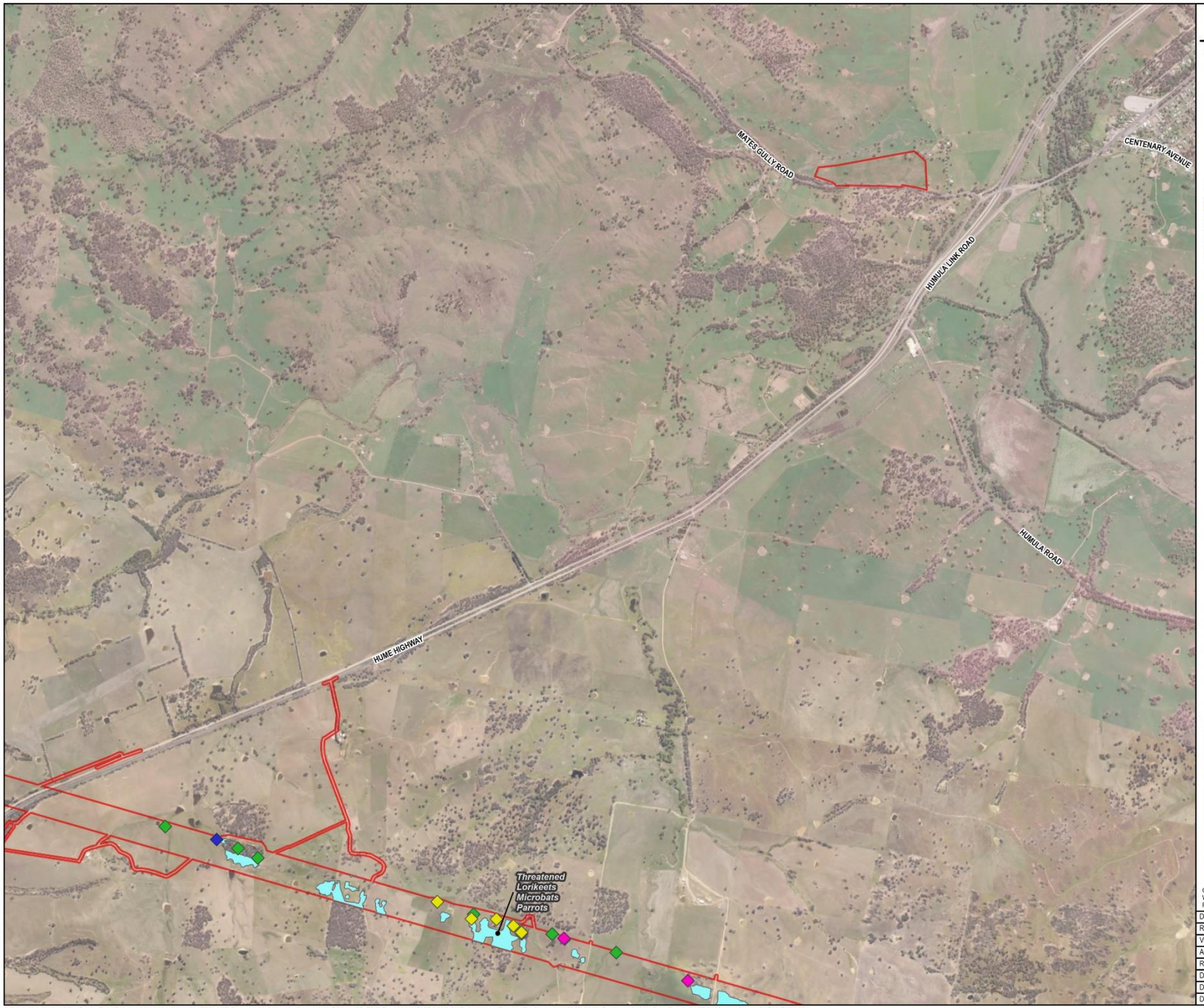
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Disturbed hollow-bearing trees and indicative Hollow Replacement Zones

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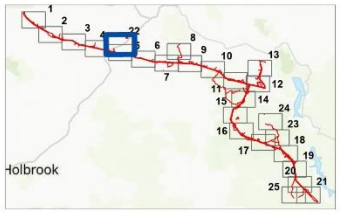
- HLW Area

Indicative Hollos Replacement Zones

- Small & Medium

Impacted Hollow-bearing Trees

- hollows 0-5cm
- hollows 11-15cm
- hollows 16-20cm
- hollows 6-10cm



City:
World Imagery: Earthstar Geographics
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Disturbed hollow-bearing trees and indicative Hollow Replacement Zones

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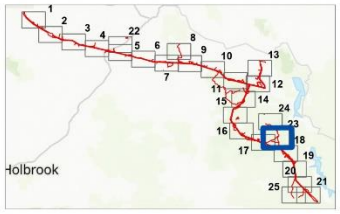
- HLW Area
- State Forest - No Hollow Hogs

Indicative Hollos Replacement Zones

- Medium

Impacted Hollow-bearing Trees

- hollows 6-10cm



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Disturbed hollow-bearing trees and indicative Hollow Replacement Zones

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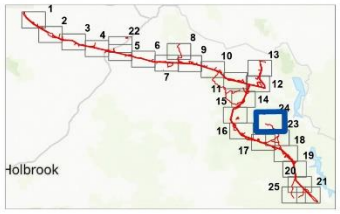
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- HLW Area
- State Forest - No Hollow Hogs

Impacted Hollow-bearing Trees

- hollows 6-10cm



City:
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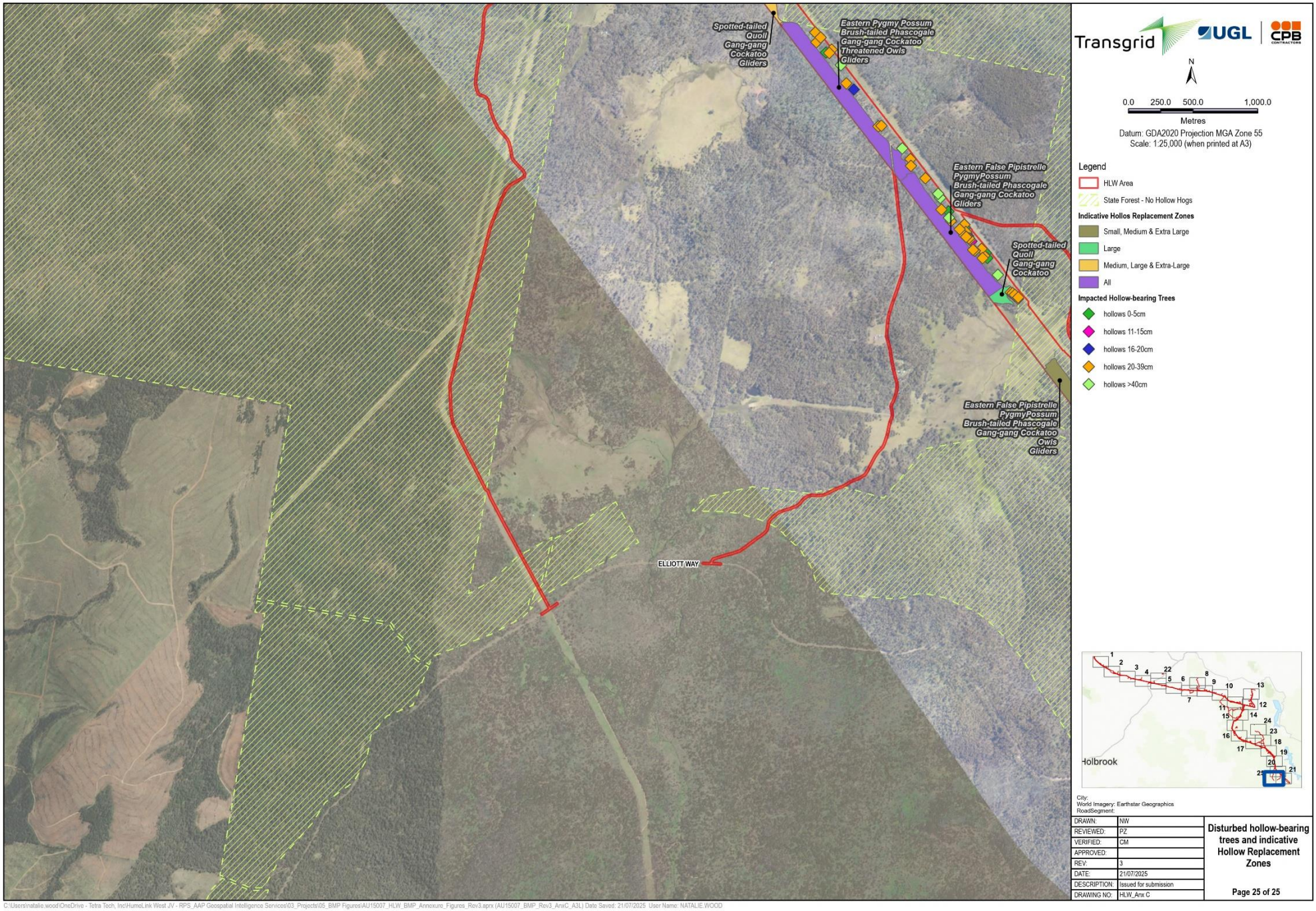
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Disturbed hollow-bearing trees and indicative Hollow Replacement Zones

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4.2.5. Timing

Vegetation clearing works for HLW will involve a staged approach, therefore a similar approach is proposed for this artificial hollow installation. Artificial hollows will be installed in accordance with the following timeframe:

- 30% to be installed prior to clearing within a particular location, to be confirmed via Post-clearing Reports.
- All remaining to be installed within 2 months of clearing within a particular location.

4.3. Nest impact management

In developing this Hollow and Nest Strategy for the HLW Project, a key consideration is how to manage bird nests encountered during vegetation clearing works. The strategy provides for the replacement of hollows and relocation of simple nests as detailed below; however, it explicitly excludes the relocation of large stick nests such as those used by raptors. Instead, the approach for large stick nests is to dismantle/remove them (when not in-use). Rationale is provided below, focusing on safety risks and consistency with utility network guideline, while ensuring active nests are handled with care.

Attracting large birds of prey near live power infrastructure poses serious risks to both the birds and the network. High-voltage transmission lines and towers can be dangerous for big raptors like the Wedge-tailed Eagle and Little Eagle. Collision and electrocution are primary concerns: large birds may collide with overhead conductors if they fly in the corridor, and they can be electrocuted by high-voltage equipment if they attempt to perch or nest on structures. Raptors nesting on or near electrical structures are at increased risk of line strikes and shocks, especially juveniles taking their first flights. When young eagles fledge from a nest near transmission lines, their inexperience can lead to collisions with wires, while adults hunting prey around conductors can also misjudge clearances.

If a large stick nest is built on a tower or pole, it can create a fire and outage hazard (e.g., nest materials or droppings can cause shorts or fires). In addition, stick nests can be extremely bulky – sometimes up to 2 m across and 3 m deep, weighing over 400 kg. These massive structures are difficult and dangerous to move intact. Instead, HLW will dismantle large nests once they are confirmed inactive. This approach is justified by several factors, including:

- Physical practicality and success rate – Nest could easily fall apart during handling, given their size and weight. Moreover, many raptors will not continue using a nest that has been moved.
- Encouraging natural relocation away from danger – By dismantling the nest (outside breeding season), the project will discourage raptors from nesting in that exact spot near the line. This gives the birds the opportunity to select an alternate nest site farther from the transmission corridor, which is ultimately safer for them.
- Safety and reliability considerations – Raptor nesting/roosting near high-voltage lines presents ongoing risks to network reliability (through outages or equipment damage), and to human safety (through potential bushfire ignition or line drops if a collision causes conductor damage).

Clearing of habitat trees containing nests will be managed in accordance with Annexure B: Clearing Protocol of the HLW BMP. The following will be implemented to mitigate impacts on nests:

- Threatened (simple) nesting birds:
    - Pre-clearing surveys will occur to record nests in known or assumed habitat.
    - Potential nest trees will be clearly identified on construction planning maps.
    - If utilised nests are identified on-site, a 100 m temporary buffer (minimal disturbance zone) will be established until follow up surveys confirm the individuals (adults and chicks) have left the nest. The purpose of the buffer is to minimise construction impacts to breeding pairs and their chicks. The buffer can be removed once chicks have

fledged.
    - Buffers are to be clearly marked using a recognised delineation protocol
    - Activity in the buffer would be limited to low impact works such as use of existing tracks.
- Threatened stick nesting birds (raptors):
    - Pre-clearing surveys will identify trees with large stick nests or any adult with nesting material in known or assumed habitat.
    - Where trees with stick nests are identified on-site, diurnal nest watching will occur during the breeding season to confirm presence of breeding activity (eggs or chicks).
    - Nest trees will be clearly identified on construction planning maps.
    - If breeding activity is recorded on-site during construction, a 100 m temporary buffer (minimal disturbance zone) will be established around the active nest until follow up surveys confirm the individual (adults and chicks) have left the nest. The purpose of the buffer is to minimise construction impacts to breeding pairs and their chicks. The buffer can be removed once chicks have fledged.
    - Buffers are to be clearly marked using a recognised delineation protocol
    - Activity in the buffer would be limited to low impact works such as use of existing tracks.
- General rescue approach for non-threatened birds:
    - Where possible and safe to do so, gain access to nests. Capture and remove any nestlings.
    - Place nestlings in cotton capture bags and assess for injuries. Store bags containing nestlings in a pet carrying cage or ventilated cardboard box. The animal container will be covered to reduce stress on the bird. Deliver to specialist wildlife carer.
    - If adult birds are captured, they will be released away from construction activities.
- Where simple nests (i.e., cup or dome nests built within trees, usually in canopy or in forks of branches) can be reasonably relocated, locations are to be determined by the Project Ecologist.
- Following confirmation of inactivity, stick/platform nests will be dismantled under supervision of the Project Ecologist (to inspect contents after dismantling and rescue any unexpected fauna in-situ). Nest materials may be disposed of offsite if damaged or at biosecurity risk, or reused as fauna habitats on-site, ensuring re-use is limited to at least 100 m off-easement to avoid additional raptor attraction.

If any nests are rebuilt during construction of HLW, the following will be implemented:

- Surveillance and detection – any nests observed will be reported to the Environmental Manager. Routine visual inspections will occur of all towers, poles, crane arms and other elevated structures:
    - Weekly in active construction areas.
    - Monthly during commissioning or when structures are static.
- Assessment of nest activity – the Project Ecologist will undertake an inspection of the identified nest, recording the following:
    - Species (if identifiable).
    - Stage of nesting (nest construction vs. active breeding).
    - Potential for use by threatened or protected raptors.
- Inactive/incomplete stick nests, or nests with no eggs/chicks, will be dismantled immediately.
- Active nests with eggs/chicks will have a 100 m temporary buffer established around, with the Project Ecologist monitoring until fledging.
- For persistent nest rebuilding at a location, the following will be considered and confirmed adequate by the Project Ecologist and HLWJV team:

- Anti-perching devices (e.g., angle rods, spinning deterrents) on tower crossarms or insulators.
- Visual deterrents (e.g., eagle silhouettes, reflective tape, raptor eye balloons).

4.4. Summary of hollow and nest strategy measures

All hollow and nest strategy measures outlined in this strategy have been summarised in Table 4-5 below. These will be implemented to minimise impacts from HLW and ensure all commitments and requirements of approval will be adhered to. These specific management and mitigation measures have been developed to address the relevant requirements of applicable legislation, the MCoA, the CoMA, the UMM and all Planning Approval Documentation, particularly the Revised BDAR.

Table 4-5 Hollow and nest management and mitigation measures

ID	Measure/Requirement	When to implement	Responsibility	Reference	Evidence
BMP13	Pre-clearing surveys to include a confirmation of all hollows lost, updated artificial hollows required, and finalised Hollow Replacement Zones to be detailed in the Pre-clearing Reports.	Pre-construction	Environmental Manager Project Ecologist	MCoA B25, B30 CoMA 2, 7 UMM B3, B12	Pre-clearing Reports
BMP14	Artificial hollow installation to occur within finalised Hollow Replacement Zones at a 1:1 ratio for all hollows showing evidence of occupation or fauna use: 30% to be installed prior to clearing and all remaining to be installed within 2 months of clearing. Artificial hollows to include salvaged hollows, hollow hogs or nest boxes (including 3D-printed boxed) as applicable. No hollow hog installation to occur within State Forests.	Pre-construction and Construction	Environmental Manager Project Ecologist Construction Manager Arborist Project Ecologist	MCoA B25, B30 CoMA 2, 7 UMM B3, B12	Post-clearing Reports Nest Box Installation Report
BMP15	Nest impact management will be undertaken during Pre-clearing Surveys and Clearing Supervision, including avoidance of breeding threatened nest trees. Simple nests may be relocated during clearing procedures under direct supervision of the Project Ecologist, however raptor (stick) nests will be dismantled to minimise collision risk.	Pre-construction and Construction	Environmental Manager Project Ecologist Construction Manager Project Ecologist	MCoA B25, B30 CoMA 2, 7 UMM B3, B12	Pre-clearing Reports Post-clearing Reports
BMP16	Post-clearing Reports to confirm the type and number of additional artificial hollow replacements necessary following final hollow clearing data, and preliminary hollow replacement installations. Confirmation of all hollows cleared, hollow size, location, and final artificial hollow installation requirements is required.	Construction	Environmental Manager Project Ecologist	MCoA B25, B30 CoMA 2, 7 UMM B3, B12	Post-clearing Reports

ID	Measure/Requirement	When to implement	Responsibility	Reference	Evidence
BMP17	Habisure system used for all artificial hollow installations, nest box dimensions and design considerations to be followed per this strategy. Hollow Hog installation/creation procedure to be followed per this strategy.	Construction	Environmental Manager Project Ecologist Construction Manager Arborist	MCoA B25, B30 CoMA 2, 7 UMM B3, B12	Nest Box Installation Report
BMP18	Any re-built nests will be managed in accordance with this strategy including detection, assessment of nest activity, temporary buffers and/or dismantling, and potential bird deterrent devices.	Pre-construction and Construction	Environmental Manager Project Ecologist Construction Manager Project Ecologist	MCoA B25, B30 CoMA 2, 7 UMM B3, B12	Fauna handling record sheet

5. Compliance management

5.1. Monitoring and inspection

Biannual (spring and autumn) monitoring of this strategy will occur during construction of HLW to determine the use of artificial hollows. Monitoring will be undertaken using an endoscopic camera (or similar) attached to an extendable pole to minimise disturbance of resident fauna. Monitoring must be incorporated into the Transgrid Operational Environmental Management Plan for a minimum of three-years post installation and will include the following:

- Name of observer.
- Date.
- Prevailing weather conditions.
- Unique identification number of the artificial hollow.
- Artificial hollow type (i.e., wooden or 3D-printed nest box, salvaged or hollow hogs).
- Assessment of artificial hollow and suspension system condition.
- Host-tree health and stability.
- Evidence of pest species.
- Photographic evidence of condition, fauna use and pest presence (if present).
- GPS coordinates (± accuracy).
- Height above ground (m).
- Orientation/direction of entrance (e.g. NE, S — relevant to thermal performance and species preference).
- Evidence of fauna use.
    - Signs of breeding or roosting (e.g., presence of eggs, chicks, active nest material)
- Fauna identification (if observed)
    - Species.
    - Number of individuals.
    - Behaviour (e.g., nesting, roosting, foraging).
- Record of recent maintenance or disturbance (e.g., box repaired, relocated, noted signs of tampering/vandalism).
- Risk or safety notes (e.g., unsafe access, wasps/bees, tree instability).
- Recommendations for follow-up (e.g., replace/repair, increase monitoring frequency, install exclusion measures).

5.2. Maintenance

During the construction period, any deteriorating artificial hollows will be replaced and any fallen hollows will be reinstalled. Any longer-term maintenance and monitoring (post-construction) would be detailed within the Transgrid Operational Environmental Management Plan. Maintenance should include the following:

- Repair or replace any damaged artificial hollows (e.g., fallen, chewed, weathered).
- Remove or exclude pest species (e.g., European Honeybees) or non-target species (e.g., Myna nests).
- Re-fasten suspension system or replace if degraded.
- Replace any artificial hollows lost or rendered unusable (targeting no net loss of installed

hollows).

- Re-bore or repair hollow hogs showing signs of collapse or degradation.
- Prune or manage surrounding vegetation if access is impeded.
- Clear blocked hollow entrances (e.g., spider webs, leaf litter, debris obstructing fauna access).
- Check and maintain drainage holes and ventilation features, particularly in nest boxes, to prevent waterlogging or overheating.
- Reposition salvaged hollows if shifted or destabilised and ensure correct orientation and positioning is retained (e.g., entrance direction, height, and placement remain within design specs).
- Document all maintenance activities including date, action taken, reason, and any follow-up required.
- Plan and schedule regular inspections (e.g., re-inspect repaired structures within 3–6 months).

5.3. Incidents and non-compliances

Non-conformances, incident reporting and subsequent investigation will be undertaken as required in accordance with Trigger Action Response Plan (TARP) provided in Table 5-1 below. HLWJV will promptly advise Transgrid on events that are non-conforming with this strategy.

Table 5-1 Hollow and nest strategy TARP

Objective	Target	Performance indicator	Method of monitoring	Frequency	Trigger	Action/response plan
Avoid disturbance to active nests during clearing works.	No active nests disturbed or destroyed.	Pre-clearing Surveys to confirm no active nests in clearing permit areas. Clearing records to document nest status.	Pre-clearing surveys & reports. Post-clearing surveys & reports.	Once per clearing permit area.	Active nest (e.g., raptor, woodland bird) found in proposed clearing zone.	100 m temporary buffer (minimal disturbance zone) established until follow up surveys confirm the individuals (adults and chicks) have left the nest. Activity in the buffer would be limited to low impact works such as use of existing tracks.
Avoid disturbance to breeding fauna during critical periods.	No clearing during breeding period without pre-clearing surveys.	Pre-clearing Surveys completed.	Pre-clearing Survey Report.	Once per clearing permit area.	Clearing within known breeding season without pre-clearing fauna surveys.	Halt works. Conduct immediate fauna survey. Notify Environmental Manager, Transgrid and CPHR if disturbance occurred.
Prevent unintentional nest disturbance during works.	Zero disturbance to active nests.	No incidents to active nests. Pre-clearing Surveys to confirm no active nests in clearing permit areas. Clearing records to	Incident reports. Pre-clearing surveys & reports. Post-clearing surveys & reports.	As necessary.	Disturbance or destruction of active nests.	Establish temporary buffers. Notify Project Ecologist, Environmental Manager, Transgrid and CPHR. Apply noise/vibration dampening measures.

Objective	Target	Performance indicator	Method of monitoring	Frequency	Trigger	Action/response plan
		document nest status.				
Maintain safe temporary buffers around active nests.	100% of active nests with 100 m temporary buffer where applicable.	Pre-clearing surveys completed for nests within appropriate breeding seasons. 100 m temporary disturbance buffers erected until adults/chicks have left.	Pre-clearing surveys & reports.	Once per clearing permit area.	Inadequate buffer zones maintained around active nesting habitat during works. Works within buffer exceed low impact works (i.e., use of existing tracks).	Halt works. Re-establish buffer and monitor for impacts. Notify Environmental Manager, Transgrid and CPHR if any impacts are recorded. Provide toolbox talks to relevant crew.
Ensure compliance with clearing protocols.	100% of applicable trees underwent two-stage clearing.	Pre-clearing Surveys completed. Ecological clearing supervision completed.	Pre-clearing surveys & reports. Post-clearing surveys & reports.	Once per clearing permit area.	Failure to implement pre-clearing surveys or clearing protocols	Suspend clearing works. Retrain staff on appropriate procedures. Conduct retrospective ecological surveys. Update clearing schedule with compliance controls.

Objective	Target	Performance indicator	Method of monitoring	Frequency	Trigger	Action/response plan
Protect important habitat features from unplanned removal.	Zero unauthorised tree actions.	Clearing permits adhered to. Final Pre-clearing Check confirm no unauthorised clearing. Clearing supervision completed for all habitat clearing works.	Clearing permit cross-checks. Final Pre-clearing Checklist. Post-clearing Report.	Once per clearing permit area.	Unapproved felling or pruning of trees with known fauna use or habitat potential.	Report and investigate impacts of unauthorised clearing. Notify Project Ecologist, Environmental Manager, Transgrid and CPHR. Retraining of staff including machinery operators.
Offset hollow loss with appropriate artificial hollows.	1:1 replacement ratio for all hollows showing evidence of occupation or fauna use.	30% of required artificial hollows installed prior to clearing at a particular location. All remaining required artificial hollows to be installed within 2 months of clearing at a particular location.	Post-clearing surveys & reports. Nest box installation & reports.	Once per clearing permit area.	<30% of required artificial hollows installed prior to clearing. Remaining hollows not installed within 2 months of clearing.	Suspend clearing in the area. Install required artificial hollows. Document locations and update tracking register.
Ensure ecological suitability and uptake of artificial hollows.	100% of installed artificial hollows meet location, design and	Artificial hollow installation completed in accordance with this strategy.	Nest Box Installation Report.	Once per installation.	Artificial hollows installed in unsuitable location. Use of	Review this strategy and conduct staff training. Rectify installation to appropriate location, design and/or species

Objective	Target	Performance indicator	Method of monitoring	Frequency	Trigger	Action/response plan
	species specifications.				unapproved artificial hollow designs.	specifications.
Ensure long-term functionality and safety of installed hollows.	100% of boxes inspected within agreed timeframe.	Artificial hollow monitoring conducted of all installed hollows.	Artificial hollow monitoring report.	Biannually (spring and autumn).	Artificial hollows not inspected or maintained within required intervals.	Conduct catch-up monitoring of any hollows missing inspection. Rectify any barriers to monitoring (i.e., access, staff availability). Revise monitoring schedule if necessary.
Achieve replacement ratio for all damaged/lost hollows.	All lost/ damaged hollows replaced within 30 days.	100% of installed hollows are maintained in safe and working condition in accordance with this strategy.	Artificial hollow monitoring & report.	Biannually (spring and autumn).	Failure to maintain 'no net loss' of hollow capacity.	Install replacements immediately. Notify Environmental Manager, Transgrid and CPHR of delay. Reinspect within 6 months. Increase future buffer stock.
Reduce predator access and human disturbance.	100% of installed hollows sited in low-risk habitat areas.	No hollows installed near infrastructure that increases predation risk (e.g., close to roads, poles, open areas frequented by large raptors).	Nest box installation & reports.	Once per installation.	Installation of supplementary hollows near infrastructure that increases predation risk.	Relocate hollow into appropriate Hollow Replacement Zone. Avoid future installations in risky areas.

Objective	Target	Performance indicator	Method of monitoring	Frequency	Trigger	Action/response plan
Reduce collision/ electrocution risk from infrastructure attraction.	No artificial nest structures or stick nest relocation within 200 m of the alignment.	No evidence of stick nests or platforms placed near conductors. Pre-clearing surveys/clearing supervision to confirm nest removal.	Pre-clearing surveys & reports. Post-clearing surveys & reports.	Once per clearing location	Relocated raptor nest observed within 200 m of transmission line.	Remove nest outside of breeding period. Monitor for future nesting attempts. Increase education for field staff on nest strategy.
Ensure fauna incidents are reported and documented	100% of fauna incidents logged and reported within 24 hours.	Fauna handling record sheet completed, with incident reported to Environmental Manager, Transgrid and CPHR.	Incident reporting log & fauna handling record sheet.	As necessary	Failure to report fauna injury or mortality from clearing or artificial hollow failure.	Notify Environmental Manager, Transgrid and CPHR. Investigate incident and address any

5.4. Reporting

5.4.1. Pre-clearing Report

Methods for the Pre-clearing Report are detailed in Annexure B: Clearing Protocol of the HLW BMP. This will include the target species, size, type, number and suitable location of replacement hollows required. This will be used to prepare a preliminary estimate of number of hollows lost and identify hollows appropriate for salvage and reuse. Final Hollow Replacement Zones will also be summarised and documented in this report.

5.4.2. Post-clearing Report

Methods for the Post-clearing Report are detailed in Annexure B: Clearing Protocol of the HLW BMP. This will include a confirmation of all hollows cleared, hollow size and final artificial hollow installation requirements following clearing.

5.4.3. Nest Box Installation Report

The Nest Box Installation Report will detail all nest boxes or other artificial hollows installed for HLW. This report will be prepared by the Project Ecologist following the installation of necessary artificial hollows and may be prepared as multiple reports to suit the staged clearing of HLW. The following minimum requirements are to be included in the Nest Box Installation Report:

- Installer(s) (Name(s), company/organisation, relevant qualifications or permits if applicable)
- Unique nest box ID.
- Number of artificial hollows installed for HLW.
- Type of artificial hollows installed. For example, Artificial Hollow Design Specifications (Include schematic reference or construction details — especially important for verifying compliance)
- Artificial hollow height and orientation.
- Location of artificial hollows (GPS coordinates) including figures displaying their location.
- Photographic Records of Each Installation (Include photo of full nest box in situ, showing label/ID, tree context, orientation)
- Distance to Nearest Infrastructure or Clearing (To assess risk of disturbance or raptor attraction)
- Date of installation.
- Justification for site selection (E.g. proximity to impact area, availability of suitable trees, fauna records, habitat quality)
- Summary of disturbance in selected locations (Detail any clearing, previous fire, erosion, infrastructure proximity, noise/light impacts etc.)
- Plant Community Types (PTCs) present in selected locations.
- Assessment of incidents and non-compliances based on the TARP in Table 5-1.
- Host Tree Species and Condition (Species name; note if mature, senescent, storm-damaged, healthy etc.)
- Monitoring Readiness (e.g. Is the box accessible for future camera checks? Is an inspection pole usable at this location?)
- Recommendations or Follow-up Actions (E.g. re-inspection date, repair scheduled, box to be relocated)

5.4.4. Monitoring reports

Following the monitoring described in Section 5.1, monitoring data will be provided to Transgrid in the

form of Artificial Hollow Monitoring Reports, including the following:

- Name of observer.
- Date.
- Prevailing weather conditions.
- Assessment of artificial hollow and suspension system condition.
- Evidence of pest species.
- Evidence of fauna use.
- Photographic evidence of condition, fauna use and pest presence (if present).
- Recommendations on maintenance/replacement (if required).
- Unique ID of Each Artificial Hollow Monitored (Ensures traceability between installation, monitoring, and maintenance actions)
- GPS Coordinates of Each Hollow (To confirm correct location and enable future relocation)
- Type of Artificial Hollow (e.g. glider box, parrot box, salvaged hollow, 3D-printed model — important for species-specific analysis)
- Height and Orientation of Artificial Hollow (Key parameters influencing usability and thermal performance)
- Host Tree Species and Condition (Helps understand habitat context, longevity of placement, and tree safety)
- Monitoring Method Used (e.g. pole camera, direct observation, remote sensor as this affects detectability)
- Observed Fauna Species (if present) (List species observed or indirectly detected, number of individuals, behaviour e.g. roosting, breeding)
- Signs of Breeding or Reproductive Activity (E.g. eggs, chicks, nesting material as this speaks to functional use)
- Signs of Occupancy (if fauna not directly observed) (e.g. scratches, scats, feathers, fur, nest material)
- Evidence of Maintenance Actions Since Last Monitoring Round (Document any repairs, replacements, pest management etc., including date and outcome)
- Cumulative Summary of Occupancy Over Time (e.g. box has been used in 3 of the last 4 monitoring events — useful for adaptive management)
- Comparison to Previous Monitoring Rounds (Trends in occupancy, condition, pest presence etc.)
- Any Safety Issues or Access Limitations Observed (E.g. wasps, unsafe trees, blocked access paths — relevant for future monitoring)
- Details of Any Unresolved Issues (E.g. persistent pest re-occupation, box inaccessible for 2+ rounds — trigger for reassessment)
- Summary Table of Artificial Hollow Status could be beneficial (Recommended for clarity — e.g. ID | Status | Fauna use | Pest presence | Action required)
- Recommendations for Additional Monitoring or Adaptive Management (E.g. install additional boxes in under-used areas, modify design for better uptake, increase predator control)
- Assessment of incidents and non-compliances based on the TARP in Table 5-1.

Any longer-term monitoring (post-construction) would be detailed within the Transgrid Operational Environmental Management Plan, however should follow the specifications detailed in Section 5.1.

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Annexure D Unexpected Finds Procedure – Biodiversity

Official

Annexure D

Unexpected Finds Procedure - Biodiversity

HumeLink West

Document Number: HLW-HLJV-PRW-ENM-PLN-000001D

Revision: 4

TransGrid

Date 03/09/2025

Document Control

Approvals

Title	HumeLink West Unexpected Finds Procedure - Biodiversity
Endorsed by Environment Representative	[redacted] (WolfPeak)
Approved on behalf of HLWJV by	[redacted]
Signed	
Dated	

Version Control

Revision	Date	Description	[redacted]
A	30/05/2024	Initial Draft for TG Review	
B	3/07/2024	Updates following receipt of UMMs and HLW mapping files	
C	19/08/2024	Update following TG comments	
1	20/12/2024	Updates following receipt of final MCoAs and draft CoMA	
2	4/06/2025	Updates following ER, FCNSW & CPHR review	
3	28/07/2025	Updates following ER & CPHR review	
4	03/09/2025	Response to DPHI RFI	

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Copy number	Issued to	Version

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Definitions

Abbreviation	Expanded text
BCD	Biodiversity Conservation Trust
BMP	Biodiversity Management Sub-plan
CEMP	Construction Environmental Management Plan
EES	Energy and Environmental Service
FCNSW	Forestry Corporation of New South Wales
HLW	The HumeLink West Stage of the HumeLink project
HLWJV	HumeLink West Joint Venture (UGL Limited and CPB Contractors)
KNP	Kosciusko National Park
MCoA	NSW Minister's Conditions of Approval
NPWS	National Parks and Wildlife Service
UMM	Updated Environmental Management Measure as outlined in the Planning Approvals Documentation

1. Introduction

1.1. Context

This Unexpected Finds Procedure (the procedure) forms part of the Biodiversity Management Sub-plan (BMP) of the HumeLink West project (HLW) Construction Environmental Management Plan (CEMP). The procedure has been prepared to outline and describe how the UGL Limited and CPB Contractors Joint Venture (HLWJV), during the construction of HLW, will comply with the Minister's Conditions of Approval (MCoA), the Updated Environmental Management Measures (UMM), and undertake its duties in accordance with the Planning Approval Documentation listed under MCoA A2.

1.2. Purpose

This procedure is applicable to all activities which have the potential to impact upon threatened flora and fauna species that are incidentally encountered during pre-clearance works, and those that have not already been assessed and approved. The procedure aims to address relevant actions and mitigation measures outlined in the following documents:

- Mitigation measure B3 and B20 of the *HumeLink Biodiversity Development Assessment Report Rev 0* (Revised BDAR; Niche Environment and Heritage Pty Ltd, June 2024).
- Condition B25 and B30 of Minister's Conditions of Approval (MCoA) A2.
- Condition 2 and 7 of Federal Minister for Water and Environment Condition of Ministerial Approval.

2. Unexpected finds procedure

The overarching HLW CEMP unexpected finds flowchart is displayed in Figure 2-1. The unexpected finds procedure specific to biodiversity is further detailed in Table 2-1.

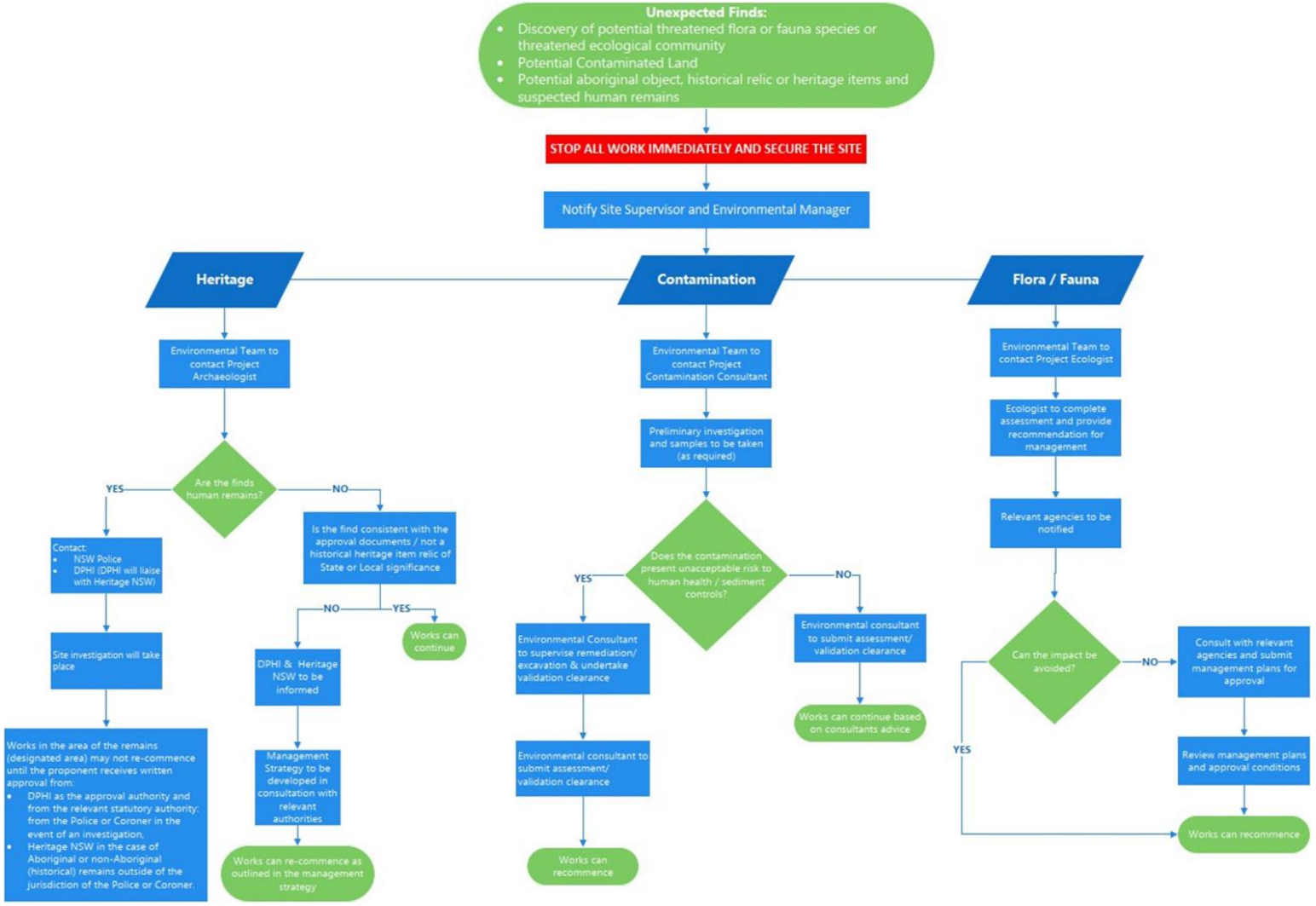


Figure 2-1 Overarching HLW CEMP unexpected finds flowchart

Table 2-1 Unexpected finds procedure

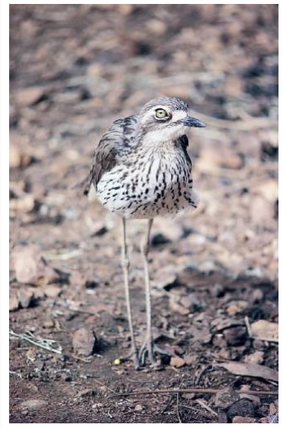
1. Threatened species/TEC is unexpectedly encountered during clearing or construction activities:	Responsible Authority
• **STOP ALL WORK** in the vicinity of the record. • Immediately notify the Environment Team. The Environment Team will then contact the Project Ecologist. • The Project Ecologist and/or Environment Team will advise Transgrid's Representative of the unexpected find. • The Project Ecologist or delegated other will assess potential impacts on a case-by-case basis as detailed below.	• Environment Team. • Project Ecologist. • Transgrid's Representative.
2. Assessment of Impact	
An assessment is to be undertaken by the Project Ecologist to verify the flora, fauna (to species level) or community and the likely impact to the threatened entity, including consideration of steps 2A, 2B and 2C (below). These steps may be used in combination if appropriate for the situation.	• Project Ecologist.
2A. Can the impact be avoided?	
Project Ecologist to determine whether the threatened entity, and/or surrounding area can be avoided by the construction or clearing works: • Avoidance measures (where possible) to be implemented as soon as reasonably appropriate (such as clearer delineation of area) by Project Ecologist or delegated other. • Immediately notify Environment Team if an avoidance measure is implemented. The Environment Team will advise relevant teams and Transgrid's Representative. • Proceed to next step (also proceed if avoidance is not appropriate for the situation).	• Project Ecologist or delegated other. • Environment Team. • Transgrid's Representative.
2B. Can the impact be minimised?	
Project Ecologist to determine whether the impact can be minimised (such as machinery approach) on the threatened entity: • Minimisation measures (where possible) to be implemented as soon as reasonably appropriate by Project Ecologist or delegated other. • Immediately notify Environment Team if a minimisation measure is implemented. The Environment Team will advise relevant teams and Transgrid's Representative. • Proceed to next step (also proceed if minimisation is not appropriate for the situation).	• Project Ecologist or delegated other. • Environment Team. • Transgrid's Representative.
2C. Can the impact be mitigated?	
Project Ecologist to determine whether the impact to threatened entity can be mitigated (such as permanent no-go zone establishment): • Mitigation measures (where possible) to be implemented as soon as reasonably appropriate by Project Ecologist or delegated other.	• Project Ecologist or delegated other. • Environment Team.

• Immediately notify Environment Team if a mitigation measure is implemented. The Environment Team will advise relevant teams and Transgrid's Representative. • Proceed to next step (also proceed if mitigation is not appropriate for the situation).	• Transgrid's Representative.
3. Reporting and evaluation	
If threatened species are detected as unexpected finds, this will be reported to Transgrid and CPHR within one month of incident. Project Ecologist and/or delegated other will outline appropriate management options such as avoidance, minimisation or mitigation measures, developed in consultation with Transgrid and Planning Secretary, CPHR and DCCEEW – Cwth. Update management plans (where relevant) to reflect minimisation and avoidance measures where necessary. Where the situation is unable to avoid, minimise, or mitigate the impact on the threatened entity, justification for why needs to be provided to Transgrid and Planning Secretary, CPHR and DCCEEW – Cwth. Project Ecologist, Environment Team and/or Transgrid Representative to consult with Planning Secretary, CPHR and DCCEEW – Cwth regarding proposed measures, impacts and follow-up actions.	• Transgrid's Representative and/or Planning Secretary, CPHR and DCCEEW – Cwth (if relevant) . • Project Ecologist or delegated other • Environment Team
4. Approvals	
If required, obtain any relevant license, permits or approvals to impact the threatened entity. The responsibility may depend on the type of approval required.	• Transgrid's Representative and/or Planning Secretary, CPHR and DCCEEW – Cwth (if relevant) . • Project Ecologist or delegated other • Environment Team
5. Recommencement of Work	
Relevant agencies are to be consulted identified in steps 3 and 4. Construction or operation works may recommence once the Planning Secretary has informed Transgrid and HLWJV (during construction) that the following has occurred: • Approvals are obtained as required, and it is confirmed that all corrective actions and additional mitigation measures have been implemented. • Ensured that the threatened entity is included in subsequent Site Environmental Plans, Project Inductions and Toolbox Talks. • Information has been provided to Transgrid and relevant stakeholders to ensure ecological monitoring requirements are updated and/or biodiversity offsets are considered.	• Transgrid.

3. Species identification guide

Table 3-1 Species identification guide

Common Name *Scientific name*	EPBC Act Status	BC Act Status	FM Act Status	Identification. Source: Australian Museum, 2022; DPI, 2025; DCCEEW – NSW, 2025a; DCCEEW – NSW, 2025b; DCCEEW - NSW, 2025c	Photo. Source: Birdlife Australia, 2022; EBIRD, 2025; DPI, 2025; DCCEEW – NSW, 2025c	Status within HLW
Regent Honeyeater *Anthochaera phrygia*	Critically Endangered	Critically Endangered		**Description:** a medium sized bird, with distinctive black and yellow colouring. Adults weigh 35 - 50 grams, are 20 - 24 cm long and have a wingspan of 30 cm. Its head, neck, throat, upper breast and bill are black, and the back and lower breast are pale lemon in colour with a black scalloped pattern. Its flight and tail feathers are edged with bright yellow. There is a characteristic patch of dark pink or cream-coloured facial-skin around the eye. Sexes are similar, though males are larger, darker and have larger patch of bare facial-skin. **Habitat:** Mainly inhabit temperate woodlands and open forests of the inland slopes of south-east Australia. Can also be found in drier coastal woodlands and forests in some years. **Habitat requirement (breeding):** As per Important Habitat Map.		Assumed present (foraging only)
Dusky Woodswallow *Artamus cyanopterus*		Vulnerable		**Description:** is a medium-sized bird (16-19.5 cm, 35 g), with a longish tail. Mostly dark grey-brown, merging to blackish on the tail, with a small black-brown mask. Bluish bill with a black tip. Upper-wings are a dark blue-grey with a white leading edge. Conspicuous white corners on the tail. In flight the dark grey-brown under-body contrasts with the whitish under-wing. Juveniles may be distinguished by white streaking on the body and whitish tips on wing feathers. Immature individuals are similar to adults but retain pale-tipped wing feathers. No seasonal variation in appearance is evident, and sexes are alike. **Habitat:** Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. It has also been recorded in shrublands, heathlands and very occasionally in moist forest or rainforest. Also found in farmland, usually at the edges of forest or woodland.		Recorded - 1 individual within non-native vegetation

Common Name *Scientific name*	EPBC Act Status	BC Act Status	FM Act Status	Identification. Source: Australian Museum, 2022; DPI, 2025; DCCEEW – NSW, 2025a; DCCEEW – NSW, 2025b; DCCEEW - NSW, 2025c	Photo. Source: Birdlife Australia, 2022; EBIRD, 2025; DPI, 2025; DCCEEW – NSW, 2025c	Status within HLW
Bush Stone-curlew *Burhinus grallarius*		Endangered		**Description:** stand around 55 cm tall. It has a grey to light brown back, marked with black blotches, and a streaked rump. It has buff and white underparts with dark streaks, and a black band that runs from near its eye down its neck. This species has large, bright yellow eyes and a hunch-shouldered stance on long spindly legs. **Habitat:** Inhabits open forests and woodlands with a sparse grassy ground layer and fallen timber. **Foraging:** Feed on insects and small vertebrates, such as frogs, lizards and snakes.		Assumed present
Gang-gang Cockatoo *Callocephalon fimbriatum*	Endangered	Endangered		**Description:** are primarily slate-grey, with the males easily identified by their scarlet head and wispy crest, while females have a grey head and crest and feathers edged with salmon pink on the underbelly. They range in length from 32 to 37 cm, with a wingspan of 62 to 76 cm. **Habitat:** in spring and summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests and woodlands, particularly box-gum and box-ironbark assemblages, or in dry forest in coastal areas and often found in urban areas. May also occur in sub-alpine Snow Gum (*Eucalyptus pauciflora*) woodland and occasionally in temperate rainforests. **Habitat requirement (breeding):** Hollow bearing trees within Eucalypt tree species with hollows at least 3 m above the ground, and with hollow diameter of 7 cm or larger.	 	Recorded - 18 individuals within PCT 295, 299, 638 and non-native vegetation; 19 individuals within PCT 268, 277, 280 and 316; 80 individuals within PCT 300, 638, 679, 953, 1196 and non-native vegetation

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South-eastern Glossy Black-Cockatoo *Calyptorhynchus lathami lathami*	Vulnerable	Vulnerable		**Description:** is a small brown-black cockatoo with a massive, bulbous bill and a short crest. Males have a prominent red tail panel, while that of females is yellow to orange-red. The coloured tail panel is barred black in juvenile birds, with the extent of barring decreasing with age. The female usually has irregular pale-yellow markings on the head and neck, and may have yellow flecks on the underparts and underwing. **Habitat:** Inhabits open forest and woodlands of the coast and the Great Dividing Range where stands of sheoak occur. **Habitat requirement (foraging):** Presence of Allocasuarina and casuarina species **Habitat requirement (breeding):** Hollow bearing trees, Living or dead tree with hollows greater than 15cm diameter and higher than 8m above ground.		sumed sent
Speckled Warbler *Chthonicola sagittata*		Vulnerable		**Description:** is a small well-camouflaged very heavily streaked ground-dwelling bird related to the scrubwrens, reaching a length of 13cm. The back, wings and tail are grey-brown, with soft dark streaks. The black crown is distinctively streaked with buff. The underparts are pale and particularly heavily streaked. The face is off-white with streaking on the ear coverts. The male has a black upper margin to the brow, while the female has a rufous upper edge to the brow. The dark tail is held horizontally, although in flight the spread tail shows a wide black band above white tips of the outer tail feathers. **Habitat:** lives in a wide range of *Eucalyptus* dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy.		Recorded

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Spotted Harrier *Circus assimilis*		Vulnerable		**Description:** is a medium-sized, bird of prey having an owl-like facial ruff that creates the appearance of a short, broad head, and long bare yellow legs. The upperparts are blue-grey with dark barring, and the wingtips are black. The face, inner wing patch, and underparts are chestnut. The long tail is boldly banded, with a wedge-shaped tip. Juveniles are mottled and streaked ginger and brown, with prominent ginger shoulders, fawn rump and banded tail. **Habitat:** Occurs in grassy open woodland including *Acacia* and mallee remnants, inland riparian woodland, grassland and shrub steppe. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands. **Foraging:** Preys on terrestrial mammals (e.g. bandicoots, bettongs, and rodents), birds and reptile, occasionally insects and rarely carrion.		Assumed present
Brown Treecreeper (eastern subspecies) *Climacteris picumnus victoriae*	Vulnerable	Vulnerable		**Description:** is a grey-brown bird with black streaking on the lower breast and belly and black bars on the undertail. Pale buff bands across the flight feathers are obvious in flight. The face is pale, with a dark line through the eye, and a dark crown. Sexes differ slightly in all plumages, with small patches of black and white streaking on the centre of the uppermost breast on males, while the females exhibit a rufous and white streaking. Juveniles differ from adults mainly by the pattern of the under-body, and by their pale bill and gape. **Habitat:** Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species; also found in mallee and River Red Gum (Eucalyptus camaldulensis) Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses.		ecorded

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Varied Sittella *Daphoenositta chrysoptera*		Vulnerable		**Description:** is a small (10 cm) songbird with a sharp, slightly upturned bill, short tail, barred undertail, and yellow eyes and feet. In flight the orange wing-bar and white rump are prominent. In NSW most individuals have a grey head and are streaked with dark brown, but in the extreme north-east they have a white head, and in the extreme south-west a black cap. **Habitat:** Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and *Acacia* woodland. **Foraging:** Feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, standing dead trees and small branches and twigs in the tree canopy.		ecorded
Purple-crowned Lorikeet *Glossopsitta porphyrocephala*		Vulnerable		**Description:** is a small (17-18.5cm) parrot. Upper parts are bright green, with a wash of bronze across the nape and mantle, while underparts are greenish-yellow with a pale blue belly. The crown is purple, appearing black in the field while the ear coverts and forehead are orange-yellow. The bend of the wing is narrowly edged bright blue while the underwing coverts are bright red and obvious in flight. **Habitat:** Found in open forests and woodlands, particularly where there are large flowering eucalypts. Also recorded from mallee habitats. **Foraging:** Feed primarily on nectar and pollen of flowering Eucalypts, including planted trees in urban areas.		Assumed Present
Little Lorikeet *Glossopsitta pusilla*		Vulnerable		**Description:** is a small (16-19 cm; 40 g) bright green parrot, with a red face surrounding its black bill and extending to the eye. The undertail is olive-yellow with a partly concealed red base, and the underwing coverts are bright green. The mantle is imbued with light brown. **Habitat:** primarily in the canopy of open *Eucalyptus* forest and woodland, yet also finds food in *Angophora, Melaleuca* and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. **Foraging:** Feeds mostly on nectar and pollen, occasionally on native fruits such as mistletoe, and only rarely in orchards.		Assumed Present

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Painted Honeyeater *Grantiella picta*	Vulnerable	Vulnerable		**Description:** is a small (16 cm) and distinctive, with a black head and back and white underparts with dark streaks on the flanks. The wings and tail are black with bright yellow edgings. The distinctive bill is pink with a dark tip. The female is greyer or browner than the male on the upperparts and has less streaking on the flanks. Juvenile colouration is even paler than females, appearing brown rather than black, with paler yellow edgings, and a brown bill. **Habitat:** Inhabits Boree/ Weeping Myall (*Acacia pendula*), Brigalow (*A. harpophylla*) and Box-Gum Woodlands and Box-Ironbark Forests. **Foraging:** A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus *Amyema*. **Habitat requirement (General):** Mistletoes present at a density of greater than five mistletoes per hectare.		Assumed Present
White-bellied Sea-Eagle *Haliaeetus leucogaster*		Vulnerable		**Description:** is a large eagle that has long broad wings and a short, wedge-shaped tail. It measures 75–85 cm in length and has a wingspan of 180–220 cm. Adults are predominantly white and grey. The head, breast and belly, and the feathering on the legs, are white. The back and upper surfaces of the wings are grey, and the undersides are greyish-black with a smaller area of white along the leading edge. The tail is grey at the base and has a white tip. The large, hooked bill is grey with a darker tip, and the eye is dark brown. The legs and feet are cream-white, with long black talons. **Habitat:** Occurs at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarsh. **Foraging:** Feed mainly on fish and freshwater turtles, but also waterbirds, reptiles, mammals and carrion. **Habitat requirement (foraging):** Waterbodies, or within 1km of a rivers, lakes, large dams or creeks, wetlands and coastlines. **Habitat requirement (breeding):** Living or dead mature trees within suitable vegetation within 1km of a rivers, lakes, large dams or creeks, wetlands and coastlines.		Recorded - 1 ndividual within PCT 266

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Little Eagle *Hieraaetus morphnoides*		Vulnerable		**Description:** is a medium-sized bird of prey that occurs in two colour forms: either pale brown with an obscure underwing pattern, or dark brown on the upper parts and pale underneath, with a rusty head and a distinctive underwing pattern of rufous leading edge, pale 'M' marking and black-barred wingtips. Both forms have a black-streaked head with a slight crest, a pale shoulder band on the upperwings, a rather short and square-tipped barred tail, and feathered legs. **Habitat:** Occupies open eucalypt forest, woodland or open woodland. Sheoak or *Acacia* woodlands and riparian woodlands of interior NSW are also used. **Foraging:** Preys on birds, reptiles and mammals, occasionally adding large insects and carrion. **Habitat requirement (general):** Nest trees, species live (occasionally dead) large old trees within vegetation.		Recorded – 2 individuals within non-native vegetation
White-throated Needletail *Hirundapus caudacutus*	Vulnerable	Vulnerable		**Description:** is a large (20 cm in length and approximately 115–120 g in weight) swift with a thickset, cigar-shaped body, stubby tail and long pointed wings. Sexes are alike, with no seasonal variation, and juveniles are separable with good visibility. The adults have a dark-olive head and neck, with an iridescent gloss on the crown; the mantle and the back are paler, greyish; and the upperwings are blackish, sometimes with a greenish gloss, with a contrasting white patch at the base of the trailing edge; the uppertail is black with a greenish gloss. The face is dark-olive with a narrow, white band across the forehead and lores and a white patch on the chin and throat. **Habitat:** they occur over most types of habitat, they are probably recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy.		Assumed Present

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Swift Parrot *Lathamus discolor*	Critically Endangered	Endangered		**Description:** is small parrot about 25 cm long. It is bright green with red around the bill, throat and forehead. The red on its throat is edged with yellow. Its crown is blue-purple. There are bright red patches under the wings. One of most distinctive features from a distance is its long (12 cm), thin tail, which is dark red. **Habitat:** are usually found in dry sclerophyll forests and woodlands, suburban parks and gardens, and flowering fruit trees. **Habitat requirement (breeding):** As per Important Habitat Map.		Assumed Present
Square-tailed Kite *Lophoictinia isura*		Vulnerable		**Description:** reddish, medium-sized, long-winged raptor, about the size of a Little Eagle or harrier. As with most raptors, there is sexual dimorphism in morphology with females being larger than males. Males weigh approximately 500 g while females weigh 650 g. The Square-tailed Kite has a length of 50-56 cm and wingspan of 130-145 cm. Adults have a white face with thick black streaks on the crown and finer streaks elsewhere. The saddle, rump and central upper tail coverts are blackish with grey-brown barring. The underparts are predominantly grey-brown with black tips on the grey, square-tipped tail and wing edges. Square-tailed Kites have monomorphic colouration (i.e. there are no differences between males and females). A key character in flight is the long fingered, upswept wings with a large white patch at the base of the barred 'fingers'. **Habitat:** Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. Is a specialist hunter of passerines, especially honeyeaters, and most particularly nestlings, and insects in the tree canopy, picking most prey items from the outer foliage. **Habitat requirement (breeding):** Nest trees.		Assumed Present

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South-eastern Hooded Robin *Melanodryas cucullata cucullata*	Endangered	Endangered		**Description:** is a large robin reaching 17 cm in length. The male is strikingly marked in black and white, with a bold black hood extending down a white breast. The back is black with distinct white shoulder and wing-bar. The tail is black, with prominent white side-panels. Females and immatures are duller, with light brownish-grey upperparts, but the same striking black and white wings. **Habitat:** Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas.		ed t
Black-chinned Honeyeater (eastern subspecies) *Melithreptus gularis gularis*		Vulnerable		**Description:** reaching 17 cm in length. The cap is black, with a white crescent around the nape, and there is a diagnostic black 'chin' beneath the bill and extending down the white throat (though this can be difficult to see in the field). There is a small crescent of blue skin above the eye. The back and wings are a dull olive-green and the tail is greyish-brown. The underparts are white, with a greyish-buff tint on the breast. The bill is short, black and slightly downcurved. **Habitat:** Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts, especially Mugga Ironbark (*Eucalyptus sideroxylon*), White Box (*E. albens*), Inland Grey Box (*E. microcarpa*), Yellow Box (*E. melliodora*), Blakely's Red Gum (*E. blakelyi*) and Forest Red Gum (*E. tereticornis*).		ssumed resent

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Turquoise Parrot *Neophema pulchella*		Vulnerable		**Description:** the male Turquoise Parrot is a highly distinctive bird with bright green upperparts and a turquoise-blue crown and face. Its shoulders are turquoise-blue, grading to deep blue at the flight-feathers. It has a chestnut-red patch on the upper-wing. The upper-breast of the Turquoise Parrot has an orange tint, while the yellow abdomen may have an orange centre. Females and immature individuals are generally duller, have whitish lores, a green, rather than yellow throat and breast and no red on the shoulder and upper-wing area. **Habitat:** Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland.		Assumed Present
Barking Owl *Ninox connivens*		Vulnerable		**Description:** is medium-sized owl (42 cm, 650 g), smaller than the similar Powerful Owl and larger than the Southern Boobook. It has bright yellow eyes and no facial-disc. Upperparts are brown or greyish-brown, and the white breast is vertically streaked with brown. The large talons are yellow. **Habitat:** inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend in to closed forest and more open areas. **Habitat requirement (general):** Hollow bearing trees, a living or dead tree with a hollow >20 cm diameter that occurs >4 metres above the ground.		Recorded - 1 individual within non-native vegetation

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Powerful Owl *Ninox strenua*		Vulnerable		**Description:** is a typical hawk-owl, with large yellow eyes and no facial-disc. Adults reach 60 cm in length, have a wingspan of up to 140 cm and weigh up to 1.45 kilograms. Males are larger than females. The upper parts of the Powerful Owl are dark, greyish-brown with indistinct off-white bars. The underparts are whitish with dark greyish-brown V-shaped markings. **Habitat:** inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. **Habitat requirement (general):** Hollow bearing trees, a living or dead tree with a hollow >20 cm diameter that occurs >4 metres above the ground.		Recorded - 1 individual within derived PCT 268
Gilbert's Whistler *Pachycephala inornata*		Vulnerable		**Description:** is a stocky whistler (17 to 20 centimetres), possessing a short but robust bill. The male is a brownish-grey, with a black patch between the red eyes and bill (the lores), and a distinctive orange-rufous chin and throat. The female is more uniformly brownish-grey, lacking the males lore and throat pattern and has a pale eye-ring. This species, particularly the female, can be difficult to distinguish from other whistlers. **Habitat:** occurs in a range of habitats within NSW, though the shared feature appears to be a dense shrub layer. It is widely recorded in mallee shrublands, but also occurs in box-ironbark woodlands,		Assumed Present

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Olive Whistler *Pachycephala olivacea*		Vulnerable		**Description:** is a small, stocky bird with a large head and strong sharp bill. It grows up to 22 cm long, including the 10 cm tail. It has a dark grey head, olive-brown upperparts, a grey throat and buff-brown underparts. The female is duller in colour than the male. **Habitat:** Mostly inhabit wet forests above about 500m. During the winter months they may move to lower altitudes.		Recorded
Scarlet Robin *Petroica boodang*		Vulnerable		**Description:** is a small robin that reaches 13 cm in length. The male has a black head and upperparts, with a conspicuous white forehead patch, white wing stripes and white tail-edges. The male has a bright scarlet-red chest and a white belly. The female is pale brown, darker above, and has a dull reddish breast and whitish throat. **Habitat**: lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs.		umed ent

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Flame Robin *Petroica phoenicea*		Vulnerable		**Description:** a small Australian robin that reaches 14 cm in length. The male has a dark grey head and upperparts, a small white forehead patch, and white wing stripes and white tail-edges. The male has a bright orange-red throat, breast and upper-belly. The lower belly is white. The female is brown, darker above, and has a whitish throat and lower belly. **Habitat:** occurs mostly in in upland tall moist eucalypt forests and woodlands, often on ridges and slopes.		Recorded
Pink Robin *Petroica rodinogaster*		Vulnerable		**Description:** The male Pink Robin has a sooty black throat and upperparts. The wings have faint, tan-buff wing-bars. The breast and belly are deep lilac-pink, and there is a small white patch on the forehead. The female has warm olive-brown upperparts and cinnamon-buff underparts, a buff forehead spot, and may have a slight pink wash on the breast. **Habitat:** Inhabits rainforest and tall, open eucalypt forest, particularly in densely vegetated gullies.	 	Recorded

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Superb Parrot *Polytelis swainsonii*	Vulnerable	Vulnerable		**Description:** is a distinctive large, bright grass-green parrot with a long, narrow tail and sharply back-angled wings in flight. Males have yellow foreheads and throats and a red crescent that separates the throat from the green breast and belly. Females are slightly duller green and have a dull, light blue wash in place of the males' red and yellow markings. **Habitat:** Inhabit Box-Gum, Box-Cypress-pine and Boree woodlands and River Red Gum forest. **Habitat requirement (breeding):** Hollow bearing trees, - Living or dead Eucalypt (*E. blakelyi, E. melliodora, E. albens, E. camaldulensis, E. microcarpa, E. polyanthemos, E. mannifera, E. intertexta, E. bridgesiana)* with hollows greater than 5 cm diameter that are greater than 4 m above ground, or trees with a DBH of greater than 30 cm.		Recorded - 11 individuals within PCT 277 and 343
Grey-crowned Babbler *Pomatostomus temporalis temporalis*		Vulnerable		**Description:** reaching to 30 cm long. Its distinctive bill is scimitar-shaped, long and heavy. The broad white eyebrow and a pale grey crown-stripe are other distinguishing characters. A dark band passes from the bill through the eye, separating the pale throat and brow to giving a 'masked' look. It has dark greyish-brown upperparts and is paler brown on the underparts, grading to a whitish throat. It is distinctive in flight, showing white tips to the tail feathers, and orange-buff patches in the broad, rounded wings. **Habitat:** Inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. Woodlands on fertile soils in coastal regions.		Recorded
Australian Painted Snipe *Rostratula australis*	Endangered	Endangered		**Description:** is small freshwater wader, with a long bill that droops slightly at the tip. The female has a chestnut-black hood with a bold white eye-patch and a cream stripe along the middle of the crown. The back and wings are patterned bronzy-greenish-grey with a few cream streaks and the underparts are white. The male is slightly smaller and has greyer, less contrasting patterns, but also has large cream spots on the wings. **Habitat:** resides in fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber.		Assumed Present

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Diamond Firetail *Stagonopleura guttata*	Vulnerable	Vulnerable		**Description:** is a large (length 10 to 12 cm, weight 17 grams), striking finch with a bright red bill, and red eyes and rump. The white throat and lower breast are separated by a broad black breast-band that extends into the strongly white-spotted, black flanks. It has a grey back and head, and ashy-brown wings. **Habitat:** Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum *Eucalyptus pauciflora* Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. Often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland.		Recorded
Freckled Duck *Stictonetta naevosa*		Vulnerable		**Description:** is a dark, greyish-brown bird with a large head that is peaked at the rear, and a distinctive narrow, slightly up-turned bill. Their dark brownish-black plumage is evenly freckled all over with white or buff. During the winter-spring breeding season, the male's bill becomes crimson at the base. **Habitat:** Prefer permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. During drier times they move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds.		ssumed resent

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Masked Owl *Tyto novaehollandiae*		Vulnerable		**Description:** A medium-sized owl to 40 - 50 cm long, with dark eyes set in a prominent flat, heart-shaped facial disc that is encircled by a dark border. The feet are large and powerful, with fully feathered legs down to the toes. The owl exists in several colour forms, with wide variation in plumage. The upperparts are grey to dark brown with buff to rufous mottling and fine, pale spots. The wings and tail are well barred. **Habitat:** Lives in dry eucalypt forests and woodlands from sea level to 1100 m, but often hunts along the edges of forests, including roadsides. **Habitat requirement (general):** Hollow bearing trees, a living or dead tree with a hollow >20 cm diameter that occurs >4 metres above the ground.		sumed sent
Sooty Owl *Tyto tenebricosa*		Vulnerable		**Description:** A medium-sized owl to 45 cm long, with dark eyes set in a prominent flat, heart-shaped facial disc. Dark sooty-grey in colour, with large eyes in a grey face, fine white spotting above and below, and a pale belly. **Habitat:** Occurs in rainforest, including dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests. **Habitat requirement (general):** Escarpments, Caves, or Cliffs, including clifflines/ledges. Hollow bearing trees: a living or dead tree with a hollow >20 cm diameter that occurs > 4 metres above the ground.		Assumed present
Little Pied Bat *Chalinolobus picatus*		Vulnerable		**Description**: is a distinctive black and white bat that weighs four to eight grams. The head and body are about 4.5 cm in length; the tail 3.5 cm. The fur is glossy black on the back, grey on the belly, with white fur along the flanks forming a 'V' in the pubic area. **Habitat**: Occurs in dry open forest, open woodland, mulga woodlands, chenopod shrublands, cypress pine forest and mallee and Bimbil box woodlands.		Assumed present

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Large-eared Pied Bat *Chalinolobus dwyeri*	Vulnerable	Endangered		**Description:** A small to medium-sized bat with long, prominent ears and glossy black fur. The lower body has broad white fringes running under the wings and tail-membrane, meeting in a V-shape in the pubic area. This species is one of the wattled bats, with small lobes of skin between the ears and corner of the mouth. **Habitat:** Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (Petrochelidon ariel), frequenting low to mid-elevation dry open forest and woodland close to these features. Females have been recorded raising young in maternity roosts (c. 20-40 females) from November through to January in roof domes in caves, overhangs, mine adits and concrete structures such as derelict buildings. They remain loyal to the same cave over many years. Found in well-timbered areas containing gullies. **Habitat requirement (general):** Cliffs; Within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, or crevices, or within two kilometres of old mines or tunnels.		Assumed present
Eastern False Pipistrelle *Falsistrellus tasmaniensis*		Vulnerable		**Description:** is relatively large with a head-body length of about 65 mm. It weighs up to 28 grams. It is dark to reddish-brown above and paler grey on its underside. It has long slender ears set well back on the head and some sparse hair on the nose. **Habitat:** Prefers moist habitats, with trees taller than 20 m. Generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings.		Recorded

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Large Bent-winged Bat *Miniopterus orianae oceanensis*		Vulnerable		**Description:** chocolate to reddish-brown fur on its back and slightly lighter coloured fur on its belly. It has a short snout and a high 'domed' head with short round ears. The wing membranes attach to the ankle, not to the base of the toe. The last bone of the third finger is much longer than the other finger-bones giving the "bent wing" appearance. It weighs up to 20 grams, has a head and body length of about 6 cm and a wingspan of 30 - 35 cm. **Habitat:** Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. Hunt in forested areas, catching moths and other flying insects above the tree tops. **Habitat requirement (breeding):** Caves or Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records with microhabitat code "IC - in cave;" observation type code "E nest-roost;" with numbers of individuals >500.		Recorded - 136 passes within PCT 266, 277 and 278
Corben's Longeared Bat *Nyctophilus corbeni*	Vulnerable	Vulnerable		**Description:** has chocolate to reddish-brown fur on its back and slightly lighter coloured fur on its belly. It has a short snout and a high 'domed' head with short round ears. The wing membranes attach to the ankle, not to the base of the toe. The last bone of the third finger is much longer than the other finger-bones giving the "bent wing" appearance. It weighs up to 20 grams, has a head and body length of about 6 cm and a wingspan of 30 - 35 cm. **Habitat:** Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures.		Assumed present

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Eastern Coastal Free-tailed Bat *Micronomus norfolkensis*	Vulnerable	-		**Description:** The Eastern Freetail-bat has dark brown to reddish brown fur on the back and is slightly paler below. Like other freetail-bats it has a long (3 - 4 cm) bare tail protruding from the tail membrane. Freetail-bats are also known as mastiff-bats, having hairless faces with wrinkled lips and triangular ears. They weigh up to 10 grams. **Habitat**: Occurs in dry sclerophyll forest, woodland, swamp forest and mangrove forests east of the Great Dividing Range. Roosts mainly in tree hollows but will roost also under bark or man-made structures.		Assumed present
Yellow-bellied Sheathtail-bat *Saccolaimus flaviventris*		Vulnerable		**Description:** is a very distinctive, large, insectivorous bat up to 87 mm long. It has long, narrow wings, a glossy, jet-black back, and a white to yellow belly extending to the shoulders and just behind the ear. Characteristically, it has a flattened head and a sharply-pointed muzzle. The tail is covered with an extremely elastic sheath that allows variation in the tail-membrane area. **Habitat:** utilises most habitats across its very wide range, with and without trees.		d
Greater Broad-nosed Bat *Scoteanax rueppellii*		Vulnerable		**Description:** is a large powerful bat, up to 95 mm long, with a broad head and a short square muzzle. It is dark reddish-brown to mid-brown above and slightly paler below. It is distinguished from other broad-nosed bats by its greater size. **Habitat:** Utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest.		Recorded

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Southern Myotis *Myotis macropus*		Vulnerable		**Description:** It has disproportionately large feet; more than 8 mm long, with widely-spaced toes which are distinctly hairy and with long, curved claws. It has dark-grey to reddish brown fur above and is paler below. It weighs up to 15 grams and has a wingspan of about 28 cm. **Habitat:** Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, wharves, bridges and in dense foliage. **General habitat constraint:** Waterbodies: waterbodies with permanent pools/stretches 3m or wider, including rivers, large creeks, billabongs, lagoons, estuaries, dams and other waterbodies, on or within 200 m of the site.		Recorded - 127 passes within PCT 266, 268, 277 and 278
Spotted-tailed Quoll *Dasyurus maculatus*	Endangered	Vulnerable		**Description:** is about the size of a domestic cat, from which it differs most obviously in its shorter legs and pointed face. The average weight of an adult male is about 3500 grams and an adult female about 2000 grams. It has rich-rust to dark-brown fur above, with irregular white spots on the back and tail, and a pale belly. **Habitat:** Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline.		Assumed present
Koala *Phascolarctos cinereus*	Endangered	Endangered		**Description:** an arboreal marsupial with fur ranging from grey to brown above, and white below. It has large furry ears, a prominent black nose and no tail. It spends most of its time in trees and has long, sharp claws, adapted for climbing. Adult males weigh 6 - 12 kg and adult females weigh 5 - 8 kg. **Habitat**: Inhabit eucalypt woodlands and forests. **Habitat requirement (general):** Presence of koala use trees.		Assumed present

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Yellow-bellied Glider *Petaurus australis*	Vulnerable	Vulnerable		**Description:** is a large, active, sociable and vocal glider. Adults weigh 450 - 700 grams, have a head and body length of about 30 cm and a large bushy tail that is about 45 cm long. It has grey to brown fur above with a cream to yellow belly, which is paler in young animals. **Habitat:** Occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils.		Recorded - 10 individuals within PCT 638, 679, 953 and non-native vegetation
Greater Glider *Petauroides volans*	Endangered	Endangered		**Description:** the largest gliding possum in eastern Australia. It has a weight range of 900-1700 g. Females are larger than males. It has a head and body length of 350-450mm and a long furry tail measuring 450-600mm. Fur colour is white or cream below and varies from dark grey, dusky brown through to light mottled grey and cream above. It has large ears with hair that projects past the outer ear edge. It has strongly reflective eyeshine in the beam of a spotlight making it easy to detect. **Habitat:** Feeds exclusively on eucalypt leaves, buds, flowers and mistletoe. Shelters during the day in tree hollows and will use up to 18 hollows in their home range.		Recorded - 18 individuals within PCT 300 and non-native vegetation & 14 individuals within PCT 300, 638, 953 and non-native vegetation

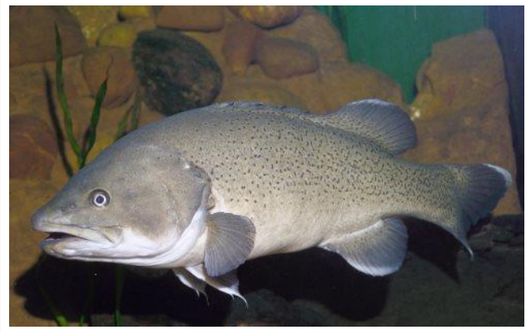
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Squirrel Glider *Petaurus norfolcensis*		Vulnerable		**Description:** have a head and body length of about 20 cm. They have blue-grey to brown-grey fur above, white on the belly and the end third of the tail is black. There is a dark stripe from between the eyes to the mid-back and the tail is soft and bushy averaging about 27 cm in length. **Habitat:** inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas.		Recorded - 2 individuals within PCT 268 and 277 & 1 individual within PCT 1196
Eastern Pygmy Possum *Cercartetus nanus*		Vulnerable		**Description:** are tiny (15 to 43 grams) active climbers, with almost bare, prehensile (capable of curling and gripping) tails, and big, forward-pointing ears. They are light-brown above and white below. Adults have a head and body length between 70 - 110 mm and a tail length between 75 - 105 mm. **Habitat:** Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest.		Recorded - 17 individuals within PCT 638, 953 and 1196
Leadbeater's Possum *Gymnobelideus leadbeateri*	Critically Endangered	Previously listed as extinct – status currently under review		**Description:** are a small, fast-moving marsupial weighing around 100–160 grams, with a grey-brown body, pale underparts, large dark eyes, and prominent rounded ears. Adults have a body length of about 15–17.5 cm and a distinctive black-tipped tail that adds another 18–20 cm, giving them a sleek, agile appearance suited for life in the treetops. **Habitat:** inhabits wet eucalypt forests, particularly those dominated by Mountain Ash and Alpine Ash trees. It relies on areas with numerous large, old trees that contain hollows for shelter, and a dense understorey of wattles that provide food and cover. Long thought extinct in New South Wales and known only from small, fragmented populations in Victoria's Central Highlands, more recently in 2025 a population was rediscovered near Yarrangobilly Caves in Kosciuszko National Park, expanding its known range.		N/A – discovered at Yarrangobilly in Kosciuszko National Park

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New Holland Mouse *Pseudomys novaehollandiae*	Vulnerable			**Description:** A small native rodent with pale grey-brown dorsal fur, light grey underparts and pale feet. The tail is longer than the head-body length and is dusky brown on top, whitish below and darker at the tip. **Habitat:** Open heathlands, woodlands and dry sclerophyll forests with a heath understorey, grasslands and vegetated sand dunes.		ssumed resent
Smoky Mouse *Pseudomys fumeus*	Endangered	Critically Endangered		**Description:** is a similar in size to a small rat, with a head and body length averaging about 90 mm and a tail averaging 140 mm. The average adult weight is 52 grams (ranging between 38 - 68 grams). The fur is fine, soft, pale-grey to bluish-grey above, with a grey to white belly and a ring of dark hairs around the eye. The tail is long, narrow and sparsely furred, mostly pale to pinkish, with a narrow, dark stripe along the upper surface. **Habitat:** tends to prefer heath habitat on ridge tops and slopes in sclerophyll forest, heathland and open-forest from the coast (in Victoria) to sub-alpine regions of up to 1800 metres, but sometimes occurs in ferny gullies.		Assumed present
Broad-toothed Rat *Mastacomys fuscus*	Vulnerable	Vulnerable		**Description:** A compact rodent, chubby-cheeked, with a short, wide face and ears, and long, dense, fine fur. It is brown above, with attractive, rufous highlights. **Habitat:** lives in a complex of runways through the dense vegetation of its wet grass, sedge or heath environment.		med nt

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Brush-tailed Phascogale *Phascogale tapoatafa*		Vulnerable		**Description:** is tree-dwelling marsupial carnivore. It has a characteristic, black, bushy 'bottlebrush' tail, with hairs up to 4 cm long. Its fur is grey above and pale cream below and it has conspicuous black eyes and large naked ears. Adults have a head and body length of about 20 cm, a tail length of about 20 cm and weigh 110 - 235 grams. **Habitat**: Prefer dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter.		Assumed present
Pink-tailed Legless Lizard *Aprasia parapulchella*	Vulnerable	Vulnerable		**Description:** worm-like, with a dark-brown head and nape, gradually merging with the pale grey or grey-brown body. The tail, nearly as long as its body, is pink or reddish-brown towards the tip. Its snout and tail are both rounded. There are no external ear openings. Specimens grow to about 25cm in length. **Habitat:** Inhabits sloping, open woodland areas with predominantly native grassy groundlayers, particularly those dominated by Kangaroo Grass (*Themeda australis*). **Habitat requirement (general):** Rocky areas, or within 50 m of rocky areas.		Recorded
Striped Legless Lizard *Delma impar*	Vulnerable	Vulnerable		**Description:** It is pale grey-brown above, with a darker head, and almost white below. The most distinguishing characteristic is a pattern of light and dark parallel lines running along the length of the body, although these may be very pale or even absent in some individuals. This parallel stripe pattern breaks up into a diagonal pattern on the tail. They grow to about 30 cm in length, with up to three-quarters of this being the tail. **Habitat:** Found mainly in Natural Temperate Grassland but has also been captured in grasslands that have a high exotic component.		Recorded

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Alpine She-oak Skink *Cyclodomorphus praealtus*	Endangered	Endangered		**Description:** is a slender medium-sized lizard reaching a maximum length of around 350 mm, with a snout to vent length up to 130 mm. Above, it is olive-green to reddish-brown and has smooth, overlapping scales with dark lateral edges that create a series of thin, longitudinal dark lines. Scales may have black and grey flecks. **Habitat**: have specific habitat requirements, preferring tree-less or very lightly treed areas that contain tussock grasses, low heath or a combination of both. Within this habitat the species shelters beneath litter, rocks, logs and other ground debris, and has been observed basking on grass tussocks.		Recorded
Rosenberg's Goanna ***Varanus rosenbergi***		Vulnerable		**Description:** Rosenburg's Goanna grows up to 1.5m long. It's dark grey with fine yellow or white spots and paired black bands from neck to tail. Its tail has narrow regular bands – a key feature that sets it apart from the Lace Monitor, which has broader tail bands. Rosenberg's Goanna also has finely barred lips and a pale-edged black stripe from eye to neck. Juveniles are brighter, with an orange tinit on the face and body. **Habitat:** It is commonly associated with heath, open forest and woodland. **Habitat requirements (breeding):**relays on large areas of habitat with access to termite mounds for nesting, hollow logs, rock crevices or burrows for shelter.		Assumed present
Broad-headed Snake *Hoplocephalus bungaroides*	Vulnerable	Endangered		**Description**: The Broad-headed Snake is black above with numerous bright yellow scales forming a series of irregular, narrow cross-bands. The belly is grey to grey-black, sometimes with yellow blotches. The head also has yellow blotches and the labials are barred yellow. It grows to a maximum length of 90 cm, however its average length is 60 cm. **Habitat:** Most commonly found in rocky outcrops and adjacent sclerophyll forest and woodland. Most suitable sites occur in sandstone ridgetops. **Habitat requirement (breeding):** Rocky areas; including escarpments, outcrops and pagodas within the Sydney Sandstone geologies.		

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Sloane's Froglet *Crinia sloanei*	Endangered	Endangered		**Description:** is a small ground-dwelling frog belonging to the family Myobatrichidae Shows far less variation in back colour pattern than other *Crinia* species, having a mustard yellow or greyish back with large patches of darker pigment over the body. The throat of males is greyish green. The call is described as a short metallic 'chick chick chick chick' repeated frequently. **Habitat:** It is typically associated with periodically inundated areas in grassland, woodland and disturbed habitats. **Habitat requirement (general):** Semi-permanent/ephemeral wet areas; Containing relatively shallow sections with submergent and emergent vegetation, or within 500 m of wet area; Swamps; Within 500 m of swamps; Waterbodies; Within 500 m of waterbody.		Assumed present
Yellow-spotted Tree Frog *Litoria castanea*	Critically Endangered	Critically Endangered		**Description**: are large, long-lived and mostly aquatic tree frogs, with only small finger and toe pads. Can be distinguished from other members of the group by its fully webbed toes and yellow spots on the groin and the back of the thighs. Elsewhere it is marbled green and gold, with black spots. This patterning varies greatly, but the pale green mid-back stripe is unvarying. The larger females may be up 9cm long. **Habitat:** Require large permanent ponds or slow flowing 'chain-of-ponds' streams with abundant emergent vegetation such as bulrushes and aquatic vegetation.		Assumed present
Booroolong Frog *Litoria booroolongensis*	Endangered	Endangered		**Description:** is a medium sized tree frog, with adults growing to about 5 cm. Their body-colour may be grey, olive or brown with indistinct black markings. The abdomen is white. The skin usually has a slightly warty appearance. The fingers and toes have well developed discs, and the toes are strongly webbed. **Habitat:** Live along permanent streams with some fringing vegetation cover such as ferns, sedges or grasses.		Assumed present

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Silver Perch *Bidyanus bidyanus*			Vulnerable	**Description:** The Silver Perch is a moderate to large, oval-shaped freshwater fish. Distinguishing features include: Small head and mouth; Grey to green in colour, sometimes gold or silvery, darker on the back and paler on the sides. Juveniles may be mottled with vertical dark bar; A single dorsal fin; White belly; and slightly forked tail. **Habitat**: Silver Perch have been found in a wide range of habitats and climates across the Murray-Darling Basin. They are generally found in faster-flowing water including rapids and races and more open sections of river. Spawning and recruitment success are both considered to be heavily dependent on high flows and overbank flooding. **General habitat requirement:** Fallen/standing dead timber including logs		Assumed present
Flatheaded Galaxias *Galaxias rostratus*			Critically Endangered	**Description:** The Flathead Galaxias is distinguished by: Flattened head; Large mouth with equal-sized jaws; Light olive green body with light mottling; Very small transparent pectoral and pelvic fins; and dorsal fin origin always slightly in front of anal fin. **Habitat:** found in still or slow moving water bodies such as wetlands and lowland streams. The species has been recorded forming shoals. They have been associated with a range of habitats including rock and sandy bottoms and aquatic vegetation. Flathead Galaxias spawn in spring and lay slightly adhesive demersal eggs.		Assumed present
Trout Cod *Maccullochella macquariensis*			Endangered	**Description:** Trout Cod can grow to 85 cm in length and 16 kg in weight, but more commonly occur up to 50 cm and 1.5 kg. They are mostly olive in colour but can range from blue-grey to dark brown on the back with a speckled pattern of dark grey to black spots. The underside is generally paler in colour ranging from grey to white. **Habitat:** Trout Cod are often found in faster flowing water with rocky and gravel bottoms, but can also be found in some slower flowing, lowland rivers. Large woody snags are very important for the species as they provide complex habitats for each stage of the species' life cycle.		Assumed Present

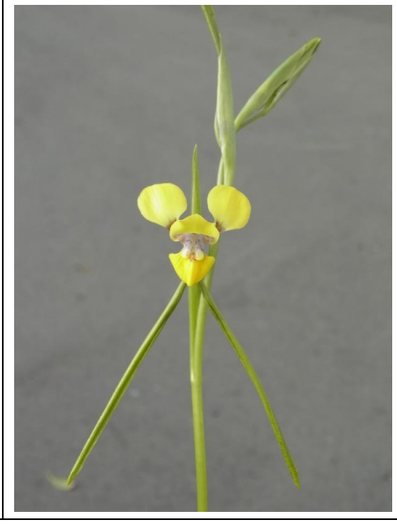
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Macquarie Perch *Macquaria australasica*			Endangered	**Description:** elongated, oval shaped fish. They are distinguished by: Large eyes; Pores on the snout and around the eye; Jaws of equal size; Large distinct scales along the body; Rounded tail. They can be black, silver-grey, blue-grey or green-brown in colour, with a paler underside. Macquarie Perch from coastal catchments are blotched with grey-brown, buff and dark grey patches over the head and body. **Habitat:** Macquarie Perch occur in waters with lots of cover such as aquatic vegetation, snags, boulders and overhanging banks.		Assumed Present
Southern Pygmy Perch *Nannoperca australis*			Endangered	**Description**: The Southern Pygmy Perch is distinguished by: Small mouth reaching to just below the eye; Colour is variable but base colour ranges from pale-cream to green-brown, paler on the belly with dark blotches along the body; Breeding males display brighter colours with dorsal and anal fins becoming bright red with black edges; A single, deeply notched dorsal fin; and squarish to slighly-rounded tail. **Habitat**: They are often found in small systems with a low flow rate and quiet vegetated areas in streams, billabongs, lakes. They prefer covered habitats and are not usually found in open water.		
Murray Crayfish *Euastacus armatus*			Vulnerable	**Description**: Murray Crayfish have characteristic white claws and three rows of large white spines on each side of the tail. Males generally have larger claws while females have broader abdomens. Individuals have a dark green to green-brown body. The species grows to more than 150 mm in carapace length; with the maximum recorded size being 174 mm and 2.5 kg. **Habitat**: Murray Crayfish prefer cool, flowing water that is well oxygenated. The species is tolerant of water temperatures up to 27°C and moderate salinities, but are intolerant to low dissolved oxygen concentrations. They create burrows that vary in complexity, from deep burrows with multiple entrances to simple burrows under a rock or log.		Assumed present

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Key's Matchstick Grasshopper *Keyacris scurra*	Endangered	Endangered		**Description**: Key's Matchstick Grasshopper is a small (females ~25 mm, males ~18mm), slender, wingless grasshopper characterised by its slanted face, splayed hind femora (longest segment of the hind leg) and sword-shaped antennae. This species occurs in several colour forms, with brown being the most common. **Habitat:** Typically found in native grasslands and grassy woodlands but it has also been recorded in other vegetation associations usually containing a native grass understory (especially kangaroo grass Themeda triandra) and known food plants (particularly Asteraceae).		Recorded
Golden Sun Moth *Synemon plana*	Vulnerable	Vulnerable		**Description**: medium-sized, day-flying (diurnal) moth. Females have a wing-span of 31 mm; the male's wingspan is 34 mm. The female has a reduced hind-wing and is a very poor flyer. The female's upper side of the fore-wing is dark grey, patterned with paler grey, and the hindwing is bright orange with black spots near the edge. The undersides of both wings is white with small black spots near the edge. The male's upper side of the fore-wing is dark brown, patterned with pale grey, and the hind-wing is bronzy-brown with dark brown patches. The undersides of both wings is pale grey with dark brown spots. Both males and females have clubbed antennae. Functional mouthparts are lacking in both sexes. The immature stages have not been described. **Habitat**: Occurs in Natural Temperate Grasslands and grassy Box-Gum Woodlands in which ground layer is dominated by wallaby grasses *Austrodanthonia* spp. Grasslands dominated by wallaby grasses are typically low and open - the bare ground between the tussocks is thought to be an important microhabitat feature for the Golden Sun Moth, as it is typically these areas on which the females are observed displaying to attract males. Habitat may contain several wallaby grass species, which are typically associated with other grasses particularly spear-grasses *Austrostipa* spp. or Kangaroo Grass *Themeda triandra*.		Identified – expert report

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Ausfeld's Wattle *Acacia ausfeldii*		Vulnerable		**Description:** is an erect or spreading shrub 2 - 4 m high with branchlets angled or flattened, resinous and smooth. The phyllodes (leaves) are narrowly elliptic to linear-oblong, straight to slightly curved, 2 - 7 cm long, 2 - 5 mm wide, hairless and are dotted with resin glands. *Acacia ausfeldii* phyllodes have a prominent mid-vein and less pronounced lateral veins, they also have an obtuse apex with a short sharp tip. **Habitat:** Grows in eucalypt woodland in sandy soil; often in remnant roadside patches of woodland. **Flowering:** from August to October. **Habitat requirement (general):** Foot slopes and low rises on sandstone.		Recorded
Yass Daisy *Ammobium craspedioides*	Vulnerable	Vulnerable		**Description:** is a rosette-forming perennial. Leaves are spoon-shaped, to 12 cm long and 17 mm wide, hairy on top and white and woolly underneath. The spring flowerheads are hemispherical buttons, to 20 mm wide, and surrounded at the base by papery leaf-like structures. **Habitat:** Found in moist or dry forest communities, Box-Gum Woodland and secondary grassland derived from clearing of these communities.		Recorded

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Bossiaea fragrans	Critically Endangered	Critically Endangered		**Description:** An erect shrub that grows to 1-2.5m high. It has characteristic flattened stems with reduced leaves known as cladodes that are glaucous green and range from 8-14mm wide. Leaf scales are present and ranging from 1.5-1.9mm long. The flowers are yellow with red markings. **Habitat:** Occurs on spilite, rhyolite or slate and volcanic substrates and is often associated with Red Stringybark (*Eucalyptus macrorhyncha) - Red Box (Eucalyptus polyanthemos) woodland +/- White Box (Eucalyptus albens).* **Flowering:** from September through to October.		Recorded
Small Pale Grass-lily *Caesia parviflora var. minor*		Endangered		**Description:** The leaves are 2 mm wide and arranged in a rosette at ground level. Several multi-branched flowering shoots spread widely and turn up at the ends. The whole plant is usually much less than 20 cm tall. The small, white starry flowers may be tinged with blue or purple. **Habitat:** Found in damp places in open forest on wet heathland on sandstone and sand.		Recorded

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Crimson Spider Orchid *Caladenia concolor*	Vulnerable	Endangered		**Description**: has a single leaf up to 15 cm long. The flower stem is up to 30 cm tall with 1 or 2 deep purplish-red flowers, 80 mm across. The flowers are said to smell strongly like a hot motor. **Habitat:** is regrowth woodland on granite ridge country that has retained a high diversity of plant species, including other orchids. **Flowering:** generally, occurs in September.		sumed esent
Caladenia montana		Vulnerable		**Description**: terrestrial orchid with a leaf 80–120 mm long and 8–12 mm wide. The flower stem is 100–250 mm tall, with one flower which is 40–60 mm across, greenish cream or cream, sometimes with reddish markings. The sepals have thickened club-like tips that are dark red or brownish and 8–15 mm long. The labellum is 10–12 mm long by 7–9 mm wide, mostly maroon, with a paler base and margins with 6–8 pairs of red teeth to 1.5 mm long. **Habitat:** restricted to high montane areas 700–1000 m a.s.l. where it grows in well-drained loam on slopes and ridges of montane forest among an understorey of shrubs. **Flowering:** from October to January.		Assumed present
Mauve Burr-daisy *Calotis glandulosa*	Vulnerable	Vulnerable		**Description:** is a sprawling, branched herb that grows to 20 cm tall and up to 1 m wide. The soft, bright green, hairy leaves have indented edges. They are up to 3 cm long and 9 mm wide. The 2 cm wide flower-heads are solitary, mauve, and have a yellow centre. Flowers may also be white, blue or pink. **Habitat:** found in montane and subalpine grasslands in the Australian Alps. **Flowering**: spring and summer.		Assumed present

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Max Mueller's Burrdaisy *Calotis pubescens*		Endangered		**Description:** is a perennial herb with thick and fleshy underground stems (rhizomes) and forms large mats. Its leaves are very woolly when young. It has unbranched flowering stems that hold single mauve or white flower-heads. **Habitat:** Grows in subalpine treeless plains in herb-rich grassland often dominated by *Poa hookeri.* **Flowering**: occurs in December		Recorded
Small Scurf-pea *Cullen parvum*		Endangered		**Description:** is a small perennial pea that may either trail or stand erect. Its leaves comprise three elongated leaflets to 25 mm long by 8 mm wide. Its flowers are usually also in threes, purple-pink (or sometimes white). **Habitat:** found in grassland, River Red Gum (*Eucalyptus camaldulensis*) Woodland or Box-Gum Woodland, sometimes on grazed land and usually on table drains or adjacent to drainage lines or watercourses, in areas with rainfall of between 450 and 700 mm. **Flowering:** occurs in Summer.		Recorded
Pine Donkey Orchid *Diuris tricolor*		Vulnerable		**Description:** is a terrestrial species (it grows from the ground rather than from rocks or vegetation). It has between one and three leaves, to 30 centimetres long and 4 mm wide. The flower stalk is between 20-40 cm high and has 2-6 flowers, which are bright yellow to orange, speckled with red to purple and white markings. **Habitat**: grows in sclerophyll forest among grass, often with native Cypress Pine (*Callitris* spp.). It is found in sandy soils, either on flats or small rises. **Flowering**: usually flowers between early September to late October.		Recorded

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Rough Eyebright *Euphrasia scabra*		Endangered		**Description:** is a semi-parasitic, annual herb, growing to about 0.5 m tall. The stems branch just below the flower-clusters (inflorescence). The leaves are variable on individual plants; those closer to the inflorescences tend to be narrower and have more teeth. **Habitat:** Occurs in or at the margins of swampy grassland or in sphagnum bogs, often in wet, peaty soil. **Flowering:** between January and April. **Habitat requirement (general):** Montane bogs or within 50 m.		Assumed present
Clover Glycine *Glycine latrobeana*	Vulnerable	Critically Endangered		**Description:** is a low-growing herb growing to only a few cm high. Leaves are split into three, like a classic clover leaf, 5–20 mm long and 4–12 mm wide. The species generally flowers in spring in the lower elevation parts of its range and in summer in higher elevation areas. **Habitat:** mainly in grassland and grassy woodland habitats, less often in dry forests, and only rarely in heathland.		Recorded

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Tumut Grevillea *Grevillea wilkinsonii*	Endangered	Critically Endangered		**Description:** typically grows to a large spreading shrub up to 2.5 m tall and 2 m wide. The leaves are more or less oblong, to 15 cm long by 2 cm wide, with scalloped edges; each scallop is separated by a small sharp tooth. The leaves are green (sometimes bronze on young foliage) and almost hairless on the upper surface; the lower surface has a silky covering of short silvery-grey hairs. The individual flowers are small and distinctive, with pinkish to purple petals and a lilac-pink, green or yellow tipped style. The flowers form toothbrush-like clusters that are usually 3 - 5 cm long. **Habitat:** the species generally grows in close proximity to the water, at altitudes between 310 and 340 m. Most healthy adult plants occur in open sunny areas, and those plants found under the canopy of dense vegetation tend to be spindly and are sometimes subject to sooty mould infestations.		d
Hoary Sunray *Leucochrysum albicans* var. *tricolor*	Endangered	Endangered		**Description:** A perennial everlasting daisy. Stems are 10–15 cm tall, with narrow leaves 2–10 cm long, covered in white cottony hairs. Yellowish flowerheads are 2–5 cm in diameter, surrounded by numerous papery, white, overlapping ovate-oblong bracts, with the outer layers tinged red, pink, purple or brown. Fruits are brown, ovoid, 2–3 mm long, with 14–20 pappus bristles. **Habitat**: a wide variety of grassland, woodland and forest habitats, generally on relatively heavy soils. **Flowering:** August to March		orded
Clandulla Geebung *Persoonia marginata*	Vulnerable	Vulnerable		**Description:** A spreading shrub that grows to 50 cm high and up to 1 m across. Young branches are hairy. Leaves are elliptic to obovate, 2–4 cm long and 6–23 mm wide, sparsely hairy when young and hairless when mature. Flowers are yellow with brownish hairs; have a densely hairy ovary; and occur on short stalks 2–7 mm long. **Habitat:** Grows in dry sclerophyll forest and woodland communities on sandstone. **Flowering:** Winter.		Assumed Present

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Pimelea bracteata	Critically Endangered	Critically Endangered		**Description:** shrub to 2 m tall, with hairless stems. Leaves are 6–10 mm long and 3–6 mm wide, often with a purplish tinge. Flowers are in nodding bracteate heads that grow on short side branches. The large bracts (6–8, 10–18 mm long) completely surrounding the cluster of pale yellow flowers and are hairless, yellow-green often tinged with purple or red. There are between 15–26 flowers 15–26 in each head, 12–17 mm long. Fruit are 3–4.5 mm long and green. **Habitat:** occurs in wetlands and along waterways and stream edges in high altitude treeless subalpine valleys. It can also occur in wet heathland and closed heath. **Flowering:** early to mid-summer.		Recorded – approximately 1,502 individuals recorded within PCT 679 and 953
Cotoneaster Pomaderris *Pomaderris cotoneaster*	Critically Endangered	Critically Endangered		**Description**: Cotoneaster Pomaderris is a shrub growing to 4 m tall. Its young stems have a covering of short, white, star-shaped hairs. Its leaves are elliptical, to 30 mm long and 15 mm wide with a tip that is sometimes indented (thus resembling the horticultural Cotoneaster, to which it is not related). The upper surface of the leaf is bristly and the lower surface has a fine white mat of star-shaped hairs. Its petal-less flowers are cream-coloured. Flowering occurs between October and November. **Habitat:** Cotoneaster Pomaderris has been recorded in a range of habitats in predominantly forested country. The habitats include forest with deep, friable soil, amongst rock beside a creek, on rocky forested slopes and in steep gullies between sandstone cliffs.		Assumed present

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Bago Leek-orchid *Prasophyllum bagoense*	Critically Endangered	Critically Endangered		**Description:** It is a tuberous ground orchid that grows singly or in loose groups. Plants have a single, erect, tubular leaf, 20 to 35 cm long and 3 to 4 mm wide. The flower spike is 5 to 9 cm long and bears 15 to 30 flowers that are densely arranged up the spike. The flowers are 8 to 11 mm across and pale tawny-green. **Habitat:** Found in grassy, low heathland dominated by *Poa clivicola, Epacris gunnii* and *E. celata* on a subalpine plain bordered by Snow Gum and Mountain Gum.		Recorded
Brandy Marys Leek-orchid *Prasophyllum innubum*	Critically Endangered	Critically Endangered		**Description:** It has a single erect bright green tubular leaf 20-50 cm long (7-15 cm of it free above the point of attachment of the inflorescence stalk) and 3-4 mm wide, often withering at the tip in flowering stage. The inflorescence is a loose spike 5-8 cm long, with 6-20 subsessile flowers, each 6-9 mm across and brownish green with white and purplish petals and a white or pink labellum. **Habitat:** The species is known only from a highly restricted streamside habitat and *Sphagnum* hummocks, and rarely on adjacent grassy flats, at altitudes of 1150-1180 m. **Flowering**: occurs between January and February.		Recorded

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Kelton's Leek Orchid *Prasophyllum keltonii*	Critically Endangered	Critically Endangered		**Description:** is a terrestrial orchid with a single erect bright green tubular leaf 20 to 35 cm long and 3 to 5 mm wide, often withering at the tip in flowering stage. 8 to 15 cm of the leaf is free above the point of attachment of the inflorescence (flower spike). The flower colour is green or brownish-red or purplish with green tinges. **Habitat:** has a preference for moderately boggy ground, though not sphagnum-dominated areas, but also occurs on some drier patches.		Recorded
Tarengo Leek Orchid *Prasophyllum petilum*	Endangered	Endangered		**Description:** Each plant produces a solitary, tubular, fleshy, dull green leaf, growing to 35 cm tall. The flower-stem emerges in mid spring to early summer from a hole near the base of the leaf. The raceme, reaching to 12 cm tall, has about 20 fragrant flowers with pointed tepals. The flowers are usually a pale whitish-green but can be pink or pale purple. **Habitat:** Grows in open sites within Natural Temperate Grassland at the Boorowa and Delegate sites. **Flowering:** occurs between September and December.		Recorded

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Alpine Greenhood *Pterostylis alpina*		Vulnerable		**Description:** There is a rosette of 3-5 basal leaves, ovate to obovate, 2–6 cm long, 10–15 mm wide. The flowering stem is rough and to 30 cm tall. The flower is about 3 cm long, erect, dark green and white. **Habitat:** is often found on sheltered southern slopes near streams in rich loam. **Flowering:** from August to October.		Recorded
Slender Greenhood *Pterostylis foliata*		Vulnerable		**Description:** with 3-6 roughly ovate leaves 2–5 cm long, 8–16 mm wide. The flowering stem is up to 30 cm high and is smooth. The flower is about 2 cm long, dark green and white with brown in the galea. **Habitat:** grows in eucalypt forest amongst an understorey of shrubs, ferns and grasses. It grows on loam or clay loam soils found on sheltered sloping to steep ground and populations may be found in localised open seepage areas. **Flowering:** occurs from August to January.		Recorded

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Blue-tongued Greenhood *Pterostylis oreophila*	Critically Endangered	Critically Endangered		**Description:** to five leaves in a basal rosette before flowering. The leaves are later arranged loosely along the 20 cm tall flowering stems. The leaves are oval in shape, to 70 mm long and 20 mm wide. The flower is solitary, erect, predominantly white with narrow green stripes, somewhat bulky (the hood-like structure being about 2.5 cm long). **Habitat:** Grows along sub-alpine watercourses under more open thickets of Mountain Tea-tree in muddy ground very close to water. **Flowering:** occurs from November to January.		Recorded
Dwarf Bush-pea *Pultenaea humilis*		Vulnerable		**Description:** is an erect to prostrate shrub, 0.2–0.8 m high with branchlets erect or drooping that are sparsely to moderately hairy. The leaves are alternate, 3.9–12.5 by 1–2.5 mm, flat, straight, smooth, leathery and light green. Leaves are sparsely hairy or may be hair free. **Habitat:** found in isolated remnants of native woodland and forest communities that occur in extensively cleared agricultural landscapes. **Flowering:** occurs from October to December.		Recorded

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Monaro Golden Daisy *Rutidosis leiolepis*	Vulnerable	Vulnerable		**Description:** is a low, tufted perennial with a woody root-stock. Leaves are dark green, woolly underneath, to about 10 cm long and 3 mm wide. The solitary, slightly domed flower-heads are 15 mm across, and occur on numerous 25 cm tall woolly stems. The stems bear a few small leaves. Flower-heads are conspicuous and bright yellow, and surrounded by pale brown, translucent, papery bracts. **Habitat:** Natural Temperate Grassland on the Monaro and occurs in sub-alpine grasslands in Kosciuszko National Park. **Flowering:** usually occurs December to February.		Recorded
Perisher Wallaby-Grass *Rytidosperma vickeryae*	Endangered			**Description**: is a small perennial grass to 0.3 m high, with tufts of leaves at intervals along a rhizome; the leaves have the ligule reduced to a ciliate rim of hairs c. 0.3 mm long, with longer hairs at the sides; the leaf blade becomes folded, c. 2 mm wide, mostly smooth; the panicle is exserted, 3-4 cm long, open, loose, with fine branches, the spikelets clustered at the ends; spikelets are 2-4-flowered, long-pedicellate, 5-7 mm long, the florets consistently longer than the glumes; the glumes are subequal, 3.8-4.2 mm long, with membranous margins; the lemma body is 3.5-4.5 mm long, obscurely 6-7-nerved, smooth on the back except for a few scattered hairs near the base and two small tufts at the level of the sinus, a tuft of hairs on the callus, and one tuft (the upper) near each margin; the lateral lobes are acute, very short, scarcely separating from the central awn; central awn brown, slightly twisted in the lower part or straight; the palea reaching almost to the top of the lobes **Habitat:** occurs in subalpine treeless vegetation, and is mainly recorded from stream-sides, the edges of tarns, and in and around bogs. **Habitat requirement (general):** Small flats on the edges of creeks and rivers, on small gravel bars and in sphagnum mounds or within 20 m; Waterbodies; Alpine bogs or within 20m.		Assumed present

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Woolly Ragwort *Senecio garlandii*		Vulnerable		**Description:** is a many-branched perennial herb or shrub growing to 1.2 m tall. It has woolly stems, and large leaves, which are also woolly below, to 15 cm long and 8 cm wide, with toothed edges. The leaves are stalkless and clasp the stem. The numerous small yellow flower-heads are clustered in sprays. **Habitat:** occurs on sheltered slopes of rocky outcrops. **Flowering:** usually September to November.		Recorded
Small Purple-pea *Swainsona recta*	Endangered	Endangered		**Description:** a slender, erect perennial herb growing to 30 cm tall. The leaves are divided into up to six pairs of 10 mm long, very narrow leaflets, each with a pointed tip. There is also a single leaflet at the end of each divided leaf. It bears one to several sprays of between 10 and 20 purple, pea-shaped flowers. **Habitat:** Grows in association with understorey dominants that include Kangaroo Grass *Themeda australis*, poa tussocks *Poa* spp. and spear-grasses *Austrostipa* spp. **Flowering:** between late September and early December.		Recorded

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Silky Swainson-pea *Swainsona sericea*		Vulnerable		**Description:** is a prostrate or erect perennial, growing to 10 cm tall. The stems and leaves are densely hairy. The leaves are up to 7 cm long, composed of 5 - 13 narrow, pointed leaflets, each up to 15 mm long. The purple pea-shaped flowers are to 11 mm long, and are held in groups of up to 8 flowers, on a stem to 10 cm tall. **Habitat:** in Natural Temperate Grassland and Snow Gum *Eucalyptus pauciflora* Woodland on the Monaro also Found in Box-Gum Woodland in the Southern Tablelands and South West Slopes. **Flowering:** usually September to November.		Recorded
Alpine Sun-orchid *Thelymitra alpicola*		Vulnerable		**Description:** Leaf linear to linear-lanceolate, 6–25 cm long, 4–13 mm wide, erect, dark green with purplish base. Scape 15–50 cm tall, 1–3.7 mm diam., straw-coloured to purplish. Pedicels 3–18 mm long, slender. Flowers 1–6, 15–34 mm across, deep purplish blue with darker longitudinal striations, opening freely in warm weather. **Habitat:** occurs in wet heaths and adjacent to Sphagnum bogs between 1000-1500 metres. **Flowering**: occurs from late November to mid-December		Recorded
Austral Toadflax *Thesium australe*	Vulnerable	Vulnerable		**Description:** is a small, straggling herb to 40 cm tall. Leaves are pale green to yellow-green, somewhat succulent, 1 - 4 cm long and 0.5 - 1.5 mm wide. Flowers are minute and white, emerging where the leaves meet the stems. **Habitat:** Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast. **Flowering:** September to November.		ded

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Swamp Everlasting *Xerochrysum palustre*	Vulnerable			**Description:** a perennial erect herb up to 100cm tall, the leaves are narrow, alternate, sessile, lanceolate, and partially stem clasping, to 10cm x 8mm. **Habitat:** grow in swampy habitats such as sedgy-heathy wetlands, heathlands and woodlands.		Recorded

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Annexure E Biosecurity Management Plan

Annexure E

Biosecurity Management Plan

HumeLink West

Document Number: HLW-HLJV-PRW-ENM-PLN-000001E

Revision: 3

TransGrid

Date 28/07/2025

Document Control

Approvals

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Approved on behalf of HLWJV by	[redacted]
Signed	
Dated	

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2	4/06/2025	Updates following ER, FCNSW & CPHR review	
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Abbreviations

Abbreviation	Expanded text
BDAR	Biodiversity Development Assessment Report
BMP	Biodiversity Management Plan
CEMP	Construction Environment Management Plan
cm	centimetre
CoMA	Commonwealth Conditions of Ministerial Approval
CPHR	Conservation Programs, Heritage and Regulation
DPI	Department of Primary Industries
DPIE	Department of Planning, Industry and Environment
FCNSW	Forestry Corporation NSW
FM Act	*Fisheries Management Act* 1994
HLW	The HumeLink West Stage of the HumeLink project
HLWJV	HumeLink West Joint Venture (UGL Limited and CPB Contractors)
HLW Area	Approved disturbance footprint of the HumeLink West Stage of the HumeLink project
KNP	Kosciuszko National Park
m	metres
MCoA	New South Wales Minister's Conditions of Approval
NPW Act	*National Parks and Wildlife Act 1974*
NPWS	National Parks and Wildlife Service
NSW	New South Wales
OEH	Office of Environment and Heritage
Revised BDAR	*HumeLink Biodiversity Development Assessment Report Rev 0* (Niche Environment and Heritage Pty Ltd, June 2024)
TARP	Trigger Action Response Plan
TG	Transgrid
UMM	Updated Environmental Management Measure as outlined in the Planning Approvals Documentation
WoNS	Weeds of National Significance

1. Introduction

1.1. Context

This Biosecurity Management Plan (the plan) forms part of the Biodiversity Management Sub-plan (BMP) of the HumeLink West project (HLW) Construction Environmental Management Plan (CEMP). The Biosecurity Management Plan has been prepared to outline and describe how the UGL Limited and CPB Contractors Joint Venture (HLWJV), during the construction of HLW, will comply with the Minister's Conditions of Approval (MCoA), the Federal Minister for Water and Environment Condition of Ministerial Approval (CoMA), the Updated Environmental Management Measures (UMM), and undertake its duties in accordance with the Planning Approval Documentation listed under the MCoA.

1.2. Purpose

This plan has been prepared based on current best practice to minimise and manage the potential biosecurity impacts of HLW, in accordance with the *Biosecurity Act 2015*. The plan aims to address relevant actions and mitigation measures outlined in the following documents:

- Mitigation measures B3 and B22 of the *HumeLink Biodiversity Development Assessment Report Rev 0* (Revised BDAR; Niche Environment and Heritage Pty Ltd, June 2024).
- Condition B25 and B30 of Minister's Conditions of Approval (MCoA) A2.
- Condition 2 and 7 of Federal Minister for Water and Environment Condition of Ministerial Approval.

1.3. Objectives

The key objective of the plan is to ensure that all avoidance, mitigation, and management measures relevant to biosecurity referred to in the environmental assessment documents and relevant permits and approvals are addressed. This management plan will achieve this objective through the following:

- Detail existing priority weed species, relevant pests and diseases of concern.
- Outline the implementation of appropriate processes to manage the spread of weeds, pests and diseases.
- How the implementation of practical measures will be undertaken during construction to avoid the introduction of new weeds and to minimise the spread of existing weeds.

2. Environmental requirements

2.1. Legislation

Legislation relevant to this plan includes:

- *National Parks and Wildlife Act 1974* (NPW Act).
- *Fisheries Management Act 1994* (FM Act).
- *Biosecurity Act 2015.*
- *Pesticides Act 1999.*
- *Protection of the Environment Operations Act 1997.*

2.2. Guidelines and standards

The following guidelines were considered in the development and implementation of this plan:

- *Regional Pest Management Strategy 2012-2017: Southern Ranges Region* (OEH, 2012).
- Noxious and Environmental Weed Control Handbook and website (DPI, 2018).
- Weed Cooperative Research Centre for Best Practice Management Guides.
- *Hygiene guidelines, Protocols to protect priority biodiversity areas in NSW from Phytophthora cinnamomi, myrtle rust, amphibian chytrid fungus and invasive plants* (DPIE, 2020).
- *Threat abatement plan for disease in natural ecosystems caused by* Phytophthora cinnamomi (Department of the Environment and Energy, 2018).

2.3. Preparation of this plan

In accordance with MCoA B30a, this plan has been prepared by suitably qualified and experienced biodiversity experts of RPS AAP Consulting Pty Ltd:

- Polina Zadorojnaya (BSc; BAM Accredited Assessor BAAS 23014).
- Joe Baird (BSc).
- Chelsea Tiller (BSc).
- Heather Duff (BScHons Geology; BSc).

Unless otherwise agreed by the Planning Secretary, within 4 months of the commencement of the Enabling Works, this strategy will be updated to incorporate any relevant aspects of the Enabling Works Management Plan.

2.4. Consultation

Consultation undertaken in preparation of this plan is summarised in Section 4 of the HLW BMP. If consultation with relevant stakeholders or regulators is required to assess the efficacy of mitigation strategies detailed in this report, these will be undertaken in accordance with Section 8.3 of the HLW BMP.

2.5. Minister's Conditions of Approval

The MCoA relevant to this plan are listed in Table 2-1. A cross reference is also included to indicate where and how the conditions are addressed in this plan or other HLW management documents.

Table 2-1 MCoA relevant to this plan

MCoA No.	Condition Requirements	Document Reference
Restrictions of Clearing and Habitat		
B25	Unless otherwise agreed with the Planning Secretary, the Proponent must: (a) ensure that the vegetation and habitat clearing limits specified in Table 2-1, Table 2-2 and Table 2-3 of Appendix 2 are not exceeded; and	Not addressed in this plan – refer Section 5.2 and 6.2 of the HLW BMP and Annexure B: Clearing Protocol.
	(b) minimise: (i) the impacts of the development on hollow-bearing trees; (ii) the impacts of the development on threatened species; and (iii) the clearing of native vegetation and key habitat; and	This plan includes provisions for minimising biosecurity impacts on native vegetation and threatened species through preventative (Section 5.1) and control measures (Section 5.2).
	(c) not undertake any works that result in ground disturbance within a minimum setback distance of 50 metres from PCT 637 – *Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion* and 30 metres from known locations of *Prasophyllum bagoense, Prasophyllum keltonni* and *Pterostylis oreophila* as mapped in the BDAR.	Not addressed in this plan – refer Section 6.2 of the HLW BMP and Annexure H: Biodiversity Monitoring Program.
Biodiversity Management Plan		
B30	Prior to carrying out any development (excluding Enabling Works, if the relevant requirements of this condition are adequately addressed in the Enabling Works Management Plan of condition B64) that could impact biodiversity values that require offsetting, the Proponent must prepare a Biodiversity Management Plan for the development to the satisfaction of the Planning Secretary. This plan must:	This plan forms part of the HLW BMP.

MCoA No.	Condition Requirements	Document Reference
	(a) be prepared by a suitably qualified and experienced biodiversity expert/s;	Section 2.3.
	(b) be prepared in consultation with CPHR and FCNSW;	Section 2.4.
	(c) be prepared generally in accordance with the *Revised Biodiversity Development Assessment Report* (Revision 0, dated 21 June 2024);	Table 2-3.
	(d) include a description of the measures that would be implemented for: (i) meeting the biodiversity mitigation requirements in condition B25 and as required by condition B29;	Not addressed in this plan – refer to HLW BMP.
	(ii) minimising: ▪ the amount of vegetation clearing on site; ▪ the loss of key fauna habitat (including tree hollows); ▪ the impacts of fauna on site, including undertaking pre-clearance surveys; and ▪ potential indirect impacts on threatened flora and fauna species;	This plan includes provisions for minimising biosecurity impacts on native vegetation and threatened species through preventative (Section 5.1) and control measures (Section 5.2).
	(iii) ensuring the development does not adversely affect the native vegetation and habitat outside the disturbance footprint;	This plan includes provisions for minimising indirect biosecurity impacts on native vegetation and threatened species outside of the disturbance footprint through preventative (Section 5.1) and control measures (Section 5.2).
	(iv) protocols for unexpected finds of threatened species and threatened ecological	Not addressed in this plan

MCoA No.	Condition Requirements	Document Reference
	communities within the disturbance footprint including the requirements for: ▪ all work in the associated location to stop to prevent further impact, and ▪ notification to the Planning Secretary and CPHR (and AG DCCEEW where relevant) in writing on any additional mitigation measures to be implemented; and ▪ relevant agencies to be consulted and the Planning Secretary to endorse recommencement of work;	– refer Annexure D: Unexpected Finds Procedure.
	(v) connectivity strategy for the potentially impacted species identified in the Revised Biodiversity Development Assessment Report (Revision 0, dated 21 June 2024) and a Supplementary Hollow and Nest Strategy;	Not addressed in this plan – refer to Annexure C: Hollow and Nest Strategy & Annexure F: Connectivity Strategy of the HLW BMP.
	(vi) protecting the conservation values of McPhersons Plain and avoiding impacts to *Prasophyllum bagoensis, Prasophyllum keltonni* and *Pterostylis oreophila*;	This plan includes provisions for preventing (Section 5.1) and controlling (Section 5.2) the spread of weeds and pathogens which may indirectly impact these values.
	(vii) rehabilitating temporary disturbance areas to facilitate natural regeneration of suitable native species;	Not addressed in this plan – refer Annexure G: Rehabilitation Plan of the HLW BMP.
	(viii) progressively monitoring the areas of partial clearance following the commencement of construction and provision of a verification report every three months during construction to confirm the assumptions made in the BDAR regarding partial clearance within the Easement Clearing Zone and whether any changes are	Not addressed in this plan – refer Annexure H: Biodiversity Monitoring

MCoA No.	Condition Requirements	Document Reference
	required to this plan;	Program of the HLW BMP.
	(ix) maximising the salvage of resources within the approved disturbance area – including vegetative and soil resources – for beneficial reuse (such as fauna habitat enhancement) during the rehabilitation and revegetation of the site;	Not addressed in this plan – refer Annexure G: Rehabilitation Plan of the HLW BMP.
	(x) collecting and propagating seed (where relevant);	Not addressed in this plan – refer Annexure G: Rehabilitation Plan of the HLW BMP.
	(xi) controlling erosion, weeds and feral pests;	This entire plan has been developed to address this condition.
	(xii)bushfire management;	Not addressed in this plan – refer to HLW BMP.
	(xiii) minimising impacts on entities at risk of a serious and irreversible impact (SAII), including for Box Gum Woodland, Rice Flower (*Pimelea bracteata*) and Sooty Owl (*Tyto tenebricosa*) and other entities that are identified as requiring mitigation measures in the Biodiversity Assessment Verification Report required by condition B29 and the additional mitigation measures outlined in the additional information (Transgrid proposal dated 2 September 2024) within three years of the date of the Project Approval (over and above the relevant credit obligations); and	This plan includes provisions for minimising biosecurity impacts on SAII entities through preventative (Section 5.1) and control measures (Section 5.2).
	(e) include a program to monitor, evaluate and publicly report on the effectiveness of these measures.	Section 6.1.
	Following the Planning Secretary's approval, the Proponent must implement the Biodiversity	Section 2.3.

MCoA No.	Condition Requirements	Document Reference
	Management Plan. *Note: The Biodiversity Management Plan must incorporate all relevant aspects of the development, including Enabling Works consistent with the requirements of condition B67.*	

2.6. Federal Minister for Water and Environment Condition of Ministerial Approval

The CoMA relevant to this plan are listed in Table 2-2. A cross reference is also included to indicate where and how the conditions are addressed in this plan or other HLW management documents.

Table 2-2 CoMA relevant to this plan

EPBC Condition No.	Condition Requirements	Document Reference
Clearing Limits		
2	To avoid and mitigate harm to protected matters, the approval holder must comply with condition B25 of the NSW approval to the extent that it relates to protected matters.	Refer Table 2-1
Biodiversity Management Plan		
7	The approval holder must comply with condition B30 of the NSW Approval. The Biodiversity Management Plan must be prepared in accordance with the Environmental Management Plan Guidelines and condition B30 of the NSW Approval.	Refer Table 2-1

2.7. Updated Environmental Management Measures

UMMs relevant to this plan are listed in Table 2-3 below. A cross reference is also included to indicate where and how the conditions are addressed in this plan or other HLW management documents.

Table 2-3 UMMs relevant to this plan

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
Biodiversity				
B3	A Biodiversity Management Plan (BMP) will be prepared in consultation with NSW DCCEEW Environment and Heritage and approved by DPHI prior to construction. The BMP will be prepared by a qualified ecologist and include a plan for implementing, evaluating and reporting on the effectiveness of all mitigation measures outlined in *Technical Report 1 – Revised Biodiversity Development Assessment Report*, including: ▪ Measures to minimise impacts to biodiversity, including measures to reduce disturbance to sensitive flora and fauna procedures for clearing of vegetation, including pre-clearing inspections and procedures for the relocation of flora and fauna.	Detailed design and construction	All locations	This plan forms part of the HLW BMP. Section 5 and 6
	▪ Preparation of a fauna handling and rescue procedure to be implemented during construction and operation for the ethical handling of injured or displaced fauna. Further, the fauna handling and rescue procedure would include an incident reporting protocol for fauna relocations, rescue and rehabilitation, euthanasia and/or fatality.			Not addressed in this strategy – refer Annexure B: Clearing Protocol of the HLW BMP.
	▪ Procedures for the demarcation and protection of retained vegetation, including vegetation adjacent to construction areas and during weed management.			Section 5.1.1 & 5.1.4

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
	▪ Vegetation clearing procedures for a two staged habitat removal process required for removal of key habitat features (hollow-bearing trees, habitat trees, and bushrock) identified in *Technical Report 1 – Revised Biodiversity Development Assessment Report* (the BDAR) and/or pre-clearing inspection. Including procedures to record the effort and outcomes of the habitat removal process.			Not addressed in this plan – refer to HLW BMP
	▪ Retention of habitat features such as rocky outcrops, surface rock, dead wood, logs, wherever practicable.			
	▪ Proposed rehabilitation of temporary disturbance areas including management and maintenance measures.			
	▪ Unexpected species finds protocol to be implemented if threatened ecological communities, flora and fauna species, not assessed in *Technical Report 1 – Revised Biodiversity Development Assessment Report*, are encountered during pre-clearing inspections.			
	▪ A description of biosecurity protocols for plant and equipment movement between sites, including species specific measures.			Section 5.1
	▪ Education of construction teams regarding the presence of native fauna and risks of vehicle collision, particularly early in the morning and late in the afternoon/at night; implementation of speed limits on sealed and unsealed tracks and roads.			Not addressed in this plan – refer to HLW BMP
	▪ Outline monitoring and compliance management requirements.			Section 6
	▪ Approach to relocation of nests by suitably qualified ecologist where found within construction work sites (i.e. nests found in hazardous areas will be translocated to nearby safe areas, direct handling of eggs and chicks will be			Not addressed in this plan –

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
	avoided where possible). This could include potentially new poles/nest platforms.			refer to HLW BMP
	▪ Details on the pre-clearing and clearing supervision process.			
	▪ Procedures for consultation with DPI Fisheries and pre-construction survey (where required) for threatened aquatic species should be established (and Commonwealth DCCEEW for Riek's Crayfish, as required), along with processes for reporting and consideration of recommendations into design and construction methods, as relevant.			
	▪ Procedures for reporting the outcomes of pre-construction aquatic biodiversity surveys (where required under mitigation measure B33) at CLASS 1 crossing locations (new and upgraded tracks) potentially supporting threatened aquatic species and any management measures to be implemented (e.g. timing construction outside of breeding seasons, crossing type, micro siting).			
	▪ Procedures for the stockpiling and supply of felled trees for KFH rehabilitation or improvement works, including procedures for consultation with DPI Fisheries.			
	The BMP will include adaptive management measures for uncertain/ indirect/ prescribed impacts and a biodiversity monitoring program. The adaptive management measures would detail procedures for uncertain impacts, risk associated with potential failure of mitigation, circumstances where avoidance may not be achievable and prescribed impacts. The adaptive management measures would be underpinned by monitoring programs, to provide early warning of ineffective measures and/or uncertain impacts occurring. The adaptive management measures would include: ▪ performance criteria to guide monitoring			

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
	▪ measurable thresholds to identify when remedial action is triggered			
	▪ adaptive management response/actions			
	▪ a trigger for additional credit obligations and/or conservation measures for uncertain, indirect or prescribed impacts, where these impacts cannot be adaptively managed			
	▪ reporting requirements.			
	The adaptive management measures and monitoring program will be developed to target specific species considered to be most at risk of significant impacts, as determined during the detailed design phase. The BMP will stipulate objectives for monitoring, reporting and evaluation, and how baseline data will be captured and represented.			
B22	A Biosecurity Management Plan will be developed as a part of the BMP, to be implemented during construction. The plan will include: • Protocols for the identification of priority weed species, relevant pests and diseases of concern, mandatory reporting obligations and management of Emergency, Control and Biosecurity zones as per the NSW Biosecurity Act 2015.	Detailed design and construction	All locations	Section 3.1, 5 & 6.3
	• Weed and pest animal management and monitoring requirements would also be outlined within the plan where relevant.	Detailed design and construction	All locations	Section 5 & 6.1
	• Inclusion of a Trigger Action Response Plan (TARP) for key biosecurity threats including known biosecurity threats to threatened species and populations.	Detailed design and construction	All locations	Section 6.2

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
	• Locations, timing and methods for removing soil and plant matter from vehicles and machinery and sourcing clean soil and materials free of contaminants for construction work.	Detailed design and construction	All locations	Section 5.1
	• Clean down stations (water or air, dependent on the identified biosecurity risk) will be constructed at suitable locations to clean down vehicles and employee shoes to stop the spread of weeds, pathogens (e.g. amphibian chytrid fungus, Phytophthora cinnamomi, exotic rust fungi and Epizootic Haematopoietic Necrosis Virus (EHNV)) and the introduction of new species. The biosecurity plan would address any Property Management Plan requirements where relevant.	Detailed design and construction	All locations	Section 5.1.3
	• Phytophthora has been detected in locations associated with the adjoining Snowy 2.0 project and in Lob's Hole (as identified in Appendix C (NSW DCCEEW Environment and Heritage detailed response) of the Submissions Report). If construction vehicles are required to move through areas of known or likely infestation, the risk of spread will be managed through the implementation of suitable hygiene protocols detailed in the Biosecurity Management Plan.	Detailed design and construction	All locations	Section 5.2.2
	Transgrid would consult with relevant agencies and groups involved with pest management in order to contribute to existing or future monitoring and management programs. Consideration of potential contributions would be targeted towards areas where greatest impacts occur, particularly through relatively intact landscapes where easement introduction increases the risk of native fauna predation	Detailed design and construction	All locations	TBD – Section 2.4
Land use and property				
LP2	A property management plan will be developed for directly impacted properties in consultation with landowners and stakeholders. The property management plans will outline the protocols that will be implemented to address landowner	Detailed design and construction	All locations	This plan has been developed to inform

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
	concerns during construction. This may include: • The process for rectification of any damage to property infrastructure caused by construction. • The process for rehabilitation and stabilization of disturbed areas following the completion of construction. • Measures to minimize disruption to agricultural practices during construction. • Any fencing and gate requirements. • Specific biosecurity protocols.			property management plans with regard to biosecurity protocols.
LP4	Biosecurity controls will be implemented to minimise the risk of off-site transport or spread of disease, pests or weeds. Controls will be in accordance with Transgrid's Biosecurity Procedure and Biosecurity Environmental Guidance Note and include development of specific controls if high biosecurity risks are identified. Appropriate measures will be implemented with respect to foot and mouth disease to control any risk of introduction via the project. The specific controls applicable to a property will be identified in consultation with the affected landowner. The effectiveness of these controls will be monitored in a manner and time interval consistent with the level of risk on each property. In the event of new infestations of notifiable weeds as a result of construction activities, the relevant control authority will be notified as per Biosecurity Act 2015 (NSW) and Biosecurity Regulation 2017.	Construction and operation	All locations	Section 5.1 and 5.2.

3. Existing environment

The following section summarises existing known weed, pest and pathogen species within the HLW Area including species, communities and habitats based on the information contained in the Revised BDAR.

3.1. Weeds

Priority Weeds are required to be managed under the *Biosecurity Act 2015.* This includes plants that are regulated with a general biosecurity duty to prevent, eliminate, or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated, or minimised, so far as is reasonably practicable. It also includes prohibition on certain dealings, including plants that must not be imported into the state, sold, bartered, exchanged, or offered for sale. Weeds of National Significance (WoNS) are regarded as a current priority and future weed threat to Australia because of their invasiveness, potential for spread, and economic and environmental impacts.

3.1.1. Terrestrial weeds

Native vegetation within the HLW Area and surrouds has been modified by past disturbances associated with land clearing, livestock grazing, mining, forestry operations, public recreation and weed invasion. This has resulted in significant amounts of terrestrial weeds across the landscape.

3.1.2. Priority weeds

Twenty-one Priority weed species were identified during flora surveys of the Revised BDAR. These species are detailed in Table 3-1, along with applicable duties under the *Biosecurity Act 2015*.

3.1.3. Weeds of National Significance

Three WoNS were identified during flora surveys for HLW, as detailed in Table 3-1. These weeds are currently subject to control programs under the *Southern Ranges Regional Pest Management Strategy (2012-2017)* (OEH, 2012).

Table 3-1 Weeds of concern recorded within the HLW Area

Scientific Name	Common Name	Duty under Biosecurity Act 2015	Weed of National Significance	Images (Victorian Resources Online), (Western Australian Herbarium), (Sydney Weeds Network), (NSW WeedWise, 2024)
Carthamus lanatus	Saffron Thistle	**General Biosecurity Duty** - prevent, eliminate or minimise any biosecurity risk they may pose.	No	
Centaurea solstitialis	St Barnaby's Thistle	**General Biosecurity Duty** - prevent, eliminate or minimise any biosecurity risk they may pose.	No	

Scientific Name	Common Name	Duty under Biosecurity Act 2015	Weed of National Significance	Images (Victorian Resources Online), (Western Australian Herbarium), (Sydney Weeds Network), (NSW WeedWise, 2024)
Cirsium arvense	Perennial Thistle	**General Biosecurity Duty** - prevent, eliminate or minimise any biosecurity risk they may pose.	No	
Cirsium vulgare	Spear Thistle	**General Biosecurity Duty** - prevent, eliminate or minimise any biosecurity risk they may pose.	No	

Scientific Name	Common Name	Duty under Biosecurity Act 2015	Weed of National Significance	Images (Victorian Resources Online), (Western Australian Herbarium), (Sydney Weeds Network), (NSW WeedWise, 2024)
Conyza bonariensis	Flaxleaf Fleabane	**General Biosecurity Duty** - prevent, eliminate or minimise any biosecurity risk they may pose.	No	

Scientific Name	Common Name	Duty under Biosecurity Act 2015	Weed of National Significance	Images (Victorian Resources Online), (Western Australian Herbarium), (Sydney Weeds Network), (NSW WeedWise, 2024)
Conyza sumatrensis	Tall Fleabane	**General Biosecurity Duty** - prevent, eliminate or minimise any biosecurity risk they may pose.	No	
Echium plantagineum	Patterson's Curse	**General Biosecurity Duty** - prevent, eliminate or minimise any biosecurity risk they may pose.	No	

Scientific Name	Common Name	Duty under Biosecurity Act 2015	Weed of National Significance	Images (Victorian Resources Online), (Western Australian Herbarium), (Sydney Weeds Network), (NSW WeedWise, 2024)
Echium vulgare	Viper Bugloss	**General Biosecurity Duty** - prevent, eliminate or minimise any biosecurity risk they may pose.	No	
Eragrostis curvula	African Lovegrass	**General Biosecurity Duty** - prevent, eliminate or minimise any biosecurity risk they may pose.	No	

Scientific Name	Common Name	Duty under Biosecurity Act 2015	Weed of National Significance	Images (Victorian Resources Online), (Western Australian Herbarium), (Sydney Weeds Network), (NSW WeedWise, 2024)
Hypericum perforatum	St. John's Wort	**General Biosecurity Duty** - prevent, eliminate or minimise any biosecurity risk they may pose.	No	
Marrubium vulgare	White Horehound	**General Biosecurity Duty** - prevent, eliminate or minimise any biosecurity risk they may pose.	No	

Scientific Name	Common Name	Duty under Biosecurity Act 2015	Weed of National Significance	Images (Victorian Resources Online), (Western Australian Herbarium), (Sydney Weeds Network), (NSW WeedWise, 2024)
Nassella neesiana	Chilean Needle Grass	**General Biosecurity Duty** - prevent, eliminate or minimise any biosecurity risk they may pose. **Regional Recommended Measure -** (Eradication) Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment.	Yes	
Onopordum acanthium	Scotch Thistle	**General Biosecurity Duty -** prevent, eliminate or minimise any biosecurity risk they may pose.	No	

Scientific Name	Common Name	Duty under Biosecurity Act 2015	Weed of National Significance	Images (Victorian Resources Online), (Western Australian Herbarium), (Sydney Weeds Network), (NSW WeedWise, 2024)
Proboscidea louisianica	Purple-flowered Devil's Claw	**General Biosecurity Duty -** prevent, eliminate or minimise any biosecurity risk they may pose.	No	
Rosa rubiginosa	Sweet Briar	**General Biosecurity Duty -** prevent, eliminate or minimise any biosecurity risk they may pose.	No	

Scientific Name	Common Name	Duty under Biosecurity Act 2015	Weed of National Significance	Images (Victorian Resources Online), (Western Australian Herbarium), (Sydney Weeds Network), (NSW WeedWise, 2024)
Rubus fruticosus sp. agg.	Blackberry	**General Biosecurity Duty** - prevent, eliminate or minimise any biosecurity risk they may pose. **Prohibition on certain dealings -** Must not be imported into the state, sold, bartered, exchanged or offered for sale.	Yes	
Senecio madagascariensis	Fireweed	**General Biosecurity Duty** - prevent, eliminate or minimise any biosecurity risk they may pose. **Prohibition on certain dealings -** Must not be imported into the state, sold, bartered, exchanged or offered for sale. **Regional Recommended Measure -** (Eradication) Land managers should mitigate the risk of new weeds being introduced to their land. The plant should be eradicated	Yes	

Scientific Name	Common Name	Duty under Biosecurity Act 2015	Weed of National Significance	Images (Victorian Resources Online), (Western Australian Herbarium), (Sydney Weeds Network), (NSW WeedWise, 2024)
		from the land and the land kept free of the plant. The plant should not be bought, sold, grown, carried or released into the environment.		
Xanthium italicum	Hunter Burr	**General Biosecurity Duty -** prevent, eliminate or minimise any biosecurity risk they may pose.	No	

Scientific Name	Common Name	Duty under Biosecurity Act 2015	Weed of National Significance	Images (Victorian Resources Online), (Western Australian Herbarium), (Sydney Weeds Network), (NSW WeedWise, 2024)
Xanthium occidentale	Noogoora Burr	**General Biosecurity Duty -** prevent, eliminate or minimise any biosecurity risk they may pose.	No	
Xanthium orientale	Californian Burr	**General Biosecurity Duty -** prevent, eliminate or minimise any biosecurity risk they may pose.	No	

Scientific Name	Common Name	Duty under Biosecurity Act 2015	Weed of National Significance	Images (Victorian Resources Online), (Western Australian Herbarium), (Sydney Weeds Network), (NSW WeedWise, 2024)
Xanthium spinosum	Bathurst Burr	**General Biosecurity Duty -** prevent, eliminate or minimise any biosecurity risk they may pose.	No	

3.1.4. Regional priority weeds

The HLW Area falls within two Local Land Service Regions: South East & Riverina Regions. Each has its own Regional Strategic Weeds Management Plan (LLS, 2022a & 2022b).

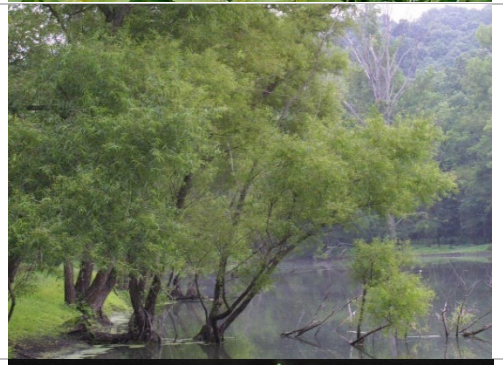
Regional priority weeds are regulated through the general biosecurity duty and each weed has a management category (Table 3-2). Regionally recommended measures are listed for each weed and communicate how landholders and stakeholders in the region should conduct their general biosecurity duty for that weed.

Regional priority weeds have been assessed by regional weed committees as posing a high risk to specific regions of NSW. Riverina and South East regional priority weeds are identified in Table 3-3 as key species of concern to be monitor closely for.

Table 3-2 Defining regional weed management categories

Management Strategy	Objective	Characteristics of weeds in this category
Prevention	To prevent the weed species arriving and establishing in the region.	Weeds currently not found in the region, that pose a significant biosecurity risk and prevention of the biosecurity risk posed by these weeds is a reasonably practicable objective.
Eradication	To permanently remove the species and its propagules from the region OR to destroy infestations to reduce the extent of the weed in the region with the aim of local eradication.	Weeds are present in limited abundance in the region. Elimination of the biosecurity risk posed by these weeds is a reasonably practicable objective.
Containment	To prevent the ongoing spread of the species in all or part of the region.	These weeds are widely distributed in parts of the region. While broad scale elimination is not practicable, minimisation of the biosecurity risk posed by these weeds is reasonably practicable.
Asset protection	To prevent the spread of weeds to key sites/assets of high economic, environmental and social value, or to reduce their impact on these sites if spread has already occurred.	These weeds are widely distributed in some areas of the region. Their spread should be minimised to protect priority regional assets.

Table 3-3 Riverina & South East Regions priority weeds

Common Name	Scientific name	Regional Management priority	Priority Weed in Local Land Service Region	Images (NSW WeedWise, 2025)
Alligator weed	*Alternanthera philoxeroides*	Eradication	Riverina	
Black willow	*Salix nigra*	Containment	Riverina	
Boneseed	*Chrysanthemoides monilifera subsp. monilifera*	Eradication	Riverina	

Common Name	Scientific name	Regional Management priority	Priority Weed in Local Land Service Region	Images (NSW WeedWise, 2025)
Cane needlegrass	*Nassella hyalina*	Eradication (Exception: Containment for Wagga)	Riverina	
Cape/Montpellier broom	*Genista monspessulana*	Eradication	Riverina	

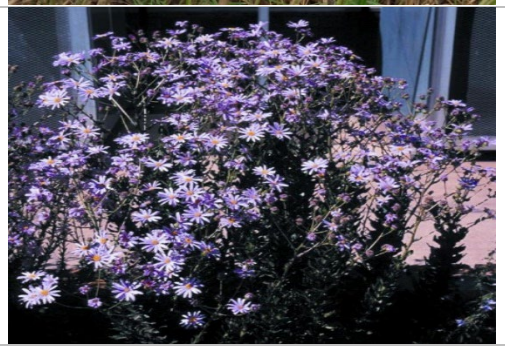
Common Name	Scientific name	Regional Management priority	Priority Weed in Local Land Service Region	Images (NSW WeedWise, 2025)
Cat's claw creeper	*Dolichandra unguis-cati* (syn. *Macfadyena unguis-cati*)	Eradication	South East	
Chilean needlegrass	*Nassella neesiana*	Eradication	Riverina	

Common Name	Scientific name	Regional Management priority	Priority Weed in Local Land Service Region	Images (NSW WeedWise, 2025)
Chinese violet	*Asystasia gangetica subsp. micrantha*	Prevention	Riverina	
Coolatai grass	*Hyparrhenia hirta*	Containment	Riverina, South East	

Common Name	Scientific name	Regional Management priority	Priority Weed in Local Land Service Region	Images (NSW WeedWise, 2025)
Coral creeper	*Barleria repens*	Prevention	South East	
Fireweed (SP)	*Senecio madagascariensis*	Eradication	Riverina	

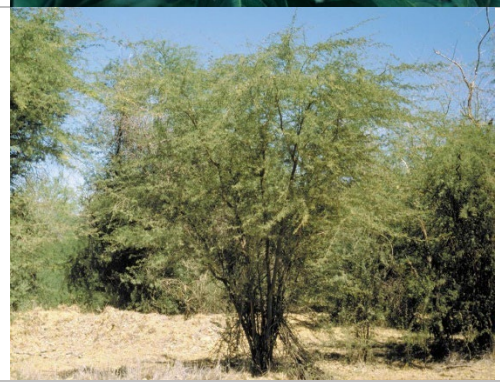
Common Name	Scientific name	Regional Management priority	Priority Weed in Local Land Service Region	Images (NSW WeedWise, 2025)
Giant devil's fig	*Solanum chrysotrichum*	Eradication	South East	
Gorse	*Ulex europaeus*	Containment	Riverina, South East	

Common Name	Scientific name	Regional Management priority	Priority Weed in Local Land Service Region	Images (NSW WeedWise, 2025)
Green cestrum	*Cestrum Parqui*	Eradication	Riverina	
Grey sallow	*Salix cinerea*	Containment	Riverina	

Common Name	Scientific name	Regional Management priority	Priority Weed in Local Land Service Region	Images (NSW WeedWise, 2025)
Groundsel bush	*Baccharis halimifolia*	Eradication	South East	
Holly leaved senecio	*Senecio glastifolius*	Prevention	South East	

Common Name	Scientific name	Regional Management priority	Priority Weed in Local Land Service Region	Images (NSW WeedWise, 2025)
Horsetails	*Equisetum spp.*	Prevention	Riverina, South East	
Kei apple	*Dovyalis caffra*	Eradication	South East	
Kidney leaf mud plantain	*Heteranthera reniformis*	Prevention	South East	
Kidney leaf mud plantain	*Heteranthera reniformis*	Eradication	Riverina	

Common Name	Scientific name	Regional Management priority	Priority Weed in Local Land Service Region	Images (NSW WeedWise, 2025)
Kudzu	*Pueraria lobata*	Eradication	South East	
Lantana	*Lantana camara*	Containment	South East	

Common Name	Scientific name	Regional Management priority	Priority Weed in Local Land Service Region	Images (NSW WeedWise, 2025)
Long leaf water primrose	*Ludwigia longifolia*	Eradication	South East	
Ludwigia	*Ludwigia peruviana*	Eradication	South East	
Mesquite	*Prosopis spp.*	Eradication	Riverina	

Common Name	Scientific name	Regional Management priority	Priority Weed in Local Land Service Region	Images (NSW WeedWise, 2025)
Ming asparagus fern/pompom asparagus	*Asparagus macowanii var. zuluensis*	Eradication	South East	
Mother-of-millions	*Bryophyllum spp.*	Eradication	Riverina	

Common Name	Scientific name	Regional Management priority	Priority Weed in Local Land Service Region	Images (NSW WeedWise, 2025)
Mysore thorn	*Caesalpinia decapetala*	Containment	South East	
Parkinsonia	*Parkinsonia aculeata*	Prevention	Riverina	

Common Name	Scientific name	Regional Management priority	Priority Weed in Local Land Service Region	Images (NSW WeedWise, 2025)
Perennial ground cherry	*Physalis longifolia*	Eradication	Riverina	
Ragwort	*Senecio jacobaea*	Prevention	Riverina	

Common Name	Scientific name	Regional Management priority	Priority Weed in Local Land Service Region	Images (NSW WeedWise, 2025)
Sagittaria	*Sagittaria platyphylla*	Eradication (Exception: Containment for Griffith)	Riverina	
Salvinia	*Salvinia molesta*	Eradication	Riverina, South East	

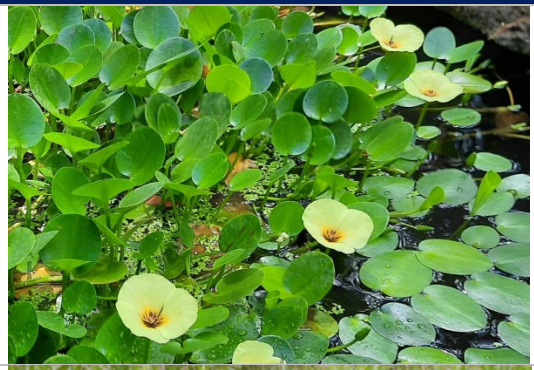
Common Name	Scientific name	Regional Management priority	Priority Weed in Local Land Service Region	Images (NSW WeedWise, 2025)
Scotch/English broom	*Cytisus scoparius subsp. scoparius*	Containment	Riverina	
Sea spurge	*Euphorbia paralias*	Containment	South East	
Senegal tea plant	*Gymnocoronis spilanthoides*	Eradication	South East	

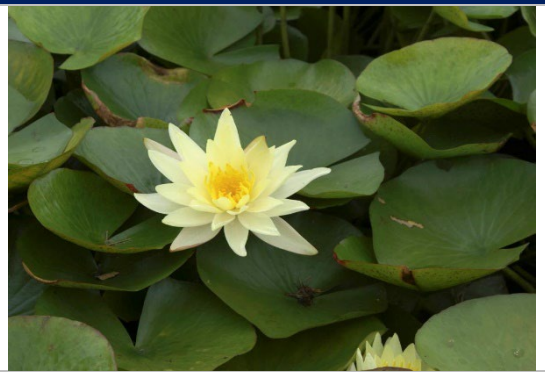
Common Name	Scientific name	Regional Management priority	Priority Weed in Local Land Service Region	Images (NSW WeedWise, 2025)
Senegal tea plant	*Gymnocoronis spilanthoides*	Prevention	Riverina	
Serrated tussock	*Nassella trichotoma*	Eradication	Riverina	

Common Name	Scientific name	Regional Management priority	Priority Weed in Local Land Service Region	Images (NSW WeedWise, 2025)
Sickle thorn	*Asparagus falcatus*	Prevention	South East	
Silverleaf nightshade	*Solanum elaeagnifolium*	Eradication	South East	

Common Name	Scientific name	Regional Management priority	Priority Weed in Local Land Service Region	Images (NSW WeedWise, 2025)
Spanish heath	*Erica lusitanica*	Containment	South East	
Sticky nightshade	*Solanum sisymbriifolium*	Eradication	South East	

Common Name	Scientific name	Regional Management priority	Priority Weed in Local Land Service Region	Images (NSW WeedWise, 2025)
Tropical soda apple	*Solanum viarum*	Prevention	Riverina	
Water hyacinth	*Eichhornia crassipes*	Eradication	Riverina	
Water lettuce	*Pistia stratiotes*	Eradication	South East	
Water lettuce	*Pistia stratiotes*	Prevention	Riverina	

Common Name	Scientific name	Regional Management priority	Priority Weed in Local Land Service Region	Images (NSW WeedWise, 2025)
Water poppy	*Hydrocleys nymphoides*	Eradication	South East	
Water poppy	*Hydrocleys nymphoides*	Prevention	Riverina	
Water star grass	Heteranthera zosterifolia	Prevention	South East	

Common Name	Scientific name	Regional Management priority	Priority Weed in Local Land Service Region	Images (NSW WeedWise, 2025)
Yellow water lily	*Nymphaea mexicana*	Prevention	Riverina	

3.1.5. Aquatic weeds

The Tumut River, which feeds into Talbingo Reservoir, intersects a portion of HLW under the Transmission Line corridor. Canadian Pondweed (*Elodea* canadensis; Plate 1) is known to occur throughout Talbingo reservoir. Canadian Pondweed is often associated with slow-moving and stationary water bodies, coastal rivers and creeks, especially in colder areas of NSW. It grows and spreads via fragmentation, and as stems readily break into pieces, these are easily transported in water. Canadian Pondweed is classified as a water weed which is known to:

- Alter dissolved oxygen levels reducing the water quality.
- Restrict navigation and recreational activities on waterways.
- Pose a drowning hazard for livestock and recreational swimmers.

Across NSW, the general biosecurity duty applicable to this weed is to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.



Plate 1 Example of *Elodea canadensis* (Canadian Pondweed; NSW WeedWise, 2024).

3.2. Pathogens

No evidence of pathogens such as Root Rot (*Phytophthora cinnamomi*), Myrtle Rust (*Austropuccinia psidii*) and Chytrid Fungus (*Batrachochytrium dendrobatidis*) or Epizootic Haematopoietic Necrosis Virus were recorded within the HLW Area. However, these have potential to occur and be imported

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onto site.

Infection of native plants by *Phytophthora cinnamomi* is listed as a Key Threatening Process under the BC Act and EPBC Act. *Phytophthora cinnamomi* can lead to death of trees and shrubs, resulting in devastation of native ecosystems (NPWS, 2006). Infection of susceptible communities with *Phytophthora cinnamomi* may lead to:

- Changes in the structure and composition of the native plant communities.
- A significant reduction in primary productivity and functionality.
- Habitat loss and degradation for dependent flora and fauna.

Phytophthora has been detected in locations associated with the adjoining Snowy 2.0 project and in Lob's Hole. Recent surveys of KNP have detected three species that are likely to be the most destructive of environmental values: *Phytophthora cinnamomi, Phytophthora gregata* and *Phytophthora multivora*. Very little of the park is currently suitable for *Phytophthora cinnamomi* but the area of suitable habitat is likely to increase in the coming decades as mean temperature increases. Only the western edge of KNP and the lower Snowy River valley are currently marginally suitable habitat for *Phytophthora cinnamomi*. *Phytophthora* species are amongst the world's most destructive plant pathogens, causing catastrophic environmental degradation and can spread through the movement of vehicles, mountain bikes, horse riders, walkers, and large feral animals. The HLW Area does not overlap with KNP and there are no plans for vehicle movements in the National Park.

'Introduction and establishment of Exotic Rust Fungi of the order *Pucciniales* pathogenic on plants of the family Myrtaceae' is listed as a KTP under the BC Act. Myrtle Rust is plant disease, caused by an introduced fungal pathogen, affects plant species in the Myrtle family (Myrtaceae), which are key, and often dominant, species in many Australian ecosystems. No known occurrences of Myrtle Rust occur within the vicinity.

'Infection of amphibians with chytrid fungus resulting in chytridiomycosis' is listed as a Key Threatening Process under the BC Act and EPBC Act. Chytridiomycosis in frogs has been recorded in the nearby Kosciusko National Park (KNP; NPWS, 2006). The disease, caused by Chytrid Fungus (*Batrachochytrium dendrobatidis*) which has been detected in the vicinity of the HLW area, has been detected in a number of threatened frog species, though it remains unclear whether it constitutes the primary cause of recent frog population declines.

'Epizootic haematopoietic necrosis of fish (EHNV)' is listed under notifiable matter under Schedule 1 of the *Biosecurity Regulation 2017*. EHNV is a disease that causes destruction of blood forming organs in outbreaks involving affected fish, particularly known host species, Redfin and Rainbow Trout (DPI, 2025; Snowy Hydro, 2023). Several native species, including Macquarie perch, are susceptible to EHNV under laboratory conditions, although natural disease events caused by EHNV have never been detected in species other than Redfin and Rainbow Trout (Snowy Hydro, 2023; Hick et al. 2019; Cardno, 2019). Whilst no known occurrences or outbreak of EHNV have been detected within the vicinity, concerns regarding the water transfer within the adjoining Snowy 2.0 project could increase the range of EHNV (Snowy Hydro, 2023).

3.3. Predator and pests

The HLW Area consists of large areas of agricultural lands, which likely provide suitable habitat for a variety of predator and pest species. The following predator and pest species have been recorded within the HLW Area:

- Goat (*Capra hircus*).
- Deer (*Cervus* sp.).
- Horse (*Equus caballus*).
- Cat (*Felis catus*).

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- House Mouse (*Mus musculus*).
- Rabbit (*Oryctolagus cuniculus*).
- Black Rat (*Rattus rattus*).
- Spotted Dove (*Spilopelia chinensis*).
- Common Starling (*Sturnus vulgaris*).
- Pig (*Sus scrofa*).
- Eurasian Blackbird (*Turdus merula*).
- Fox (*Vulpes vulpes*).

Observations of predator and pest species were not limited to any one habitat type, and it is likely that they occur throughout the HLW Area.

3.3.1. Feral Horse (*Equus caballus*)

Feral horses are present along the HLW Area particularly the Green Hills State Forest Area. They predominantly inhabit public lands, including national parks and state forests, with occasional movements onto adjacent private properties. Their presence negatively affects environmental values through grazing of native vegetation and soil disturbance, especially in alpine and sub-alpine environments. The negative environmental impact of feral horses has been formally recognised by the listing of habitat degradation and loss by feral horses as a KTP under the BC Act. Additionally, feral horses pose a notable risk to public safety in areas near main roads and highways due to the potential for vehicle collisions (LLS, 2024a, 2024b).

4. Environmental aspects and impacts

The relationship between environmental aspects and impacts can be best explained as cause and effect. Details of the biosecurity-specific aspects as well as known and potential impacts are summarised below. Refer to Appendix A2 of the CEMP for the full HLW Aspects and Impacts Register.

4.1. Aspects

Key aspects of the HLW that could result in biosecurity impacts include:

- Vegetation clearing and topsoil stripping.
- Earthwork.
- Movement of vehicles.
- Construction of watercourse crossings.
- Demolition works.
- Site access.
- Material stockpiles.
- Generator use.
- Establishment and use of construction support sites including potential impacts on flood behaviour and vehicle wash down.

4.2. Potential impacts

The potential for impacts on biosecurity will depend on a number of factors. Impacts will be dependent on the nature, extent and magnitude of construction activities and their interaction with the natural environment. Potential impacts attributable to construction include the following:

- Introduction of weeds and pathogens.
- Spread of weeds and pathogens, resulting in degradation of retained native vegetation and habitat.

The environmental management measures described below have been developed to minimise and mitigate the impacts on biosecurity as a result of HLW construction.

The most significant pest animals in the HLW Area include pigs, foxes and rabbits. Construction activities in already predominately cleared landscapes (i.e., areas previously cleared for agriculture) of are unlikely to significantly change the number or movement patterns of these pests. However, fragmentation of undisturbed dense forested habitat may have increased exposure to exotic fauna that were previously not able to access this landscape (Dickman 1996; May and Norton 1996).

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5. Environmental control measures

A range of environmental requirements and control measures are identified in the HumeLink Revised BDAR and conditions of approval. Safeguards and management measures will be implemented to avoid, minimise or manage impacts from the introduction and spread of weeds and pathogens. Transgrid will act as the property manager and will be responsible for fulfilling general biosecurity duties and managing weed and pest control in accordance with the *Biosecurity Act 2015* (NSW).

Management measures for the control of weeds and pathogens will be undertaken via three methods: prevention, control and disposal as detailed below.

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5.1. Prevention

HLWJV will implement the following measures to prevent the introduction or spread of weeds pathogens on site:

- Baseline weed surveys.
- Hygiene inspections and completed Weed Hygiene Declarations of vehicles, vessels, plant and equipment being transported onsite.
- Application of washdown locations and/or disinfection points at key locations onsite supported by hygiene/disinfection records.
- Restricted access to areas of known weed/pathogen infestation sites.
- No-go zones.

5.1.1. Baseline surveys

Prior to the commencement of clearing, weeds will be mapped within the HLW Area during pre-clearing surveys. Given the large area of impact associated with HLW, weed mapping may be undertaken on-foot, using drones or using binoculars to assess a larger area from a vantage point. The surveys will also assist with developing ‘restricted areas’ and updated hygiene protocols for the works by the Project Ecologist. Restricted areas will be considered areas of dominant weed infestation and will have specific measures as outlined in Section 5.1.4 below. When restricted areas are identified, these will be translated to the HLW Environmental Plans, with washdown areas clearly represented.

Additionally, a soil sampling program will be undertaken prior to construction by a suitably qualified person(s) to test for presence/absence of *Phytophthora* within the HLW Area. The sampling and monitoring will follow the methodology outlined in Section 6.1.3. Similar to the weed surveys, this sampling will assist in identifying any required restricted areas, with pathogens and form a baseline for the ongoing monitoring. Likewise, as for weeds, HLW Environmental Plans will represent pathogen restricted areas with disinfection points clearly represented.

5.1.2. Hygiene declaration and inspections

All suppliers of plant and equipment, HLWJV and contractors will be informed of their general obligation under the *Biosecurity Act 2015* to prevent the introduction and spread of diseases, weeds and contaminants. The suppliers will be expected to present their materials and equipment clean and free of dirt, mud, seed and biological materials including weeds, seeds, pathogen and other organisms. The supplier will complete the Hygiene Declaration Form (Attachment 1) prior to entry onsite. Completed forms will be kept in the HLW office (or accessible electronically) for audit and compliance tracking purposes. The completed Hygiene Declaration Form will be kept in the relevant

vehicle during transportation and presented at the HLW access point.

A summary of hygiene declaration and inspection outcomes including an evaluation of biosecurity measure effectiveness will be provided in annual reporting.

5.1.2.1. Checkpoints

Checkpoints will be established to carry out visual inspections of plant and equipment to ensure compliance with the Hygiene Declaration Form. Checkpoints will be located at or prior to access points onsite. Where cleanliness standards are not met, site entry will be refused, and thorough off-site wash down at an appropriate facility will be required prior to site access being granted.

5.1.3. Washdown stations

Where incoming and outgoing vehicles, vessels, machinery and equipment do not satisfy the cleanliness requirements of the Hygiene Declaration Form, washdown will be required. Only relevant equipment that is cleaned to the specified standard will be accepted onsite. No incoming rejected plant and equipment will be permitted to washdown using an onsite facility. Commercial car-wash facilities should be used where possible. Council facilities and/or existing facilities may also be used where permission has been granted.

Washdown areas will be located at major access points and HLW compound sites, as permissible with relevant Property Management Plans. In locations of key weed or pathogen outbreaks (restricted areas), vehicle and machinery inspection and washdown will be required upon entering the HLW Area from outside and when leaving restricted areas (refer to Section 5.1.4 of this report). Similarly, vehicle and machinery inspection and washdown will be mandatory for entry into the following no-go zones (refer Annexure B Clearing Protocol of the HLW BMP):

- PCT 637 + 50 m buffer.
- Known *Prasophyllum bagoense, Prasophyllum keltonni* and *Pterostylis oreophila*, + 30 m buffer.
- McPhersons Plain + 30 m buffer.

Such facilities will be contained, Transgrid approved, and away from production and other sensitive areas and not drain into waterways. The washdown procedure is detailed in Table 5-1 below.

Table 5-1 Washdown protocol for vehicles and heavy machinery (DPIE, 2020)

Step	Method
Check	• Check the exterior and interior of vehicles and machinery for soil, plant material and other debris.
Clean	• Remove large clods of dirt and soil using a stiff brush or crowbar. • Remove all soil, plant material and other debris from the interior using a vacuum or dustpan and brush. Focus on the cabin floor, floor mats and pedals. • Place debris in a bag and dispose of in a commercial waste bin. • If returning from a potentially-contaminated area, wash vehicle and/or machinery as soon as possible (e.g. at a commercial carwash) before heading back to site. If a carwash facility is not available, spray tyres thoroughly with a disinfectant.
Dry	• Where practical, allow vehicle or machinery to dry before proceeding.

5.1.4. Restricted areas

Weed or pathogen dominated areas identified during the baseline weed survey and soil sampling (Section 5.1.1) will be demarcated and signposted by the Project Ecologist/Contractors during pre-clearing surveys. Weed or pathogen infested areas and weed/pathogen topsoil stockpiles will be demarked as restricted areas. Vehicles or plant that are required to enter the restricted areas will be cleaned at in-situ mobile washdown stations prior to moving to other areas of the site. Temporary washdown stations will be established in weed and pathogen restricted areas as they are identified. Once vehicles or items of mobile plant or equipment are assessed as clean and/or disinfected to the satisfaction of the Weed Hygiene Declaration and/or disinfection record, they will be free to move about the HLW Area.

The demarcated restricted areas will be inspected as part of the weekly environmental inspection by HLWJV to ensure the flagging, signage and washdown areas are in place and functioning.

5.1.5. Predator and pests

There is potential for increased human activity from HLW to result in increased activity of predators and pests; associated with several Key Threatening Processes listed under the BC and EPBC Act (refer to Section 6.3 of the HLW BMP). To minimise the risk of increased predator and pest activity during construction, the following controls will be implemented:

- Food waste will be stored appropriately in fauna-inaccessible bins and disposed off-site.
- No waste will be left outside in open areas accessible to fauna.
- Opportunistic sightings of predator and pest activity will be documented.
- No feeding or interactions with feral horses or any other fauna.
- Staff inductions will include awareness training on:
    - Avoiding conflict or attraction (e.g., leaving food waste accessible).
    - Reporting sightings or damage.

5.2. Control

As outlined in Section 6.1.1, baseline weed surveys and soil sampling for potential pathogens will be undertaken prior to the commencement of clearing. With this baseline data, weed and pathogen controls will be outlined for specific locations within the HLW Area. The following sections discuss aspects of the relevant controls that will be implemented for HLW.

5.2.1. Weed control

Recommended controls for known weeds in the HLW Area are detailed in Table 5-2, however methods may be tailored in accordance with legislative (or local control authority) requirements and landowner approval.

Table 5-2 Recommended weed controls

Scientific Name	Common Name	Recommended controls
Carthamus lanatus	Saffron Thistle	• Physical removal. • Weed spraying.
Centaurea solstitialis	St Barnaby's Thistle	
Cirsium arvense	Perennial Thistle	
Cirsium vulgare	Spear Thistle	
Conyza bonariensis	Flaxleaf Fleabane	• Physical removal.
Conyza sumatrensis	Tall Fleabane	

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Scientific Name	Common Name	Recommended controls
Echium plantagineum	Patterson's Curse	• Weed spraying.
Echium vulgare	Viper Bugloss	• Weed spraying.
Eragrostis curvula	African Lovegrass	• Physical removal. • Weed spraying.
Hypericum perforatum	St. John's Wort	• Physical removal. • Weed spraying.
Marrubium vulgare	White Horehound	• Physical removal. • Weed spraying.
Nassella neesiana	Chilean Needle Grass	
Onopordum acanthium	Scotch Thistle	
Proboscidea louisianica	Purple-flowered Devil's Claw	
Rosa rubiginosa	Sweet Briar	• Physical removal. • Weed spraying. • Cut and paint.
Rubus fruticosus sp. agg.	Blackberry	
Senecio madagascariensis	Fireweed	• Weed spraying.
Xanthium italicum	Hunter Burr	• Physical removal. • Weed spraying.
Xanthium occidentale	Noogoora Burr	
Xanthium orientale	Californian Burr	
Xanthium spinosum	Bathurst Burr	

5.2.1.1. Physical weed control

Prior to the commencement of clearing, pre-clearing surveys will outline the location of all weeds and weeds to be controlled. Weeds will be controlled by a suitably qualified and experienced contractor. During clearing works, topsoil from areas identified as dominated by weeds will be stockpiled separately from 'clean' topsoil. Weed topsoil stockpiles will be stored in areas exhibiting the same weed presence. Stockpiles will be sign-posted with erosion and sediment controls and prevention controls (Section 5.1) implemented. Stockpiles will also be covered with geofabric, landscape fabric, tarpaulin or sterile cover crop to minimise weed growth. Stockpiles will be monitored and weed control will be undertaken if required, as per Section 5.2.1.2. HLWJV will determine if this topsoil can be reused. If not usable, weed topsoil will be disposed of at an appropriate licenced waste management facility in accordance with the *Biosecurity Act 2015* and *Protection of the Environment Operations Act 1997*, or with Transgrid and landowner approval buried on site.

Weeds are to be physically removed (per Table 5-2) and disposed of at a licenced waste management facility or destroyed in a manner to mitigate against weed spread. All other non-weed materials excavated within a weed risk area can be moved within the boundaries of that same weed risk area but cannot be taken to an area with a different weed risk.

5.2.1.2. Chemical weed control

A weed control contractor will be employed to implement chemical weed control for HLW as the primary means of eradicating or mitigating against the spread of weeds. The weed control contractor will be suitably qualified and experienced in the management and control of weeds, particularly those known to occur in the HLW Area.

At minimum, annual weed control program will take place throughout the construction of HLW. This will generally involve a spring and summer round of weed spraying, the timing of which will be adapted each season to maximise efficacy by targeting the most appropriate life stage of the target species. The precise timing and locations for weed spraying will be determined by the weed control contractor.

Prior to spring, the weed contractor will prepare a tailored weed spraying program which considers the following:

- Weed monitoring results from pre-clearing surveys.
- Seasonal and climatic factors such as flowering/seeding time and susceptibility to different controls (refer weeds of concern listed in Table 3-1).
- Staging of vegetation clearing works, with weeds in areas prioritised for clearing to be controlled as a priority to avoid dispersal of weed plant material.
- Recent bushfire activity.
- Necessity for follow-up spraying.
- Current spraying activities in the HLW Area and surrounds.
- The time and resources available to carry out the weeding program.
- Landowner approvals (if relevant).

Areas subject to traffic and disturbance will have weeds sprayed to reduce the presence of weeds around the HLW Area. This may include access roads, spoil emplacement areas, topsoil areas, areas that support sediment control structures, and other areas (as recommended by the weed contractor). Geo-tracking will be used in weed spraying units to identify which areas have been sprayed.

Topsoil, mulch and spoil stockpiles will be inspected for evidence of weeds on a regular basis as part of routine environmental site inspections. Chemical weed control can be undertaken to eradicate weeds on stockpiles and limit seed and propagule proliferation.

There is a range of herbicide and treatment options available for certain weed species. Where available, herbicide treatments should be selective or at least partially selective. The NSW Weed Wise database in accordance with the Transgrid Schedule of Approved Pesticides will be consulted when determining chemical control options for the treatment of select weed species. Spraying is to be done in consultation with Transgrid, State Forests and relevant landowners. Due consideration and restricted herbicide use will also occur where spraying activity has the potential to affect protected flora and fauna individuals or communities.

No application of aquatic herbicides will occur during construction works.

5.2.1.3. No-go zones

No-go zones are designated areas established to prevent the spread of weeds and pathogens during vegetation clearing and construction activities. Per Annexure B Clearing Protocol of the HLW BMP, these zones will be clearly marked and signposted by the Project Ecologist/Contractors during pre-clearing surveys, ensuring that all personnel are aware of their locations and the restrictions in place. Weed control methods specific to no-go zones are detailed in Table 5-3.

Table 5-3 Specific weed controls for no-go zones

No-go zone	Weed controls
PCT 637 + 50 m buffer	• Weed inspection is to occur every 3 months (quarterly). • Limited to hand-weeding only within 30 m of the no-go zone. • No herbicide use. • Prioritised removal of *Cirsium vulgare, Holcus lanatus, Juncus acutus, Eragrostis curvula, Poa annua* and *Rubus* spp.

No-go zone	Weed controls
Known *Prasophyllum bagoense*, *Prasophyllum keltonni* and *Pterostylis oreophila*, + 30 m buffer	• Weed inspection is to occur every 2 weeks (fortnightly). • Limited to hand-weeding only within 5 m of each no-go zone. • No herbicide use. • Prioritised removal of invasive grasses (e.g., Phalaris, *Poa annua, Agrostis capillaris*).
McPhersons Plain + 30 m buffer	• Weed inspection is to occur every 3 months (quarterly). • Limited to hand-weeding only within 30 m of the no-go zone. • No herbicide use. • Prioritised removal of *Cirsium vulgare, Holcus lanatus, Juncus acutus.*

5.2.2. Pathogen control

As outlined in Section 5.1.1, baseline soil sampling for potential pathogens will be undertaken prior to the commencement of clearing. Based on the findings of the sampling, specific pathogen controls including restricted areas will be outlined for specific locations within the HLW Area. There is also potential for other pathogens to occur onsite, including Myrtle Rust and Chytrid Fungus. No other pathogens have been identified within the HLW Area to date. Testing for Myrtle Rust and Chytrid Fungus will be undertaken if concerns are raised regarding their potential presence onsite such as sick amphibians or lesions on Myrtaceae.

The prevention measures outlined in Section 5.1 will prevent the spread of any pathogens onsite from potential pathogen infected areas. Primary control methods for Phytophthora and other pathogens (if applicable) are prevention (outlined in Section 5.1), monitoring (outlined in Section 6.1) and adaptive management. If an infestation is identified, onsite controls are to be put in place to prevent its spread. Controls will be based on site-specific risk exposure and may include, but not be limited to, the following:

- Demarcation and signposting of the restricted area to reduce disturbance and control access.
- Establishment of washdown and/or disinfection stations at the access and exit points of the restricted area.
- Utilisation of mobile disinfectant pump packs to address pathogen risk where required.
- Toolbox talk on the restricted area to communicate the risks and new controls in place.
- Review of site activities in the area to determine if activities can be modified to prevent further disturbance to the restricted area. Modification of activities may include rerouted access around the restricted area.
- If works are required in the restricted area, works are to be undertaken during periods of dry soil conditions, wherever practicable.

Table 5-4 and Table 5-5 below show the hygiene protocols adopted from *Hygiene Guidelines; Protocols to protect priority biodiversity in NSW, from amphibian chytrid fungus and other diseases in Australian frogs* (DPIE, 2020). The guidelines promote the adoption of basic hygiene procedures into daily routines when working in the field. Table 5-4 and Table 5-5 of the guidelines (DPIE, 2020) are considered appropriate safeguards for working within the HLW Area.

Table 5-4 Basic hygiene protocol for personnel, clothing, footwear, tools and equipment

Step	Description
Check	Check personnel, clothing, footwear, backpacks and equipment for soil, mud, plant material/propagules (seeds) and other debris.

Clean	• Carry a hard brush and a spray bottle of disinfectant—made up of a solution of 70% ethanol or methylated spirits in 30% water. If you are able to carry more, assemble a simple hygiene kit. • Remove all soil, plant material and other debris from footwear, clothing, gloves and tools using a hard brush before disinfecting. • Disinfect with a solution of 70% ethanol or methylated spirits in 30% water— applied through a spray bottle. • Wash hands with soap and water. Remove seeds from clothing, footwear, tools and equipment by hand. Seeds that are difficult to remove can be scraped off clothing with a sharp implement, but use caution. Have a co-worked double check that you have removed all seeds.
Dry	Ensure hands, clothing, footwear and equipment are dry before proceeding if possible.

Table 5-5 Hygiene protocol for vehicles and heavy machinery

Step	Description
Check	Check the exterior and interior of vehicles and machinery for soil, plant material, seeds and debris.
Clean	• Carry a hard brush and a spray bottle of disinfectant—made up of a solution of 70% ethanol or methylated spirits in 30% water. If you are able to carry more, assemble a simple hygiene kit. • Remove large clods of dirt and soil using a hard brush or crowbar. Pay attention to mudflaps and tyres. • Remove all soil, plant material, seeds and other debris from the interior using a vacuum and/or dustpan and brush. Focus on cabin floors, floormats and pedals. Place debris in a bag and dispose of in a commercial waste bin. • Use a wash-down facility for vehicles and machinery if available, or wash-down on a hard, well-drained surface, for example a road, and on ramps if possible. • Dispose of wash-down water so that it drains back into a low area of the infested zone away from waterways. If this is not possible, empty it into a waste container for responsible disposal offsite. Don't allow wash-down water to drain into clean bushland. • Don't drive through wash-down water. If a carwash facility is not available, spray tyres thoroughly with a disinfectant.
Dry	Where practical, allow vehicle or machinery to dry before proceeding.

5.2.2.1. Chytrid fungus control measures

To minimise the risk of spreading chytrid fungus (*Batrachochytrium dendrobatidis*), strict quarantine protocols should be implemented for any newly captured or relocated amphibians in accordance with Annexure B Clearing Protocol of the HLW BMP.

5.2.3. Feral Horse control

Impact avoidance and minimisation has been prioritised in the McPhersons Plain area through detailed design measures. The existing horse-exclusion fencing around the central portion, established to protect threatened flora species, will be maintained and designated as a no-go zone per Annexure B Clearing Protocol of the HLW BMP.

The following controls apply to mitigate impacts associated with Feral Horses within the HLW Area:

- The horse-exclusion fencing around the central portion of McPhersons Plain (to prevent impacts to threatened flora species) will be maintained.
- Stock-proof fencing of laydown areas, spoil sites and erosion controls where horse entry may cause damage. Fencing is to include gates that remain closed when not in active use, including signage to inform staff of requirement.

5.3. Disposal

Weeds removed during clearing, as well as weedy vegetative material and weed seed collected in washdown facilities, will be disposed of at a licenced waste management facility in accordance with the *Biosecurity Act 2015* and *Protection of the Environment Operations Act 1997.*

5.4. Biosecurity outbreak

Biosecurity outbreaks occur when unknown or unexpected animal and plant diseases and pests, such as Red Imported Fire Ants (*Solenopsis Invicta*), occur on a site. No known risks of biosecurity outbreaks occur within the HLW Area or surrounds, however outbreaks have potential to occur. This plan will reduce the likelihood of introduction of biosecurity risks, however if unknown pest or pathogens are identified or suspected on-site, all HLW personnel have a responsibility to report to the Environmental Manager or Construction Manager. Suspected sightings and identifications are to be reported to DPI's Invasive Plants and Animals department on 1800 680 244.

If a suspected outbreak is recorded, reasonable action must be taken to isolate the incident. All staff should be notified, and the area contained. For information on current outbreaks in NSW, refer to the Department of Primary Industries website.

5.5. Summary of biosecurity management measures

All biosecurity management measures outlined in this plan have been summarised in Table 5-6 below. These will be implemented to minimise biosecurity impacts from HLW and ensure all commitments and requirements of approval will be adhered to. These specific management and mitigation measures have been developed to address the relevant requirements of applicable legislation, the MCoA, the CoMA, the UMM and all Planning Approval Documentation, particularly the Revised BDAR.

A summary of all management and mitigation measures relevant to the HLW BMP is provided in Section 7.13 of the BMP.

Table 5-6 Biosecurity management and mitigation measures

ID	Measure/Requirement	When to implement	Responsibility	Reference	Evidence
BMP25	Baseline weed surveys will be complete during pre-clearing surveys, including the identification of weed species present, density and location of weeds, and physical demarcation of weed restricted areas	Pre-construction	Environmental Manager Project Ecologist	MCoA B30 UMM B3, B8, B9 and B22	Project Ecologist confirmation Updated sensitive area maps and HLW GIS Pre-clearing Report
BMP26	A soil sampling program be undertaken prior to construction by a suitably qualified person(s) to test for presence/absence of *Phytophthora* within the HLW Area. Soil sampling will be undertaken within the HLW Area, including key areas such as at vehicle washdown (to ensure that hygiene measures are effective) and around key infrastructure areas and roads where there is movement of vehicles, vessels, plant and machinery.	Pre-construction	Environmental Manager Project Ecologist	MCoA B30 UMM B3, B8, B9 and B22	Soil sampling results

ID	Measure/Requirement	When to implement	Responsibility	Reference	Evidence
BMP27	All suppliers of plant and equipment, HLWJV and contractors will be informed of their general obligation under the *Biosecurity Act 2015* to prevent the introduction and spread of diseases, weeds and contaminants. The suppliers will be expected to present their materials and equipment clean and free of dirt, mud, seed and biological materials including weeds, seeds, pathogen and other organisms. Suppliers will complete the Hygiene Declaration Form provided in Attachment 1 prior to entry onsite.	Pre-construction and Construction	All staff	MCoA B30 UMM B3, B8, B9 and B22	Hygiene Declaration Form records
BMP28	Hygiene checkpoints will be established at or prior to access points onsite to carry out visual inspections of plant and equipment to ensure compliance with the Hygiene Declaration Form. Where cleanliness standards are not met, site entry will be refused, and thorough off-site wash down at an appropriate facility will be required prior to site access being granted	Pre-construction and Construction	Environmental Manager Construction Manager	MCoA B30 UMM B3, B8, B9 and B22	Site audit records
BMP29	Onsite washdown stations will accompany restricted areas and be contained, Transgrid approved, and away from production and other sensitive areas. Washdown areas will be located at major access points, HLW compound sites and no-go zones, as permissible with relevant Property Management Plans. Washdown procedure detailed in this plan will be followed.	Pre-construction and Construction	Environmental Manager Construction Manager	MCoA B30 UMM B3, B8, B9 and B22	Site audit records

ID	Measure/Requirement	When to implement	Responsibility	Reference	Evidence
BMP30	Restricted areas (i.e., weed/ pathogen dominated areas, weed/ pathogen topsoil stockpiles) will be demarcated and signposted. These areas will be subject to weekly inspection to ensure the flagging, signage and washdown areas are in place and functioning	Pre-construction and Construction	Environmental Manager Construction Manager	MCoA B30 UMM B3, B8, B9 and B22	Site audit records
BMP31	To minimise the risk of increased predator and pest activity, the following controls will be implemented: • The horse-exclusion fencing around the central portion of McPhersons Plain (to prevent impacts to threatened flora species) will be maintained. • Stock-proof fencing of laydown areas, spoil sites and erosion controls where horse entry may cause damage. Fencing is to include gates that remain closed when not in active use, including signage to inform staff of requirement. • No feeding or interactions with feral horses or any other fauna. • Staff inductions will include awareness training on: ◦ Avoiding conflict or attraction (e.g., leaving food waste accessible). ◦ Reporting sightings or damage.	Pre-construction and Construction	All staff	MCoA B30 UMM B3, B8, B9 and B22	Site audit records

ID	Measure/Requirement	When to implement	Responsibility	Reference	Evidence
BMP32	Weed control program within the HLW Area will involve physical and chemical methods as detailed in this plan: • A weed control contractor will be employed to implement chemical weed control for HLW as the primary means of eradicating or mitigating against the spread of weeds. • Topsoil from areas identified as dominated by weeds will be stockpiled separately from 'clean' topsoil. • Appropriate weeds are to be physically removed and disposed of at a licenced waste management facility.	Construction	Environmental Manager Weed Control Contractor Project Ecologist	MCoA B30 UMM B3, B8, B9 and B22	BMP Monitoring Report
BMP33	Annual weed monitoring will be conducted to determine weed cover for the HLW Area, inform the location and extent of controls and monitor cycles of weed growth and novel weed establishment. Annual pathogen monitoring will occur to test for presence/absence of *Phytophthora* within the HLW Area. Monitoring methods to follow those detailed in this plan.	Construction	Environmental Manager Project Ecologist	MCoA B30 UMM B3, B8, B9 and B22	BMP Monitoring Report
BMP34	All HLW personnel must report suspected emerging weeds, pest or pathogens immediately to the Environmental Manager or Construction Manager. Suspected sightings are to be reported to DPI's Invasive Plants and Animals department on 1800 680 244.	Pre-construction and Construction	All staff Environmental Manager Construction Manager	MCoA B30 UMM B3, B8, B9 and B22	Site audit records

6. Compliance management

6.1. Monitoring and inspection

6.1.1. Baseline weed monitoring

Prior to the commencement of clearing, weeds will be mapped within the HLW Area during pre-clearing surveys. Given the large area of impact associated with HLW, weed mapping may be undertaken on-foot, using drones or using binoculars to assess larger areas from a vantage point. The surveys will include the identification of weed species present, including density and location, and will include the physical demarcation of weed restricted areas. Results of baseline weed monitoring, particularly locations of weed restricted areas, will be used to confirm sensitive area maps and update HLW GIS.

6.1.2. Ongoing weed monitoring

Weed monitoring will continue annually during construction works to determine weed cover for the HLW Area, inform the location and extent of controls and monitor cycles of weed growth and novel weed establishment. For the first monitoring event, it is necessary to install permanent markers (e.g., star picket marked/flagged with monitoring location name) and record the coordinates of each monitoring location in order to relocate for subsequent monitoring events. Monitoring will be conducted via transects as follows:

- A series of transects are to be undertaken within the HLW Area at the following intervals: .
    - Every 250 m in:
        - Areas with known weed infestations.
        - High-conservation value vegetation (e.g., TECs or SAII flora species polygons).
        - Within rehabilitated areas per Annexure G Rehabilitation Plan of the HLW BMP.
    - Every 1,000 m in:
        - Cleared or low-value grazing lands.
        - Low condition, non-sensitive vegetation.
- The line-point intercept method will be used along each transect.
- At each interval, the cover of weed species will be measured, using a straight rod. Any intercepts or “hits” of a weed species on the rod will be recorded as present (with one being the upper limit for each stratum at each point). No intercepts of weed species at each stratum records a zero.
- As data is collected along each transect, the cover (%) of weeds for each stratum (exotic shrubs <1 m, exotic grasses and exotic ground cover) is calculated by dividing the number of hits by the number of transects, then multiplying it by 100.
- As data is collected along each transect, the cover (%) of each stratum of weeds is calculated by determining the average cover at each interval.

6.1.3. Pathogen monitoring

A soil sampling program will be undertaken prior to construction by a suitably qualified person(s) to test for presence/absence of *Phytophthora* within the HLW Area. Soil sampling will be undertaken within the HLW Area at key areas such as access points, vehicle washdown stations (to ensure that hygiene measures are effective) and compounds where there is movement of vehicles, vessels, plant and machinery. Initial sampling to occur during pre-construction to compile baseline data and generate occurrence maps (as determined by results), followed by annual monitoring events during construction.

For each monitoring location, several small sub-samples should be collected and combined into a

single representative sample for that location. The collection of each sub sample will involve:

- Use a sterile garden trowel to scrape away surface leaf litter.
- Dig a small hole, collect a small amount of soil and living plant roots (the hole does not need to be any deeper than 10 cm and you only need 100-250 grams of soil).
- Place combined samples into a new, thick zip-lock plastic bag.
- Label the bag with date, monitoring site code and sample number (e.g., 19/10/2025, AccomCamp1).
- Place into a second bag to prevent cross contamination and as a safeguard against breakage.
- Store soil samples in a cool, dark place and dispatch for analysis as practicable after sampling.
- After each sample, scrub your hands and the trowel thoroughly with methylated spirits to disinfect them and prevent cross-contamination of samples.
- Send samples to a suitable laboratory to analyse for *Phytophthora*. The samples are to be stored in temperatures below 24° C, and with ice bricks that do not directly have contact with the samples.

Monitoring data (laboratory results) for each monitoring location is to be kept in a spreadsheet with additional results added after each monitoring period.

6.2. Incidents and non-compliances

Non-conformances, incident reporting and subsequent investigation will be undertaken as required in accordance with the Trigger Action Response Plan (TARP) provided in Table 6-1 below. HLWJV will promptly advise Transgrid on events that are non-conforming with this plan.

Table 6-1 Biosecurity Management Plan TARP

Objective	Target	Performance indicator	Method of monitoring	Frequency	Trigger	Action/response plan
Minimise spread of weeds	Control weeds identified during baseline monitoring.	Weed densities are decreasing from baseline values.	Ongoing weed monitoring.	Annually (during construction).	Weed density increasing from baseline values.	Continue monitoring and implement weed control measures.
	Identify if previously unrecorded weed species are present and establish weed management measures or investigations.	No new weeds established.	Ongoing weed monitoring.	Annually (during construction).	New weed species/location identified within HLW Area.	Report new weed presence to Transgrid. Develop and implement weed management options to control new weeds. Investigate the source of weed spread and implement improvements to weed management measures. Transgrid will report any new weed presence to NSW DPI, if the species is a Prohibited Matter such as *Parthenium hysterophorus*.
Prevent spread of pathogens	Identify previously unrecorded *Phytophthora* presence within	No new records of *Phytophthora* within HLW Area. No evidence of	Soil monitoring Ongoing weed monitoring.	Annually (during construction).	• Soil sample returns a positive result for *Phytophthora.*	Report new *Phytophthora* presence to Transgrid. Develop and implement pathogen management options. Investigate the source of pathogen spread

Objective	Target	Performance indicator	Method of monitoring	Frequency	Trigger	Action/response plan
	the HLW Area.	vegetation dieback.			• *Phytophthora* die back identified.	and implement improvements to pathogen management measures.
		No spread of *Phytophthora* within HLW area.	Implementation of hygiene protocols for vehicles travelling into, through and exiting the any known areas of infestation.	Annually (during construction)	• Hygiene protocols not followed correctly.	Re-train workers on hygiene protocols. Review and implement pathogen management options. Ensure vehicles are adequately disinfected. Report new potential *Phytophthora* location to TransGrid.
Prevent infectious disease impacting amphibians.	Known biosecurity threats to threatened species or populations result from activities in the HLW Area. Loss of amphibian species.	Infection of frogs by amphibian chytrid causing the disease *chytridiomycosis*	Monitoring of populations. Implementation of specific hygiene protocols for vehicles travelling into, through and exiting the any known areas of infestation.	Annually (during construction)	• Hygiene protocols not followed correctly. • Spread of target disease in amphibian populations (known or unknown source)	Re-train workers on hygiene protocols. Review and implement disease management options relating to amphibian species. Ensure vehicles are adequately disinfected. Report new potential *chytridiomycosis* location to TransGrid.
Prevent spread of infectious	Known biosecurity threats to threatened	Introduction and establishment of exotic rust fungi	Monitoring of populations. Implementation	Annually (during construction)	• Hygiene protocols not followed correctly.	Re-train workers on hygiene protocols. Review and implement pathogen

Objective	Target	Performance indicator	Method of monitoring	Frequency	Trigger	Action/response plan
fungi through HLW.	species or populations result from activities in the HLW Area. Loss of flora or infection of *Myrtaceae* species.	of the order *Pucciniales* pathogenic on plants of the family *Myrtaceae*	of specific hygiene protocols for vehicles travelling into, through and exiting the any known areas of infestation.		• Spread of target disease in amphibian populations (known or unknown source) • Loss of flora with symptoms of *Pucciniales.*	management options. Ensure vehicles are adequately disinfected. Report new potential *Pucciniales* location to TransGrid. If possible, prevent further vehicles travelling through known infected location.

6.3. Reporting

6.3.1. Pre-clearing report

Pre-clearing reports will include results from baseline weed monitoring detailed in Section 6.1.1. Pre-clearing reports are to include the following information:

- Weed species identified, including locations (figures) and estimates of density.
- Recommended weed control measures based on confirmed weed species occurrence.
- Locations of weed restricted areas.

6.3.2. Annual report

As stated in the HLW BMP, an annual BMP Monitoring Report will be prepared to document the biosecurity mitigation measures implemented during construction works. This report would include the following matters of relevance to weed and pathogen management:

- Details on the weed control actions undertaken since the last report, including;
    - o A list of the control activities undertaken.
    - o A map of areas where control activities were undertaken.
- A comparative analysis of baseline data.
- The efficacy of the control measures in relation to the objective of minimising weed and pathogen distribution and/or abundance in the HLW Area.
- Recommendations for future control activities.
- A summary of the efficacy of other control measures outlined in this plan and recommendations for revisions to controls.

During construction, any biosecurity issues will be reported to Transgrid immediately.

6.4. Training

All site personnel will undergo site induction training and toolbox talks. Items of relevance to biosecurity that will be covered in training include:

- Identification of weeds on-site.
- Washdown procedures and hygiene standards.
- Any disinfection requirements.

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Attachment 1 Weed and Pathogen Hygiene Declaration Record

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Appendix A - Biosecurity Form

- This form is for use when entering a property that has been declared an emergency zone under the Biosecurity Act 2015.
- Please refer to the Biosecurity Procedure for more information.

  For any assistance with completing this form, please contact the Senior Environment and Sustainability Manager.

Section 1. Details of Work	
Work Dates	
Transmission Line/Structure No.	
Is the work urgent (operational importance)? If so, explain why	
Description of Proposed Work	
Section 2. Biosecurity Information	
Reason for the Emergency Zone	
Conditions of the Emergency Zone	
Is access allowed? Will an approved permit be required from the government?	
Is access allowed? Will an approved permit be required from the government?	

Section 3. Property owners/stakeholders		
Name	Contact details	Details of any known property owner/stakeholder requirements

Section 4. Preparation of the Biosecurity Form

Prepared by:		Signature:	
Position Title:		Date	

Section 5. Approval of the Biosecurity Form

Approved by:		Signature:	
Position Title:		Date:	

Appendix B - Hygiene Check – Digital form

Transgrid

Hygiene Check

Single Submission

Scan this QR code to submit forms via the Sitemate app

Link: sitemate.id/s7ccst

It's easy to use

1. Scan the QR code using your phone or tablet camera
2. Install the Sitemate app and login (or sign up to create your Sitemate ID)
3. Go to the Forms tab, then tap the green button
4. Enter the link above to start submitting forms

Appendix C – Hygiene Check – Paper form

Hygiene Check – Utility Vehicle

SECTION A - Information			
Project / Site			
Property Owner			
Location			
Date	Click here to enter a date.	Name	
Vehicle / Plant Type / Registration No.	Choose an item.		
Driver / Operator			
Travelling / Delivered from			
Travelling / Delivered to			

SECTION B – Hygiene Log		
A) Does the Property have a specific Biosecurity Management Plan or are there known Biosecurity Risks*? If Yes, prior to entry you must contact the Property owner to verify you can comply with the Biosecurity Management Plan. If you cannot comply contact your Environmental Business Partner	☐ YES	☐ NO
B) Does the Property Owner &/or work location require any specific Biosecurity measures/protocols to be undertaken prior to entry/exit?	☐ YES	☐ NO
If Yes to a) or b) detail requirements:		
C) Is the vehicle clean & have any specific requirements identified in a) or b) been addressed? (i.e. free of all mud, seed, vegetative material, bio-security risks such as insects, animals, nests, etc) A Hygiene Check (Section C) must be completed.	☐ YES	☐ NO
If No to **C)** what remedial action has been carried out. ☐ onsite wash-down / disinfection prior to entry ☐ offsite wash-down / disinfection prior to entry, ☐ entry not undertaken ☐ Other:		

*known Biosecurity Risk includes areas/locations where a specific weed or pathogen is known to occur or where the stakeholder/property owner requests specific Biosecurity Protocols are followed.

Section C Hygiene Check - Light Vehicles & Trucks / Trailers ☐ YES Clean ☐ NO Not Clean							
Floor Wells / Mats	☐ YES	☐ NO	☐ NA	Mud Flaps	☐ YES	☐ NO	☐ NA
Engine Bay	☐ YES	☐ NO	☐ NA	Rims	☐ YES	☐ NO	☐ NA
Grill / Radiator	☐ YES	☐ NO	☐ NA	Side Steps	☐ YES	☐ NO	☐ NA
Bonnet recess	☐ YES	☐ NO	☐ NA	Underbody	☐ YES	☐ NO	☐ NA
Wheels / Spares	☐ YES	☐ NO	☐ NA	Suspension	☐ YES	☐ NO	☐ NA
Wheel arches	☐ YES	☐ NO	☐ NA	Tool Boxes	☐ YES	☐ NO	☐ NA
Tray	☐ YES	☐ NO	☐ NA	Other	☐ YES	☐ NO	☐ NA

SECTION D– Verification (I the undersigned declare that the information that I have provided is true & correct)			
Name			
Signature		Date	
Date			

*Declaration must be signed & dated prior to Site entry.

Appendix D Hygiene Check – Mobile Plant

Hygiene Check – Mobile Plant			
SECTION A - Information			
Project / Site			
Location			
Date	Click here to enter a date.	Name	
Vehicle / Plant Type	Choose an item.		
Vehicle / Plant Number / Registration No.			
Driver / Operator / Supplier			
Travelling / Delivered from			
Travelling / Delivered to			

SECTION B – Hygiene Log		
A) Does the Property have a specific Biosecurity Management Plan or are there known Biosecurity Risks*? If Yes, prior to entry you must contact the Property owner to verify you can comply with the Biosecurity Management Plan. If you cannot comply contact your Environmental Business Partner	☐ YES	☐ NO
B) Does the Property Owner &/or work location require any specific Biosecurity measures/protocols to be undertaken prior to entry/exit?	☐ YES	☐ NO
If Yes to a) or b) detail requirements:		
C) Is the vehicle clean & have any specific requirements identified in a) or b) been addressed? (i.e. free of all mud, seed, vegetative material, bio-security risks such as insects, animals, nests, etc) A Hygiene Check (Section C) must be completed.	☐ YES	☐ NO
If No to **C)** what remedial action has been carried out. ☐ onsite wash-down / disinfection prior to entry ☐ offsite wash-down / disinfection prior to entry, ☐ entry not undertaken ☐ Other:		

*known Biosecurity Risk includes areas/locations where a specific weed or pathogen is known to occur or where the stakeholder/property owner requests specific Biosecurity Protocols are followed.

Section C Hygiene Check - Mobile Plant	☐ bulldozer, ☐ excavator, ☐ roller, ☐ loader, ☐ grader, ☐ crane, ☐ EWP, ☐ mulcher / slasher, ☐ bobcat / skid steer, ☐ mulcher / slasher ☐ Moxi										
Interior / Cabin											
Foot well / interior	☐ YES	☐ NO	☐ NA	Floor mats	☐ YES	☐ NO	☐ NA	Ladder / Steps	☐ YES	☐ NO	☐ NA
Body / Booms / Engine Bay											
Engine Bay	☐ YES	☐ NO	☐ NA	Chassis / Frames	☐ YES	☐ NO	☐ NA	Grill / Radiator	☐ YES	☐ NO	☐ NA
Rams/Hoses	☐ YES	☐ NO	☐ NA	Booms	☐ YES	☐ NO	☐ NA	Counterweights	☐ YES	☐ NO	☐ NA
Tracks, Rollers, Drums, Tyres											
Guards / wheel arches / tyres	☐ YES	☐ NO	☐ NA	Frames	☐ YES	☐ NO	☐ NA	Tracks / Rollers	☐ YES	☐ NO	☐ NA
Buckets, Blades, Rippers, Augers											
Blades / tines	☐ YES	☐ NO	☐ NA	Buckets	☐ YES	☐ NO	☐ NA	Augers	☐ YES	☐ NO	☐ NA
Mulcher / slasher	☐ YES	☐ NO	☐ NA	Other					☐ YES	☐ NO	☐ NA

SECTION D– Declaration of Remedial Actions* (I the undersigned declare that the information that I have provided is true and correct)			
Have remedial actions been undertaken (if required)?	☐ YES	☐ NO	☐ NA

Name			
Signature		Date	
Date			

*Declaration must be signed and dated prior to Site entry.

Annexure F Connectivity Strategy

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Annexure F

Connectivity Strategy

HumeLink West

Document Number: HLW-HLJV-PRW-ENM-PLN-000001F

Revision: 7

TransGrid

Date 22/05/2026

Document Control

Approvals

Title	HumeLink West Connectivity Strategy
Endorsed by Environment Representative	[redacted] (Wolfpeak Group Ltd Pty)
Approved on behalf of HLWJV by	[redacted]
Signed	
Dated	

Version Control

Revision	Date	Description	[redacted]	
A	26/03/2024	Preliminary draft		
B	30/05/2024	Updated format and structure		
C	3/07/2024	Updates following receipt of UMMs and HLW mapping files		
D	19/08/2024	Update following TG review		
1	14/03/2025	Updates following receipt of final MCoA & CoMA		
2	4/06/2025	Updates following ER, FCNSW & CPHR review		
3	28/07/2025	Updates following ER & CPHR review		
4	30/07/2025	Updates from Client to achieve consistency across project		
5	08/08/2025	Updates following CPHR review		
6	12/08/2025	Updates following CPHR review		
7	22/05/2026	Minor update to reference Conductor Line-Marking Plan (s4.6)		

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The document is uncontrolled when printed. One controlled hard copy of the CEMP and supporting documentation will be maintained by the Quality Manager at the HLW office (and on the HumeLink website link to be provided).

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Abbreviations

Abbreviation	Expanded text
BC Act	*Biodiversity Conservation Act 2016* (NSW)
BCS	Biodiversity Conservation and Science group within DCCEEW – NSW (now referred to as CPHR)
BDAR	Biodiversity Development Assessment Report
BMP	Biodiversity Management Sub-plan
CEMP	Construction Environmental Management Plan
CoMA	Commonwealth Conditions of Ministerial Approval
CPHR	Conservation Programs, Heritage & Regulation (formerly BCS) group within DCCEEW - NSW
Cth	Commonwealth of Australia
DAWE	Department of Agriculture, Water and the Environment
DBH	Diameter at Breast Height
DCCEEW - Cth	The Commonwealth Department of Climate Change, Energy, the Environment and Water
DCCEEW – NSW[1]	The NSW Department of Climate Change, Energy, the Environment and Water (formerly DPE)
DPE	Department of Planning and Environment (now known as NSW DCCEEW)
DPI	Department of Primary Industries
DPIE	Department of Planning, Industry and Environment (now known as NSW DCCEEW)
DPHI	Department of Planning, Housing and Infrastructure
ECZ	Easement clearing zone
EIS	Environmental Impact Statement
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999* (Cth)
FCNSW	Forestry Corporation New South Wales
GDE	Groundwater Dependent Ecosystems
GIS	Geographic Information System
GPS	Global Positioning System
HLW	The HumeLink West Stage of the HumeLink project
HLWJV	HumeLink West Joint Venture (UGL Limited and CPB Contractors)
HLW Area	Areas within and adjacent to the approved disturbance footprint of the

[1] As of the 1st January 2024 the NSW Department of Planning and Environment has split into the Department of Climate Change, Energy, the Environment and Water (NSW) and the Department of Planning, Housing and Infrastructure. DCCEEW (NSW) includes the environmental regulators (such as NSW EPA, BCS, NPWS, DPE-Water), while the Department of Planning, Housing and Infrastructure (DPHI) includes planning regulatory services.

Abbreviation	Expanded text
	HumeLink West Stage of the HumeLink project
HTZ	Hazard Tree Zone
KFH	Key Fish Habitat
MCoA	NSW Minister's Conditions of Approval
NPWS	NPWS
NSW	New South Wales
PCT	Plant Community Type
Project	HumeLink West
Revised BDAR	*HumeLink Biodiversity Development Assessment Report Rev 0* (Niche Environment and Heritage Pty Ltd, June 2024)
RPS	RPS AAP Consulting Pty Ltd
SAII	Serious And Irreversible Impact
TARP	Trigger Action Response Plan
TCZ	Total Clearing Zone
TEC	Threatened Ecological Community
UMM	Updated Environmental Management Measure as outlined in the Planning Approvals Documentation

1. Introduction

1.1. Context

This Connectivity Strategy (the strategy) forms part of the Biodiversity Management Sub-plan (BMP) of the HumeLink West project (HLW) Construction Environmental Management Plan (CEMP). This strategy has been prepared to outline and describe how the UGL Limited and CPB Contractors Joint Venture (HLWJV), during the construction of HLW, will comply with the Minister's Conditions of Approval (MCoA), the Federal Minister for Water and Environment Condition of Ministerial Approval (CoMA), the Updated Management Measures (UMM), and undertake its duties in accordance with the Planning Approval Documentation listed under the MCoA.

1.2. Purpose

This strategy has been developed based on current best practices to minimise and manage the potential fauna connectivity impacts as a result of HLW. The proposed management measures aim to address relevant actions and mitigation measures outlined in the following documents:

- Updated mitigation measures B3, B6, B10, B11 and B28 pf the *HumeLink Revised Biodiversity Development Assessment Report Rev 0* (Revised BDAR; Niche Environment and Heritage Pty Ltd, June 2024).
- Condition B25 and B30 of the Minister's Conditions of Approval (MCoA) A2.
- Condition 2 and 7 of the Federal Minister for Water and Environment Condition of Ministerial Approval (CoMA).

In areas of natural habitat, powerline easements directly replace habitat formerly available to wildlife and disrupt ecological processes, such as predation and animal movements. Altered patterns of species abundance and species composition have also been reported at the edges of habitat fragments (Strevens et al., 2008). Powerline easements remove and periodically suppress vegetation within the vicinity of the powerline to protect the power supply and reduce bushfire risk. This can cause significant ecological impacts by fragmenting habitats and vegetation communities, providing a physical habitat division, barrier to movement and altering species interactions. These impacts are particularly important for gene flow and long-term population viability through reduced dispersal opportunities and loss of metapopulation structure. Aerial species such as birds and bats that fly at heights where transmission lines are located also have a high potential for collision and may be at risk of midair collisions during stringing activities.

1.3. Objective

This strategy's objective is to design the implementation of mitigation measures to ensure fauna corridors and habitat connectivity are maintained across the HLW transmission easement, in line with the UMMs. The scope of this strategy includes:

- Specifying existing habitat connectivity condition, proposed impacts on such features, and identifying connectivity and fauna movement corridors.
- Identifying the entities that require habitat connectivity and collision-risk mitigation measures.
- Identifying proposed mitigation measures to address prescribed impacts associated with habitat connectivity impaired or severed as a result of HLW. This includes retention of connectivity along the HLW alignment and establishment of connectivity corridors as identified through the process set out in section 4 - 4.5.
- Detailing the desktop and field investigations required to identify the location of connectivity corridors.
- Adopting project design elements that minimise interactions with threatened entities such as conductor line-markers as fauna deterrents.

- Detailing compliance management measures and procedures.
- Outlining a monitoring program to assess the efficacy of connectivity mitigation measures.
- Prescribing threshold triggers for the implementation of adaptive management measures.

2. Environmental requirements

2.1. Relevant documents and guidelines

The main document relevant to this strategy is the Transgrid Connectivity Review Letter (July, 2025) which reviewed the species associated with the connectivity corridors identified in Table A24-10 of the *HumeLink Biodiversity Development Assessment Report Rev 0* (Revised BDAR; Niche Environment and Heritage Pty Ltd, June 2024). Five additional corridors were added for inclusion in this review in the cleared landscapes in the Batlow area. The Transgrid Connectivity Review Letter (July, 2025) involved a desk-based spatial analysis to assess:

- Associations between the connectivity corridors and the distribution of relevant threatened species susceptible to habitat fragmentation because of the Project based on the Revised BDAR Species Polygons and Bionet Atlas records from the past 20 years.
- The level of existing habitat connectivity was visually assessed using aerial photography, vegetation cover and classified as:
    - Key riparian crossing
    - Intact vegetation corridor
    - Fragmented vegetation corridor
    - Non-functional corridor (parallel transmission lines)
    - Non-functional corridor (plantation).
- The risk of impacts to connectivity from the approved development footprint was also visually assessed using aerial photography, vegetation cover and classified as:
    - Connectivity maintained – continuous areas of vegetation retained within the corridor
    - Minor impact – limited clearing, such as access tracks, while functional connectivity maintained
    - Moderate impact – partial clearing, while some connectivity likely to persist between patches on each side of the corridor
    - High impact – extensive clearing, majority of vegetation in corridor impacted and connectivity severed.

The conclusions of the Transgrid Connectivity Review Letter (July, 2025) will be reviewed based on the Final Layout Plans and Field Surveys (Section 0) and documented in the Glider Inspection Report (Section 4.5.3) in consultation with CPHR.

This Strategy has been prepared in accordance with the Environmental Management Plan Guidelines (DCCEEW Cth, 2024).

2.2. Permits and licences

The permits and licences relevant to this strategy include:

- All HLW Ecologists must, at a minimum, hold a Scientific Licence under Part 2 of the *Biodiversity Conservation Act 2016* (BC Act), including Animal Ethics Approval, for fauna handling, rescue and all additional survey works.
- Where rescued fauna requires rehabilitation and care, only wildlife rehabilitation centres authorised under Part 2 of the BC Act may be utilised.
- Clearing works to be managed and monitored using internal HLWJV Clearing Permits.

2.3. Preparation of this strategy

In accordance with MCoA B30a, this strategy has been prepared by suitably qualified and experienced

biodiversity experts of RPS AAP Consulting Pty Ltd:

- Polina Zadorojnaya (BSc; BAM Accredited Assessor BAAS 23014).
- Tara Boreham (BSc; BAM Accredited Assessor BAAS 23039).

2.4. Consultation

This strategy was prepared incorporating technical advice provided by Dr Rodney van der Ree, Technical Executive – Ecology, WSP.

All additional consultation undertaken in preparation of this strategy is summarised in Section 4 and Annexure J: Consultation Report of the HLW BMP. If consultation with relevant stakeholders or regulators is required to assess the efficacy of mitigation strategies detailed in this report, these will be undertaken in accordance with Section 8.3 of the HLW BMP.

2.5. Minister's Conditions of Approval

The MCoA relevant to this strategy are listed in Table 2-1. A cross reference is also included to indicate where and how the conditions are addressed in this strategy or other HLW management documents.

Table 2-1 MCoA relevant to this strategy

MCoA No.	Condition Requirements	Document Reference
Restrictions of Clearing and Habitat		
B25	Unless otherwise agreed with the Planning Secretary, the Proponent must: (a) ensure that the vegetation and habitat clearing limits specified in Table 2-1, Table 2-2 and Table 2-3 of Appendix 2 are not exceeded; and	Not addressed in this strategy – refer to the HLW BMP, including Annexure B: Clearing Protocol.
	(b) minimise: (i) The impacts of the development on hollow-bearing trees. (ii) The impacts of the development on threatened flora and fauna populations. (iii) The clearing of native vegetation and key habitat.	This strategy includes provisions for minimising connectivity (Section 4) and collision (Section 4.4) impacts on fauna populations, as well as minimising the clearing of native vegetation and key habitats in connectivity corridors (Section 4.2.1.2).
	(c) not undertake any works that result in ground disturbance within a minimum setback distance of 50 metres from PCT 637 – Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion and 30 metres from known locations of *Prasophyllum bagoense, Prasophyllum keltonii* and *Pterostylis oreophila* as mapped in the BDAR.	Not addressed in this strategy – refer to the HLW BMP, including Annexure B: Clearing Protocol.
Biodiversity Management Plan		
B30	Prior to carrying out any development (excluding Enabling Works, if the relevant requirements of this condition are adequately addressed in the Enabling Works Management Plan of condition B64) that could impact	This strategy forms part of the HLW BMP.

MCoA No.	Condition Requirements	Document Reference
	biodiversity values that require offsetting, the Proponent must prepare a Biodiversity Management Plan for the development to the satisfaction of the Planning Secretary. This plan must:	
	(a) be prepared by a suitably qualified and experienced biodiversity expert/s;	Section 2.3 and 2.4.
	(b) be prepared in consultation with CPHR and FCNSW;	Section 2.4.
	(c) be prepared generally in accordance with the *Revised Biodiversity Development Assessment Report* (Revision 0, dated 21 June 2024);	Section 2.1 and Table 2-3.
	(d) include a description of the measures that would be implemented for: (i) meeting the biodiversity mitigation requirements in condition B25 and as required by condition B29;	Not addressed in this strategy – refer to HLW BMP.
	(ii) minimising: ▪ the amount of vegetation clearing on site; ▪ the loss of key fauna habitat (including tree hollows); ▪ the impacts of fauna on site, including undertaking pre-clearance surveys; and ▪ potential indirect impacts on threatened flora and fauna species;	This strategy includes provisions for minimising connectivity (Section 4) and collision (Section 4.4) impacts on fauna populations, as well as minimising the clearing of native vegetation and fauna habitat within connectivity corridors (Section 4.2.1.2).
	(iii) ensuring the development does not adversely affect the native vegetation and habitat outside the disturbance footprint;	Not addressed in this strategy – refer Annexure B: Clearing Protocol of the HLW BMP.
	(iv) protocols for unexpected finds of threatened species and threatened ecological communities within the disturbance footprint including the requirements for: ▪ all work in the associated location to stop to prevent further impact, and	Not addressed in this strategy – refer to Annexure D: Unexpected Finds Procedure of the HLW BMP.

MCoA No.	Condition Requirements	Document Reference
	▪ notification to the Planning Secretary and CPHR (and AG DCCEEW where relevant) in writing on any additional mitigation measures to be implemented; and ▪ relevant agencies to be consulted and the Planning Secretary to endorse recommencement of work;	
	(v) connectivity strategy for the potentially impacted species identified in the Revised Biodiversity Development Assessment Report (Revision 0, dated 21 June 2024) and a Supplementary Hollow and Nest Strategy;	This strategy addresses the requirement for a connectivity strategy. Refer to Annexure C: Hollow and Nest Strategy of the HLW BMP.
	(vi) protecting the conservation values of McPhersons Plain and avoiding impacts to Prasophyllum bagoensis, Prasophyllum keltonni and Pterostylis oreophila;	Not addressed in this strategy – refer Annexure G: Rehabilitation Plan of the HLW BMP.
	(vii) rehabilitating temporary disturbance areas to facilitate natural regeneration of suitable native species;	Not addressed in this strategy – refer Annexure H: Biodiversity Monitoring Program of the HLW BMP.
	(viii) progressively monitoring the areas of partial clearance following the commencement of construction and provision of a verification report every three months during construction to confirm the assumptions made in the BDAR regarding partial clearance within the Easement Clearing Zone and whether any changes are required to this plan;	Not addressed in this strategy – refer Annexure H: Biodiversity Monitoring Program of the HLW BMP.
	(ix) maximising the salvage of resources within the approved disturbance area – including vegetative and soil resources – for beneficial reuse (such as fauna habitat enhancement) during the rehabilitation and revegetation of the site;	This strategy includes provisions for the reuse of salvaged resources within connectivity corridors (Section 4.2.1.2) Refer to Annexure G: Rehabilitation Plan of the HLW BMP for additional measures to address this condition.

MCoA No.	Condition Requirements	Document Reference
	(x) collecting and propagating seed (where relevant);	Not addressed in this strategy – refer Annexure G: Rehabilitation Plan of the HLW BMP.
	(xi) controlling erosion, weeds and feral pests;	Not addressed in this strategy – refer to Annexure G: Rehabilitation Plan of the HLW BMP.
	(xii) bushfire management;	Not addressed in this strategy – refer to Annexure E: Biosecurity Management Plan of the HLW BMP.
	(xiii) minimising impacts on entities at risk of a serious and irreversible impact (SAII), including for Box Gum Woodland, Rice Flower (Pimelea bracteata) and Sooty Owl (Tyto tenebricosa) and other entities that are identified as requiring mitigation measures in the Biodiversity Assessment Verification Report required by condition B29 and the additional mitigation measures outlined in the additional information (Transgrid proposal dated 2 September 2024) within three years of the date of the Project Approval (over and above the relevant credit obligations); and	This strategy includes provisions for minimising collision risk for the Sooty Owl (Section 4.4).
	(e) be prepared in consultation with CPHR and FCNSW.	Section 5.
	Following the Planning Secretary's approval, the Proponent must implement the Biodiversity Management Plan. *Note: The Biodiversity Management Plan must incorporate all relevant aspects of the development, including Enabling Works consistent with the requirements of condition B67.*	Noted.

2.6. Federal Minister for Water and Environment Condition of Ministerial Approval

The CoMA relevant to this strategy are listed in Table 2-2. A cross reference is also included to indicate where and how the conditions are addressed in this strategy or other HLW management documents.

Table 2-2 CoMA relevant to this strategy

CoMA No.	Condition Requirements	Document Reference
Clearing Limits		
2	To avoid and mitigate harm to protected matters, the approval holder must comply with condition B25 of the NSW approval to the extent that it relates to protected matters.	Refer Table 2-1.
Biodiversity Management Plan		
7	The approval holder must comply with condition B30 of the NSW Approval. The Biodiversity Management Plan must be prepared in accordance with the Environmental Management Plan Guidelines and condition B30 of the NSW Approval.	Refer Table 2-1.

2.7. Environmental Management Measures

UMMs relevant to this strategy are listed in Table 2-3 below. A cross reference is also included to indicate where and how the conditions are addressed in this strategy or other HLW management documents.

Table 2-3 UMMs relevant to this strategy

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
Biodiversity				
B3	A Biodiversity Management Plan (BMP) will be prepared in consultation with NSW DCCEEW Environment and Heritage and approved by DPHI prior to construction. The BMP will be prepared by a qualified ecologist and include a plan for implementing, evaluating and reporting on the effectiveness of all	Detailed design and construction	All locations	This strategy forms part of the HLW BMP.

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
	mitigation measures outlined in Technical Report 1 – Revised Biodiversity Development Assessment Report, including:			
	• Measures to minimise impacts to biodiversity, including measures to reduce disturbance to sensitive flora and fauna procedures for clearing of vegetation, including pre-clearing inspections and procedures for the relocation of flora and fauna.			This strategy includes provisions for minimising connectivity (Section 4) and collision (Section 4.4) impacts on fauna populations, as well as minimising the clearing of native vegetation and fauna habitat within connectivity corridors (Section 4.2.1.2).
	• Preparation of a fauna handling and rescue procedure to be implemented during construction and operation for the ethical handling of injured or displaced fauna. Further, the fauna handling and rescue procedure would include an incident reporting protocol for fauna relocations, rescue and rehabilitation, euthanasia and/or fatality.			Not addressed in this strategy – refer Annexure B: Clearing Protocol of the HLW BMP.
	• Procedures for the demarcation and protection of retained vegetation, including vegetation adjacent to construction areas and during weed management.			
	• Vegetation clearing procedures for a two staged habitat removal process required for removal of key habitat features (hollow-bearing trees, habitat trees, and bushrock) identified in *Technical Report 1 – Revised Biodiversity Development Assessment Report* and/or pre-clearing inspection. Including procedures to record the effort and outcomes of the habitat removal process.			

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
	• Retention of habitat features such as rocky outcrops, surface rock, dead wood, logs, wherever practicable.			This strategy includes provisions for the retention of habitat features within connectivity corridors (Section 4.2.1.2) Refer to Annexure G: Rehabilitation Plan of the HLW BMP for additional measures to address this condition.
	• Proposed rehabilitation of temporary disturbance areas including management and maintenance measures.			Not addressed in this strategy – refer Annexure G: Rehabilitation Plan of the HLW BMP.
	• Unexpected species finds protocol to be implemented if threatened ecological communities, flora and fauna species, not assessed in *Technical Report 1 – Revised Biodiversity Development Assessment Report*, are encountered during pre-clearing inspections.			Not addressed in this strategy – refer Annexure D: Unexpected Finds Procedure of the HLW BMP.
	• A description of biosecurity protocols for plant and equipment movement between sites, including species specific measures.			Not addressed in this strategy – refer Annexure E: Biosecurity Management Plan of the HLW BMP.
	• Education of construction teams regarding the presence of native fauna and risks of vehicle collision, particularly early in the morning and late in the afternoon/at night; implementation of speed limits on sealed and unsealed tracks and roads.			Section 4.4, refer to HLW BMP for additional information.

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
	• Outline monitoring and compliance management requirements.			Section 5
	• Approach to relocation of nests by suitably qualified ecologist where found within construction work sites (ie nests found in hazardous areas will be translocated to nearby safe areas, direct handling of eggs and chicks will be avoided where possible). This could include potentially new poles/nest platforms.			Not addressed in this strategy – refer Annexure C: Hollow and Nest Strategy of the HLW BMP.
	• Details on the pre-clearing and clearing supervision process.			Not addressed in this strategy – refer Annexure B: Clearing Protocol of the HLW BMP.
	• Procedures for consultation with DPI Fisheries and pre-construction survey (where required) for threatened aquatic species should be established (and Commonwealth DCCEEW for Riek's Crayfish, as required), along with processes for reporting and consideration of recommendations into design and construction methods, as relevant.			Not addressed in this strategy – refer Section 7.7 of the HLW BMP.
	• Procedures for reporting the outcomes of pre-construction aquatic biodiversity surveys (where required under mitigation measure B33) at CLASS 1 crossing locations (new and upgraded tracks) potentially supporting threatened aquatic species and any management measures to be implemented (eg timing construction outside of breeding seasons, crossing type, micro siting).			
	• Procedures for the stockpiling and supply of felled trees for KFH rehabilitation or improvement works, including procedures for consultation with DPI Fisheries.			Not addressed in this strategy – refer Annexure G: Rehabilitation Plan of

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
				the HLW BMP.
	The BMP will include adaptive management measures for uncertain/ indirect/ prescribed impacts and a biodiversity monitoring program. The adaptive management measures would detail procedures for uncertain impacts, risk associated with potential failure of mitigation, circumstances where avoidance may not be achievable and prescribed impacts. The adaptive management measures would be underpinned by monitoring programs, to provide early warning of ineffective measures and/or uncertain impacts occurring. The adaptive management measures would include: • performance criteria to guide monitoring • measurable thresholds to identify when remedial action is triggered • adaptive management response/actions • a trigger for additional credit obligations and/or conservation measures for uncertain, indirect or prescribed impacts, where these impacts cannot be adaptively managed • reporting requirements. The adaptive management measures and monitoring program will be developed to target specific species considered to be most at risk of significant impacts, as determined during the detailed design phase. The BMP will stipulate objectives for monitoring, reporting and evaluation, and how baseline data will be captured and represented.			Not addressed in this strategy – refer Annexure H: Biodiversity Monitoring Program of the HLW BMP.
B6	The design and construction methodology for the project must identify additional avoidance and minimisation measures to further reduce impacts to entities which are likely to have a serious and irreversible impact to the greatest extent practicable. Opportunities for intact and/ or higher condition remnants should	Detailed design	Where SAII candidate species considered likely to	Section 4.1. Refer to HLW BMP for additional measures.

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
	be prioritised for avoidance incorporating consideration of connectivity between retained remnants within and adjacent to the amended project footprint must be considered in the connectivity strategy.		result in SAII are mapped	
B10	As a part of the BMP (refer to mitigation measure B3), a Connectivity Strategy will be developed in consultation with NSW DCCEEW Environment and Heritage. The core objectives of the strategy will be to outline the final locations of the proposed mitigation measures identified within *Technical Report 1 – Revised Biodiversity Development Assessment Report*. The Connectivity Strategy will be implemented to maintain connectivity in areas identified as facilitating fauna movement. Consideration of connectivity corridors will occur as a minimum at:	Detailed design and construction	Transmission line corridor at strategic locations (as identified in *Technical Report 1 - Revised Biodiversity Development Assessment Report; Attachment 24, Figure 13-2*	This strategy has been developed to address this condition.
	• key riparian crossings			Section 4.2.1.3
	• areas of the transmission line joining proposed biodiversity stewardship sites (ie Donna Valley Biodiversity Stewardship Site) and/or conservation reserve estate (ie Tarlo River National Park, Bango Nature Reserve, Mudjarn Nature Reserve and Minjary National Park)			Section 4.2.1.3 Tarlo River National Park, Bango Nature Reserve, Mudjarn Nature Reserve and Minjary National Park are relevant to HumeLink East only and have therefore been excluded from the HLW BMP.
	• transmission line structure locations that occur in woodland vegetation at strategic locations (ie vegetation corridors with moderate to high landscape connectivity, and with moderate to high levels of fauna activity/ movement).			Section 4.2.1.3

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
	The final locations of connectivity corridors and minimum width requirements will be identified. Access tracks will avoid connectivity corridors and favour existing access wherever possible. Construction will avoid and minimise any disturbance of connectivity corridors, where practicable. Connectivity measures such as fauna sensitive structures (ie under transmission glider poles), vegetation stepping stones, or reduced clearing will be considered. Glider connectivity opportunities will be considered in at least six locations within the project footprint that align with glider corridors and opportunities identified in the glider memo (Niche, 2023).			Section 4.2.1
B11	Conductor line-marking techniques will be considered at specific locations identified in *Technical Report 1 – Revised Biodiversity Development Assessment Report* during design refinement to minimise bird strike. Use of fauna deterrent devices, most likely consisting of the "flapper" variety, will be considered. Positioning and exact diverter model will also be considered during detailed design and will be developed as part of the project design. At a minimum, these will be used at sites recommended for specific corridors (refer to *Technical Report 1 – Revised Biodiversity Development Assessment Report, Attachment 24*) where flapper devices are considered warranted based on distribution, and nature of avifauna records, and nearby suitable waterbird habitat (within 1 km). Fauna deterrent methods proposed are outlined in the Connectivity Strategy.	Detailed design	Transmission line corridor – at sites recommended for specific corridors (as identified in *Technical Report 1 – Revised Biodiversity Development Assessment Report; Attachment 24*	Section 4.4.1

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
B28	Micro-siting of infrastructure requiring sub-surface work, such as transmission line structure footings and access tracks, will be undertaken as part of detailed design-stage of the project, to: • minimise prescribed impacts and impacts to native vegetation, where possible including cut and fill • design and micro-siting of new access tracks will seek to avoid or minimise impacts to breeding and sheltering habitat for fauna, including habitat trees and rocky habitats (ie rock outcrops, large boulders, piled rock, and rock features that provide potential sheltering • avoid impacts to groundwater dependent ecosystems (GDEs), aquatic habitats and aquifers • prioritise restoration of disturbed areas within lands of high biodiversity significance including connectivity corridors, intact vegetation remnants and breeding habitat for fauna, including threatened species and ecological communities). Access track corridors will be established with consideration to terrain to minimise cut/fill and vegetation clearing.	Detailed design and construction	Transmission line corridor, construction compounds, accommodation facilities	Section 4.1 and 4.2.1.2. Refer to HLW BMP for additional measures.

‘

3. Background

3.1. Impacts

HLW will involve the establishment of an approximately 151 km long transmission line supported by a series of free-standing lattice structures that would range between 50-76 m in height, spaced between 300-600 m apart. The HLW easements will typically be 70 m wide, however a number of locations may require wider easements of up to 130 m. There are numerous locations where the easement will run parallel to the existing Line 64 and Line 66 easements. This will result in a worsening of existing fragmentation, resulting in a total easement width of 180-200 m wide.

The *HumeLink Vegetation Clearing Method and Management Memorandum* (Rev 1; Transgrid, 2023) was prepared to describe the vegetation clearing methodology proposed for the construction and operation of HLW, as replicated below.

The HLWJV clearing protocol has been developed to consider several 'disturbance zones' to accommodate the various specific clearing requirements of the construction and operational maintenance phases. These zones are described with respect to construction clearing/management requirements and methodology. The zones are summarised below with respect to connectivity. Indicative displays are provided in Plate 3-1 through Plate 3-4.

1. **Total Clearing Zone (TCZ)** – complete clearing of vegetation. Includes transmission line structures, access tracks, substations and telecommunications connections and construction ancillary facilities. Complete clearing of all vegetation.
2. **Easement Clearing Zone (ECZ)** – partial clearing of vegetation to accommodate 500 kV transmission lines at maximum line operating conditions. This includes:
    a. Clearing of all trees (i.e., trees of a sufficient height which, if they were to fall, would strike the overhead conductors or the transmission line structures, or come close enough to result in electrical flashover).
    b. Retention of mid and understorey vegetation (excluding trees) with a mature height up to 5.6 m.
    c. Manual methods used in areas of very high ecological sensitivity (e.g., where endangered orchids are present).
3. **Hazard Tree Zone (HTZ)** – partial clearing. Removal of trees outside of the easement which, if they were to fall, would strike the overhead conductors or the transmission line structures or come close enough to cause electrical flashover and infringe on the VCR at maximum conductor sag. These hazard trees pose a potential bushfire risk, risk to the asset, and require management/removal as part of construction. Clearing works will be managed to minimise impacts to mid and understorey vegetation.

Given the scale and linear nature of HLW, the use of habitat corridors must be broadened to the issue of maintaining connectivity at the landscape scale, rather than on individual patches within the alignment. Landscape patterns that promote connectivity for species, communities and ecological processes are a key element in nature conservation in environments modified by human impacts.

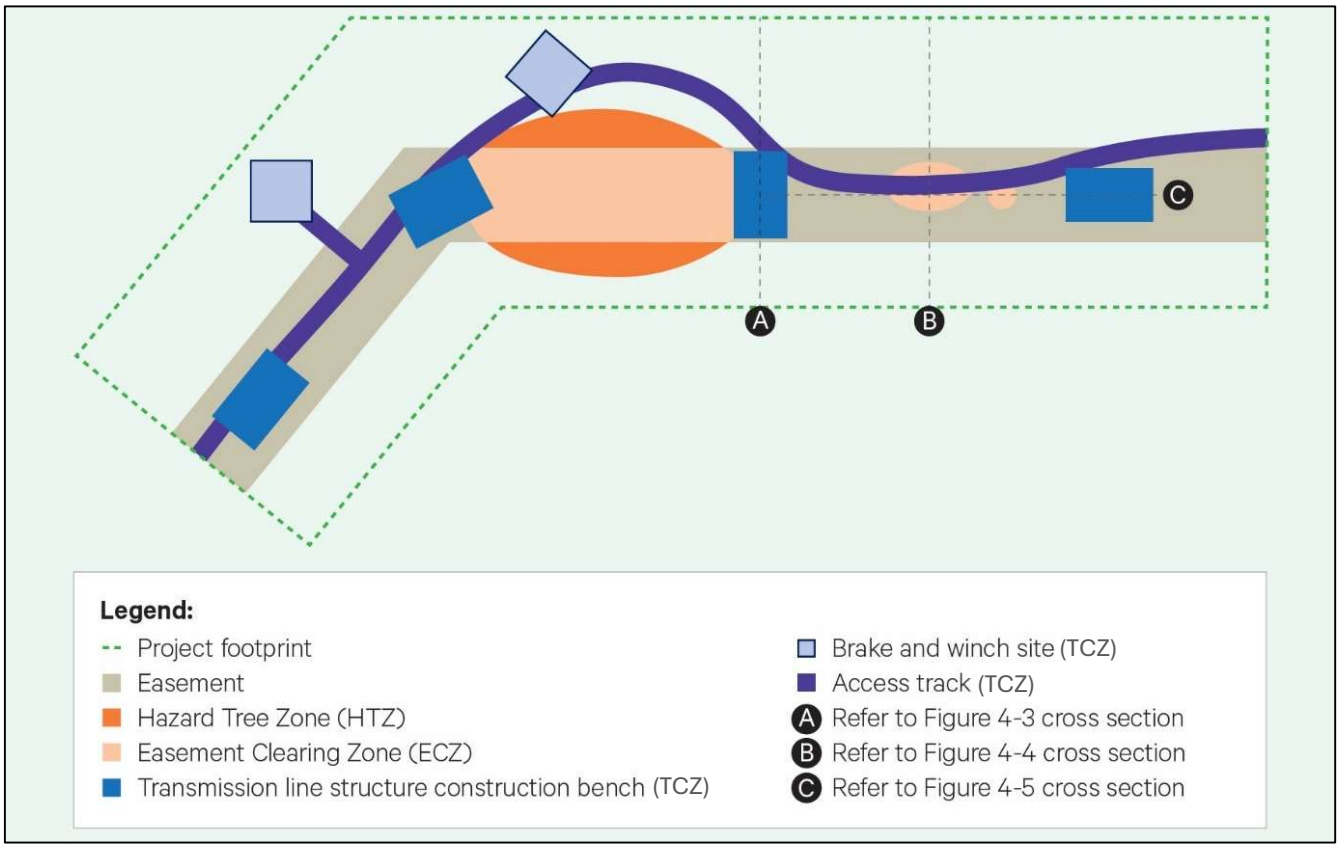


Plate 3-1 Indicative disturbance zones

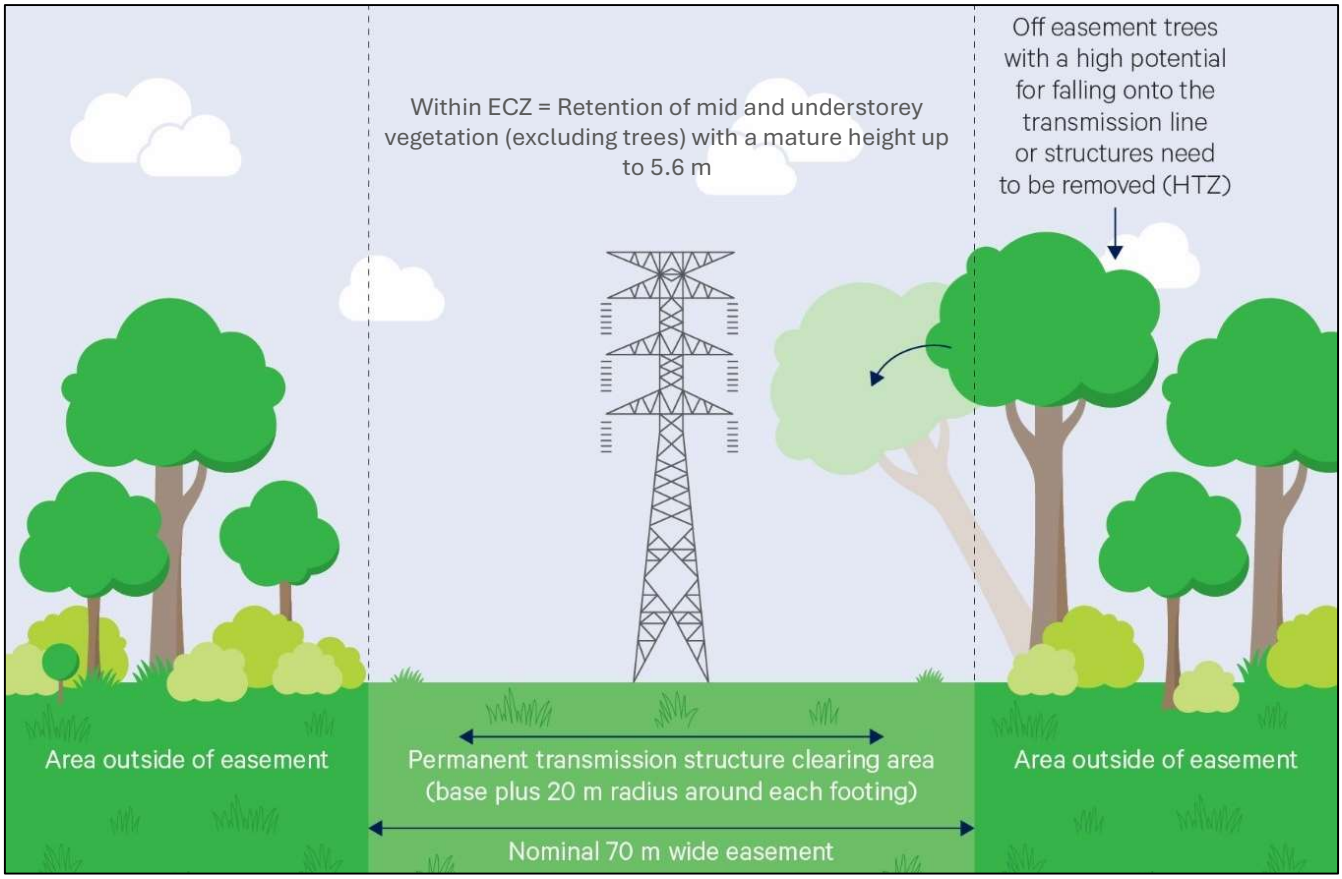


Plate 3-2 Indicative vegetation clearing around a typical transmission line structure

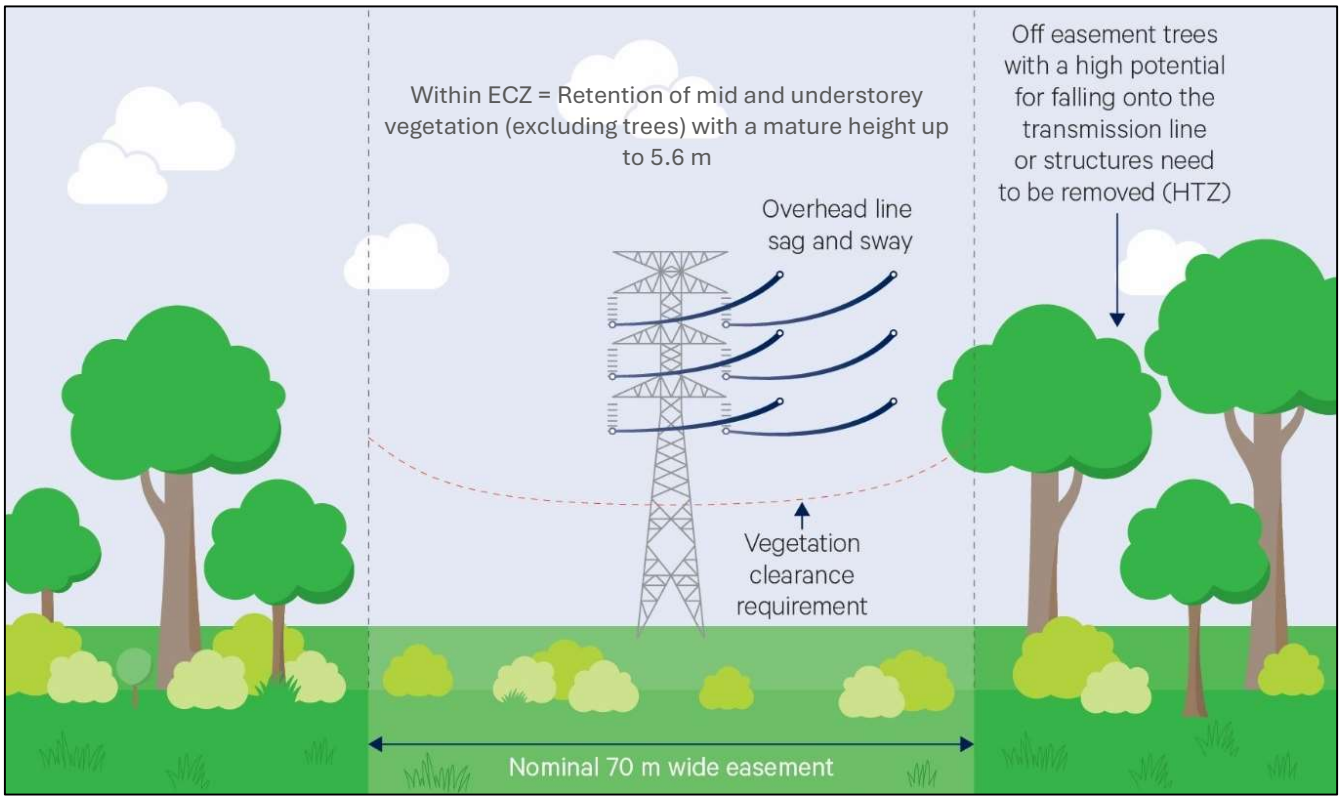


Plate 3-3 Indicative vegetation clearing within the easement

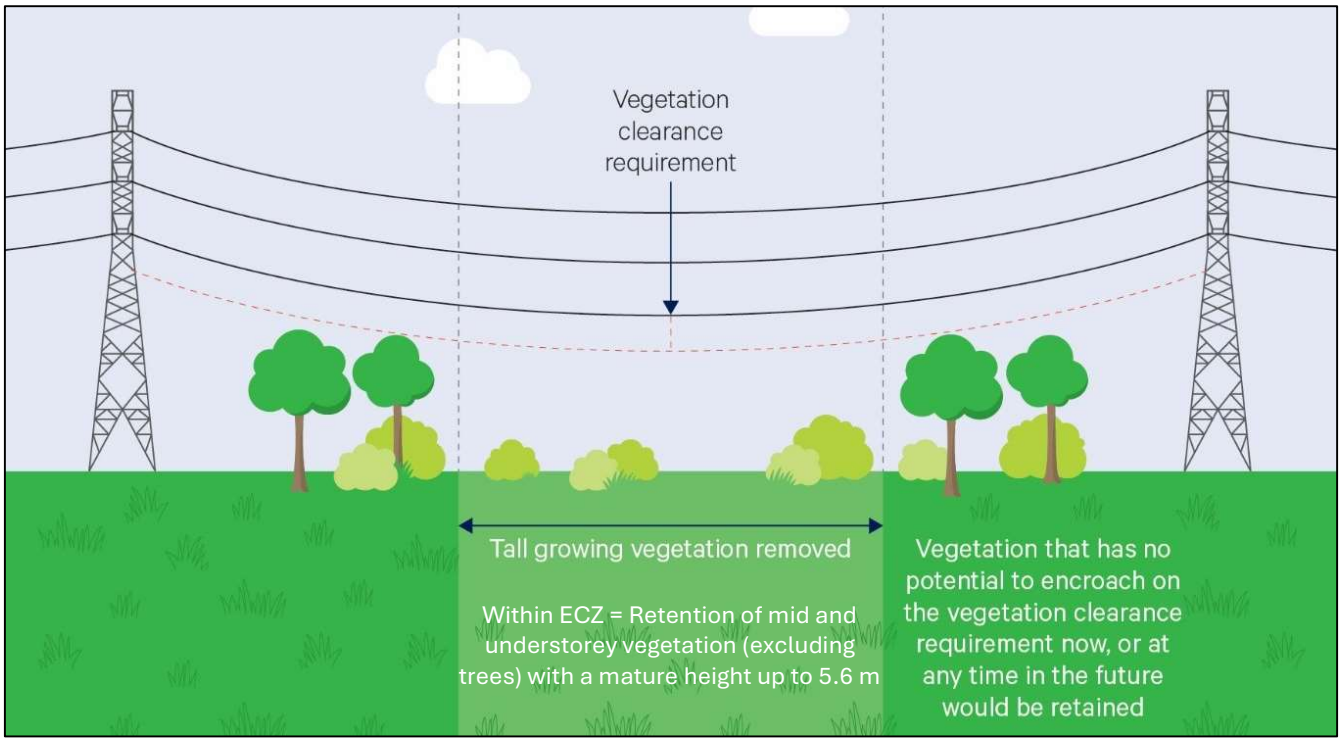


Plate 3-4 Indicative vegetation clearing mid-span

3.2. Target entities

As detailed in the Revised BDAR, it is considered that HLW is unlikely to significantly impede on habitat connectivity for microbats and some species of birds given the high mobility of aerial species. Similarly, terrestrial movement (either on the ground or below the upper stratum of vegetation) is unlikely to be substantially altered as the majority of ground and shrub vegetation will be retained within the easement, retaining foraging habitats and reducing risk of predation. As such, impacts relating to habitat connectivity on Large Forest Owls, Raptors, Cockatoos, Parrots, and microbats/megabats are considered reduced (albeit modified).

Terrestrial and arboreal mammals, small, sedentary woodland birds, reptiles and amphibians rely on vegetated connectivity for movement across the landscape, and may be impacted by HLW. Connectivity impacts may also extend to Threatened Ecological Communities, with the Revised BDAR noting potential connectivity impacts on the following community present in the HLW Area: Tableland Basalt Forest in the Sydney Basin and South Eastern Highlands Bioregions (Endangered Ecological Community per the BC Act).

Aerial species such as birds and bats that fly at heights where transmission lines are located have a high potential for collision, and may be at risk of midair collisions during stringing activities. Increased artificial lighting around construction compounds, worker accommodation facilities, and substations within the amended project footprint may impact sensory ecology of avian species (increased collision risk during nocturnal flight/foraging). The Little Eagle and Barking Owl are at increased risk of vehicle collision during the construction phase where vegetation clearing provides hunting or scavenging opportunities along easement and track edges.

Threatened fauna species specific to the HLW with potential connectivity and collision impacts are listed in Table 3-1 below (per Attachment 24 of the Revised BDAR), with the addition of a few target species for consideration.

Table 3-1 Threatened entities and potential HLW impact via connectivity and collision

Group	Potential impact (per Revised BDAR)		Entity	BC Act Listing	EPBC Act Listing	Relevant ecology for connectivity consideration
	Connectivity	Collision				
Microbats	May alter their flight path to avoid cleared areas (however may also use cleared areas as flyaways).	Interaction with transmission line structures or associated lines may alter flight patterns / behaviour or collision / injury / death.	Eastern False Pipistrelle	V	-	Eastern False Pipistrelle is a microbat with preferences for tall and wet forests, although it is found in lower altitudes and open forests (Menkhorst & Lumsden, 1995). This species selects roost trees with a Diameter at Breast Height (DBH) ranging from 55 cm up to 153.5 cm. It is dependent on large tracts of forested areas, with forests of a density >50% or more considered to provide suitable habitat. Studies have shown that patches of vegetation should have no more than a 1.3 km gap between other patches to provide suitable exchange of metapopulations (Herr, 1998). Patches themselves must be connected via corridors, thus enabling an improved exchange between patches by avoiding unnecessary energy expenditure.
			Southern Myotis	V	-	Southern Myotis is a microbat with preferences for riparian habitats given its specialised 'trawling' foraging strategy, where individuals rake their feet on a water surface to capture prey. It occurs predominantly in a narrow coastal band in northern and eastern Australia, however has also been recorded along some of the major inland rivers, reflecting its close association with water (Gonsalves and Law, 2017). Observations of the Southern Myotis have mostly been near large, permanent bodies of freshwater at low elevations where the terrain is flat and surrounded by vegetation (Anderson et al., 2006). This species is known to traverse long distances along riparian corridors, with one study recording individuals 4.95 km (straight line distance) from its known roost (Gonsalves and Law, 2017).

Group	Potential impact (per Revised BDAR)		Entity	BC Act Listing	EPBC Act Listing	Relevant ecology for connectivity consideration
	Connectivity	Collision				
			Large-eared Pied Bat	E	E	Large-eared Pied Bat forages over dry eucalypt forests, open woodlands and riparian corridors with an abundance of flying insects. Require connected patches of native vegetation, particularly along cliff lines, drainage lines and forested ridgelines; highly sensitive to habitat fragmentation due to roost fidelity (Williams and Thomson, 2019). Prefers habitat patches >20 ha with structural complexity and access to vertical features. Maternity colonies have been recorded in habitats up to several hundred hectares, but individuals may also persist in smaller patches if adjacent to escarpments or ridgelines (DCCEEW – Cth, 2021).
	N/A		Large Bent-winged Bat	V	-	N/A – species limited to collision-risk per Revised BDAR
Megabats	N/A	Interaction with transmission line structures or associated lines may alter flight patterns / behaviour or collision / injury / death.	Grey-headed Flying-fox	V	V	N/A – species limited to collision-risk per Revised BDAR

Group	Potential impact (per Revised BDAR)		Entity	BC Act Listing	EPBC Act Listing	Relevant ecology for connectivity consideration
	Connectivity	Collision				
Terrestrial & arboreal mammals	May result in increased predation when traversing open areas, and may create movement barriers	N/A	Broad-toothed Rat	V	V	The Broad-toothed Rat is a terrestrial and mostly nocturnal rodent. It is herbivorous with grasses forming the greatest component of its diet. In summer, it nests in burrows in the soil, while in winter, it dens communally during the day in nests of shredded grass situated in dense undergrowth or under logs beneath the snow. In alpine and sub-alpine areas, it is generally active in the vegetation layer under snow cover (DCCEEW - Cth, 2023b). Home range size and social dispersion vary seasonally from approximately 0.1-0.3 ha (DCCEEW - Cth, 2023b), however there is little information in the literature on maximum separation distances between isolated patches. As such, the patch size definition of 100 m, from the Biodiversity Assessment Method 2020 will be taken as a precautionary measure. While Broad-toothed Rats are good dispersers and have been shown to recolonise high-quality patches following local extinction (such as following high-intensity fires), recolonisation following such events will depend on the level of connectivity between subpopulations, as well as proximity from source subpopulations. Powerline easement vegetation can support small mammal communities, including Broad-toothed Rat, provided the vegetation is managed to maintain structural complexity without mass slashing (Clarke & White, 2008).
			Brush-tailed Phascogale	V	-	The Brush-tailed Phascogale is an arboreal marsupial dependent on hollows-bearing trees. It requires multiple den sites within a home range, often using a network of hollows across 10-20 different trees. It forages in tree canopies and on tree trunks, feeding on invertebrates, small vertebrates, nectar and bird eggs. Movement is both arboreal and terrestrial, requiring structurally connected canopies or dense groundcover in linear strips. Known to travel hundreds of metres per night, with home ranges of 40-80 ha required in forest environments (van der Ree et al., 2006).

Group	Potential impact (per Revised BDAR)		Entity	BC Act Listing	EPBC Act Listing	Relevant ecology for connectivity consideration
	Connectivity	Collision				
			Smoky Mouse	CE	E	The Smoky Mouse is a small rodent known to occur in Kosciuszko National Park and recent records in Bondo and Ingbyra State Forests. It occupies a variety of habitats however appears to prefer sub-alpine regions of up to 1,800 m in Southeastern NSW (Woods & Ford, 2000). The Smoky Mouse is primarily herbivorous but also consumes invertebrates, with diet varying seasonally according to food availability and energetic demands. There is little information on the species' movements through the landscape as most surveys have relied on trapping, however a characteristic of Smoky Mouse colonies is their ephemeral nature. This may suggest the species shifts its home range following disturbance or predation (Menkhorst & Broome, 2006).
			Koala	E	E	Koalas are tree-dwelling, obligate folivores with a highly specialised diet. The Koala's diet is defined by the availability and palatability of a limited variety of *Eucalyptus*, *Corymbia* and *Angophora* species. Koalas are nocturnal and spend significant periods of time moving across the ground between food and shelter trees. Movement increases in the breeding season (DAWE, 2022b). Koalas are known to traverse terrestrially in areas of disturbance and fragmentation, including highly urbanised areas. However, the *Koala Biodiversity Assessment Method Survey Guidelines* (DPE, 2022) suggest that fragmentation occurs once there is a gap of 500 m or more suitable habitat. Distance travelled has been shown to increase with decreasing patch connectivity, and in the most fragmented habitat, Koalas can travel over 30 km (Rus et al., 2021).

Group	Potential impact (per Revised BDAR)		Entity	BC Act Listing	EPBC Act Listing	Relevant ecology for connectivity consideration
	Connectivity	Collision				
			Spotted-tailed Quoll	V	E	The Spotted-tailed Quoll is a nocturnal, cat-sized, carnivorous marsupial occurring in eastern Australia from south-eastern Queensland to western Victoria. They are solitary animals (Todd et al. that occur at low densities. Males have larger ranges of up to a few thousand hectares in size, while females have smaller ranges of several hundred hectares. Home range sizes may vary depending on the quality of habitat – ranges may be smaller in the higher quality habitat in northern NSW than in southern NSW and Victoria. There is demonstrated absence or reduced abundance in cleared areas and the large home range size required by the species reduces viability in smaller fragments of Spotted-tailed Quoll (Threatened Species Scientific Committee, 2020). There is little information in the literature on maximum separation distances between isolated patched. As such, the patch size definition of 100 m, from the *Biodiversity Assessment Method 2020* will be taken as a precautionary measure.
			Eastern Pygmy-possum	V	-	The Eastern Pygmy-possum is a small arboreal marsupial that is distributed in the south-eastern corner of mainland Australia and in Tasmania. Pygmy-possums are agile climbers that feed mostly on the pollen and nectar from banksias, eucalypts and understorey plants and will also eat insects, seeds and fruit (NSW Scientific Committee, 2021). Home ranges are variable (0.04–19.5 ha), with males having significantly larger home ranges (Law et al., 2013), and they move through rangers on-ground. The factors threatening the survival of the Eastern Pygmy-possum include isolated sub-populations with little opportunity for dispersal which increases the risk of local extinction; clearing that results in habitat loss and fragmentation; inappropriate fire regimes that remove nectar-producing understorey plants; the loss of nest sites due to past intensive forestry and firewood collection; and predation by foxes and cats (DAWE, 2022). There is little information in the literature on maximum separation distances between isolated patched. As such, the patch size definition of 100 m, from the *Biodiversity Assessment Method 2020* will be taken as a precautionary measure.

Group	Potential impact (per Revised BDAR)		Entity	BC Act Listing	EPBC Act Listing	Relevant ecology for connectivity consideration
	Connectivity	Collision				
			Southern Greater Glider	E	E	The Greater Glider is a nocturnal, arboreal marsupial, predominantly solitary and largely restricted to eucalypt forests and woodlands of eastern Australia. It is typically found in highest abundance in taller, montane, moist eucalypt forests on fertile soils, with relatively old trees and abundant hollows. During the day, the Greater Glider shelters in tree hollows, with a particular preference for large hollows (diameter >10 cm) in large, old trees (DCCEEW - Cth, 2022). Both live and standing dead trees are used for denning (Goldingay, 2012), however the species prefers to use live hollow-bearing trees when adequate numbers are available. Habitat ranges are relatively small (1-4 ha) but are larger (up to 19 ha) in forests on less fertile sites and in more open woodland (DCCEEW - Cth, 2022). During the night, movements are primarily restricted to gliding between trees. When gliding, they can cover distances up to 100 m but usually tend not to glide further than 30 m. Maximum separation distances are highly dependent on glide angles, further detailed in this strategy. The Greater Glider is particularly sensitive to vegetation clearing and intensive timber harvesting, although responses vary according to landscape context and the extent of tree removal and retention (DCCEEW - Cth, 2022). Although Greater Gliders have small home ranges, their low reproductive rate and sensitivity to disturbance means they tend to become locally extinct in small and fragmented habitat patches. Greater Gliders disperse poorly across vegetation that is not native forest, and so do not readily recolonise isolated sites from which they have been lost (DCCEEW - Cth, 2022).

Group	Potential impact (per Revised BDAR)		Entity	BC Act Listing	EPBC Act Listing	Relevant ecology for connectivity consideration
	Connectivity	Collision				
			Yellow-bellied Glider	V	V	The Yellow-bellied Glider is a large, nocturnal glider that relies on tall eucalypt forest habitat to allow it to glide from tree-to-tree whilst foraging (DAWE, 2022a). The gliders utilise hollows in large old trees (usually more than 1 m DBH) for shelter and breeding (denning). It is active for most of the night and devotes 90% of the time spent outside the den to foraging-related activities. Home ranges are necessarily large, because the trees used as foraging substrates are dispersed and use of trees can vary through time and space. The species has very low dispersal capabilities over spaces larger than its gliding distance. Maximum separation distances are highly dependent on glide angles, further detailed in this strategy. Habitat corridors are required to facilitate dispersal of the Yellow-bellied Glider between fragmented habitat patches and/or that enable recolonization or movement away from threats. They have a glide ratio (horizontal distance/height dropped) of around 2.0, and corridors spanning gaps larger than the distance gliders are likely to be able to travel should be considered critical to the survival. There is not enough evidence to define the canopy and width characteristics of appropriate corridors. In the absence of such information, a precautionary approach should be taken to maximise dispersal by considering all habitat corridors in the species' range to be habitat critical to the survival (DAWE, 2022a).

Group	Potential impact (per Revised BDAR)		Entity	BC Act Listing	EPBC Act Listing	Relevant ecology for connectivity consideration
	Connectivity	Collision				
			Squirrel Glider	V	-	The Squirrel Glider is a medium-sized glider, requiring hollow-bearing, floriferous eucalypt open forests and woodlands with a Banksia or Acacia shrub layer, that provide den sites in tree cavities and a good winter supply of nectar. Large trees with abundant hollows are critical elements (NSW Scientific Committee, 2008). Habitat types are specific, and subject to extensive fragmentation (Goldingay & Jackson 2004). The group occupies and defends (by scent-marking) a large territory that may have about 20 hollow trees used over a period of six weeks. Mean home range is 3-4 ha in productive inland habitat fragments (NSW Scientific Committee, 2008). Squirrel Gliders have limited ability to disperse across urban or agricultural land given their relatively small glide distances. Although capable and willing to cross open habitat on occasion (e.g. to reach heavily flowering trees), they more typically require sufficient connectivity of tree cover within their maximum gliding distance. They are therefore susceptible to habitat fragmentation and hence population fragmentation (NSW Scientific Committee, 2008). Maximum separation distances are highly dependent on glide angles, further detailed in this strategy.
Small, sedentary woodland birds	May create movement barriers	N/A	Flame Robin	V	-	The Flame Robin, Scarlet Robin and Pink Robin are small, woodland songbird which occupy habitats with open ground layers of grass or bark, course woody debris, a sparse shrub and sapling layer. Flame and Pink Robins occupy more mesic habitats while Scarlet Robins occur in drier habitats. All species forage mostly on the ground during the cooler months. In summer and autumn, Scarlet Robins forage on arthropods from bark and foliage substrates, while Flame and Pink Robins forage flying insects close to the ground (Robinson, 1992). All robins are highly mobile and are known for seasonal/breeding migrations (Chambers and Keatley, 2010). There is little information in the literature on maximum separation distances between isolated patches. As such, the patch size definition of 100 m, from the *Biodiversity Assessment Method 2020* will be taken as a precautionary measure.
			Scarlet Robin	V	-	
			Pink Robin	V	-	

Group	Potential impact (per Revised BDAR)		Entity	BC Act Listing	EPBC Act Listing	Relevant ecology for connectivity consideration
	Connectivity	Collision				
			Varied Sittella	V	-	Varied Sitella are small, tree-trunk foraging woodland birds, mostly found in eucalypt woodlands and forests where rough-barked trees and mature eucalypts with hollows and dead branches are present. It is highly dependent on intact woodland with connected canopy structures and forms year-round social groups that defend territories. The Varied Sittella feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, standing dead trees, and from small branches and twigs in the tree canopy. It builds a cup-shaped nest of plant fibres and cobwebs in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years (NSW Scientific Committee, 2010). The sedentary nature of this species makes land clearing a potential barrier to movement; coupled with poor disbursement, not often crossing gaps >100-150 m (NSW Scientific Committee, 2010).
			Brown Treecreeper (eastern subspecies)	V	V	Brown Treecreepers (eastern subspecies) inhabit dry open eucalypt forests and woodlands, primarily occupying woodlands dominated by stringybarks or other rough-barked eucalypts. These usually have an open grassy understorey, occasionally with one or more shrub species. The subspecies is also found in mallee, forests and woodland subject to periodic inundation. It is not usually found in woodlands with a dense shrub layer and is absent from heavily degraded woodlands and steep rocky hills (DCCEEW - Cth, 2023a). Fallen timber is an important habitat component for foraging. The subspecies forages on the ground and in mature live and dead trees, where it feeds on invertebrate prey. It also feeds on nectar from Mugga Ironbark (*Eucalyptus sideroxylon*) and Paperbarks, as well as sap and lizards. Ideal habitat requires an ongoing disturbance regime, such as historical Indigenous burning practices, to suppress the ground layer and prevent it from becoming too dense and uniform. The subspecies roosts in tree cavities in a variety of eucalypt species and hollows in live or dead. The Conservation Advice states that gaps greater than 100 m between trees should be avoided to ensure that populations remain connected (DCCEEW - Cth, 2023a).

Group	Potential impact (per Revised BDAR)		Entity	BC Act Listing	EPBC Act Listing	Relevant ecology for connectivity consideration
	Connectivity	Collision				
Forest owls	N/A	May become entangled / collide with powerlines	Barking Owl	V	-	N/A – species limited to collision-risk per Revised BDAR
			Masked Owl	V	-	
			Powerful Owl	V	-	
			Sooty Owl	V	-	
Cockatoos	N/A	May become entangled / collide with powerlines	Gang-gang Cockatoo	E	E	N/A – species limited to collision-risk per Revised BDAR
			Glossy Black-Cockatoo	V	V	
Raptors	N/A	May become entangled / collide with powerlines	Square-tailed Kite	V	-	N/A – species limited to collision-risk per Revised BDAR
			Little Eagle	V	-	
			White-bellied Sea-eagle	V	-	
Migratory birds	N/A	May become entangled / collide with powerlines	Swift Parrot	E	CE	N/A – species limited to collision-risk per Revised BDAR
			Fork-tailed Swift	P	M	
			Sharp-tailed Sandpiper	P	M	
			Red-necked Stint	P	M	

Group	Potential impact (per Revised BDAR)		Entity	BC Act Listing	EPBC Act Listing	Relevant ecology for connectivity consideration
	Connectivity	Collision				
			Latham's Snipe	P	M	
			Common Greenshank	P	M	
			Marsh Sandpiper	P	M	
Reptiles	Restricted home ranges may be impeded by cleared land	N/A	Alpine She-oak Skink	E	E	The Alpine She-oak Skink is a cryptic grassland specialist restricted to the mainland Australian Alps. It has specific habitat requirements, preferring tree-less or very lightly treed areas that contain tussock grasses, low heath or a combination of both. Within this habitat the species shelters beneath litter, rocks, logs and other ground debris, and has been observed basking on grass tussocks. It has a highly restricted range, however has been found to persist under a range of habitat conditions, including a temporary loss of resources, a range of ground stratum vegetation heights and a range of elevation-associated microclimate attributes (Hartley et al., 2023). There is little information in the literature on maximum separation distances between isolated patched. As such, the patch size definition of 100 m, from the *Biodiversity Assessment Method 2020* will be taken as a precautionary distance.

Group	Potential impact (per Revised BDAR)		Entity	BC Act Listing	EPBC Act Listing	Relevant ecology for connectivity consideration
	Connectivity	Collision				
			Pink-tailed Legless Lizard	V	V	The Pink-tailed Legless Lizard is the most south-easterly occurring species of the genus and is distributed along the western foothills of the Great Dividing Range. It cohabitates in ant burrows, commonly below rocks, while feeding on the ant's eggs and larvae. Known and potential threats to the species include pasture improvement, overgrazing, soil disturbance, rock removal, weed invasion, inappropriate fire regimes and fire management activities, recreational activities and predation (Wong et al., 2011). Observations of the lizard's distribution patterns are limited due to its cryptic nature. However, the species has been recorded on roadsides and urban areas, and connectivity for this species is likely dependent on a combination of rock, vegetation and bare ground. Plate-sized bush rock in grassland is critical for its occurrence. The Threatened Biodiversity Data Collection (DCCEEW – NSW, 2025) suggests a 50 m maximum separation distances between isolated patches for this species, limited to grassland containing plate rock.
			Striped Legless Lizard	V	V	The Striped Legless Lizard is a grassland specialist, found only in areas of native grassland and nearby grassy woodland and exotic pasture (Threatened Species Scientific Committee, 2016). It has a preference for high grass structural complexity and floristic community, most commonly been encountered in natural temperate grasslands dominated by native grasses (Howland et al. 2016). Utilises inter-tussock spaces, cracks in dry soil and shelter beneath rocks and logs for thermoregulation. Striped Legless Lizards appear to have limited dispersal distances, with evidence suggesting genetic differentiation at distances less than 400 m (Threatened Species Scientific Committee, 2016).
Amphibians	Installation of access tracks across waterways may reduce	N/A	Sloane's Froglet	E	E	Sloane's Froglet, Booroolong Frog and Yellow-spotted Tree Frog are all species dependent on stream and riparian habitats. Sloane's Froglet occupies ephemeral and temporary freshwater wetlands, flood-runners and seasonally inundated grasslands, with breeding triggered by rainfall and surface water (NSW Scientific Committee, 2023). The
			Booroolong Frog	E	E	

Group	Potential impact (per Revised BDAR)		Entity	BC Act Listing	EPBC Act Listing	Relevant ecology for connectivity consideration
	Connectivity	Collision				
	connectivity along the length of the stream		Yellow-spotted Tree Frog	CE	CE	Booroolong Frog lives exclusively along rocky sections of permanent streams in wet and dry forest, woodland, and cleared grazed land. The species is reliant on permanent running water and does not occupy ephemeral streams, or streams that have dried during severe drought (Threatened Species Scientific Committee, 2021). The Yellow-spotted Bell Frog has been found in permanent ponds, swamps, lagoons, farm dams and the still backwaters of slow flowing streams, usually with emergent vegetation such as tall reeds or with overhanging grassy banks (Threatened Species Scientific Committee, 2019). The *NSW Survey Guide for Threatened Frogs* (DPIE, 2020) suggests a 50 m maximum separation distance for the Booroolong Frog, the smallest of the three species.
Insects	Restricted home ranges may be impeded by cleared land	N/A	Key's Matchstick Grasshopper	E	E	Historical records of Key's Matchstick Grasshopper are typically associated with primary and secondary native grasslands, dominated by tall stands of *Themeda triandra* (Kangaroo Grass) and species within the Asteraceae family (TSSC, 2020). The species has also been recorded in other vegetation types containing a native grass understory. The species feeds on a range of native and introduced species, preferring small ephemeral plants to the larger perennial species (TSSC, 2016). The relationship to *T. triandra* is considered only for shelter from predators or climactic stressors and it is not part of the species food requirements. An expert report prepared for the Revised BDAR noted that construction of access tracks and road improvements can fragment the grasshopper's habitat, isolating populations and limiting genetic diversity (Yagui, 2024). Maximum dispersal distance is estimated at 10 m (TSSC, 2020), therefore the maximum separation distance between two isolated patches would be 10 m.

Group	Potential impact (per Revised BDAR)		Entity	BC Act Listing	EPBC Act Listing	Relevant ecology for connectivity consideration
	Connectivity	Collision				
TECs	Increased fragmentation may result in loss of community composition, structure and function.	N/A	Tableland Basalt Forest in the Sydney Basin and South Eastern Highlands Bioregions	EEC	-	Tableland Basalt Forest is dominated by an open eucalypt canopy of variable composition. *Eucalyptus viminalis, E. radiata, E. dalrympleana subsp. dalrympleana* and *E. pauciflora* may occur in the community in pure stands or in varying combinations. The community typically has an open canopy of eucalypts with sparse mid-story shrubs (e.g., *Acacia melanoxylon* and *A. dealbata*) and understory shrubs (e.g., *Rubus parvifolius*) and a dense groundcover of herbs and grasses, although disturbed stands may lack either or both of the woody strata (DCCEEW – NSW, 2025). The structure of the community varies depending on past and current disturbances, particularly fire history, clearing and grazing. Contemporary tree-dominated stands of the community are largely relics or regrowth of originally taller forests and woodlands, which are likely to have had scattered shrubs and a largely continuous grassy groundcover. At some sites, mature trees may exceed 30 m tall, although regrowth stands may be shorter than 10 m tall (DCCEEW – NSW, 2025).

P = Protected; V = Vulnerable; E = Endangered; CE = Critically Endangered; M = Migratory; EEC = Endangered Ecological Community; - = not listed

4. Connectivity strategy measures

This strategy will be carried out during the pre-construction and construction phases of HLW, with the monitoring phase continuing post-construction and into operation in accordance with Annexure H: Biodiversity Monitoring Program of the HLW BMP (to be detailed in the Transgrid Operational Biodiversity Management Plan).

4.1. Retention

Micro-siting of transmission line infrastructure, associated work sites and other areas of disturbance has been undertaken in accordance with ecological constraints mapped in the HLW Area (refer Section 7.2.2 of the HLW BMP). This has resulted in the prioritised avoidance to the extent possible for:

- Threatened species habitat, including:
  - Habitat trees.
  - Rocky habitats (i.e., rock outcrops, large boulders, piled rock, and rock features).
  - Course woody debris.
- Waterways (particularly Key Fish Habitat [KFH]) vegetated riparian zones and instream vegetation.
- Nature refuges and existing conservation lands (i.e., established BioBank and Biodiversity Stewardship sites, Conservation Agreement sites, National Parks and State Forests).
- Artificial threatened species habitats.

The following key measures will be implemented within partial clearing zones (ECZ & HTZ) to retain connectivity along the HLW alignment:

1. Retention of native grasses, sedges, herbs, logs, rocks and soil crusts to the extent possible.
2. Retention of selected shrubs with a mature height up to 5.6 m, particularly targeting retention of clusters with current connectivity across the easement. This will be prioritised within connectivity corridors through the selection of suitable clearing techniques to retain shrubs such as hand clearing / felling.
3. Ground impacts will be minimised through:
   a. Choice of low-impact machinery and tracks.
   b. Minimising and consolidating access paths.
   c. Restricting machinery access in ecologically sensitive areas (e.g., wetlands and bogs).
4. Hand clearing/felling will occur in the immediate vicinity of areas of very high ecological sensitivity identified in the constraints mapping (refer Section 7.2.2 of the HLW BMP).
5. Implementation of Annexure G: Rehabilitation Plan of the HLW BMP, including:
   a. The appropriate salvage, storage and reuse of habitat resources (large and course woody debris, rock refugia, aquatic habitats) in accordance with relevant HLW bushfire controls.
   b. Rehabilitation of temporary disturbance sites (temporarily disturbed portions of the TCZ; e.g., brake and winch sites, temporary access tracks, construction compounds, workforce accommodation facilities) to a point of natural regeneration.
   c. Rehabilitation of Key's Matchstick Grasshopper habitats via direct seeding.

4.2. Connectivity corridors

This strategy designates connectivity corridors by target fauna use into two categories: Ground Corridors and Glider Crossings, summarised in Table 4-1.

Table 4-1 Connectivity corridor categories

Connectivity corridor category	Rational	Target species
Ground Corridors	As detailed in Section 3, all canopy trees must be removed within the ECZ to accommodate 500 kV transmission lines at maximum line operating conditions. The requirements of the HTZ would result in the further removal of trees within proximity to the alignment where there is a potential for them to impact on transmission lines. This prevents the retention of continuous habitat structure (canopy, mid and ground strata) within disturbance zones. As such, Ground Corridors will be defined linear areas connecting the HLW Area to adjacent habitats; designated and strategically retained/managed to facilitate the safe and functional movement of fauna and dispersal of flora across the landscape. They are intended to minimise habitat fragmentation and maintain ecological processes by preserving ground and shrub habitat structure, particularly for species with limited dispersal ability or reliance on specific movement pathways.	• Eastern False Pipistrelle. • Southern Myotis. • Large-eared Pied Bat. • Broad-toothed Rat. • Brush-tailed Phascogale. • Smoky Mouse. • Koala. • Eastern Pygmy-possum. • Spotted-tailed Quoll. • Flame Robin. • Scarlet Robin. • Pink Robin. • Varied Sittella. • Brown Treecreeper (Eastern Subspecies). • Alpine She-oak Skink. • Pink-tailed Legless Lizard. • Striped Legless Lizard. • Sloane's Froglet. • Booroolong Frog. • Yellow-spotted Tree Frog. • Key's Matchstick Grasshopper.
Glider Crossings	Glider Crossings are proposed at locations where vegetation clearing for HLW will result in the fragmentation of threatened Glider habitats and create a barrier effect to the movement of these species. Based on the Revised BDAR and limitations of Glider capability in traversing open areas (Goldingday & Taylor 2009; Goldingay 2014), hazard reduction requirements would restrict the retention of trees with adequate heights to enable Glider crossings. As a result, installation of permanent Glider poles within Glider Crossings is deemed the preferred connectivity mitigation measure.	• Southern Greater Glider. • Squirrel Glider. • Yellow-bellied Glider.

4.3. Ground Corridors

4.3.1. Ground corridor locations

The outcomes of the Transgrid Connectivity Review Letter (July, 2025) for ground corridors is presented in Table 4-2 below. This identifies the corridor ID, associated species, existing connectivity and impact to connectivity based on the approved disturbance areas. Connectivity corridor infrastructure (such as rocks, and other refugia) will be installed immediately after clearing, or as early as possible (generally one month) to maintain home ranges and enable safe movement of displaced fauna.

All ground corridor locations must be reviewed through the final selection process outlined in Section 4.5.

Official

Table 4-2 Desk based assessment of ground corridors (Transgrid, June 2025)

Corridor ID	Associated species	Existing connectivity	Humelink impact to connectivity	Ground Corridor recommendations
INL_23_92	Bush Stone-curlew, Koala and Sloane's Froglet.	Key riparian crossings	Moderate	Review Final Layout Plans and minimise impacts to O'Briens Creek.
INL_23_90	Bush Stone-curlew, Koala and Squirrel Glider.	Key riparian crossings	High	Corridor of scattered paddock trees along Kyeamba River Floodplain. Development will have minimal impact to existing connectivity.
INL_20_88	Bush Stone-curlew, Koala, Squirrel Glider and Squirrel Glider endangered population.	Non-functional corridor (parallel transmission lines)	Moderate	Development will have minimal impact to existing connectivity.
INL_17_86	Koala, Squirrel Glider, Squirrel Glider endangered population and Striped Legless Lizard.	Intact vegetation corridor	Connectivity maintained	Development will have minimal impact to existing connectivity.
INL_17_85	Koala, Pink-tailed Legless Lizard, Squirrel Glider and Squirrel Glider endangered population.	Non-functional corridor (parallel transmission lines)	Connectivity maintained	Field verification to assess existing connectivity across TL to north between 500 - 1200m to east to incorporate surface rocks for Pink-tailed Work-lizard.

Corridor ID	Associated species	Existing connectivity	Humelink impact to connectivity	Ground Corridor recommendations
INL_17_83	Koala, Pink-tailed Legless Lizard, Squirrel Glider and Squirrel Glider endangered population.	Non-functional corridor (plantation)	Connectivity maintained	Current location unsuitable due to cleared plantation forest to the north. Field verification required to assess alternate location ~1400 m west to incorporate surface rock for Pink-tailed Worm-lizard.
INL_17_84	Koala, Pink-tailed Legless Lizard and Squirrel Glider.	Fragmented vegetation corridor	Connectivity maintained	Corridor of scattered paddock trees along Turners Creek. Development will have minimal impact to existing connectivity.
BON_2_81	Nil	Fragmented vegetation corridor	High	Maintain corridor along Nacki Nacki Creek riparian zone for non-threatened species. Connectivity impacts to be reviewed against Final Layout Plans.
SNO_TG_1	Eastern Pygmy-possum, Greater Glider, Koala and Squirrel Glider.	Fragmented vegetation corridor	High	Review ground corridor connectivity for based on Final Layout Plans.
SNO_TG_2	Eastern Pygmy-possum, Greater Glider, Koala and Pink Robin.	Fragmented vegetation corridor	High	Review ground corridor connectivity for based on Final Layout Plans.
SNO_GREH_2	Eastern Pygmy-possum, Greater Glider, Koala and Pink Robin.	Key riparian crossings	Moderate	Provide ground level shrub regeneration / revegetation for Eastern Pygmy Possum and small woodland birds.

Corridor ID	Associated species	Existing connectivity	Humelink impact to connectivity	Ground Corridor recommendations
SNO_TG_3	Eastern Pygmy-possum, Greater Glider, Koala, Pink Robin, Squirrel Glider and Yellow-bellied Glider population on the Bago Plateau.	Fragmented vegetation corridor	High	Review ground corridor connectivity based on Final Layout Plans.
SNO_TG_4	Eastern Pygmy-possum, Koala and Squirrel Glider.	Fragmented vegetation corridor	High	Review ground corridor connectivity for based on Final Layout Plans.
BON_2_80	Nil	Non-functional corridor (plantation)	High	Shift corridor ~1700 m west to Sharps Creek and maintain for non-threatened species. A supplementary ground corridor should also be assessed ~1700 m east near Wondalga Road and the HumeLink T-junction. Connectivity impacts to be reviewed against Final Layout Plans.
SNO_GREH_3	Greater Glider, Koala and Yellow-bellied Glider population on the Bago Plateau.	Intact vegetation corridor	High	Maintain corridor along riparian corridor for non-threatened species
SNO_TG_5	Eastern Pygmy-possum, Koala and Pink Robin.	Fragmented vegetation corridor	High	Review ground corridor connectivity for based on Final Layout Plans.

Corridor ID	Associated species	Existing connectivity	Humelink impact to connectivity	Ground Corridor recommendations
BON_2_64	Bush Stone-curlew, Eastern Pygmy-possum, Greater Glider, Koala, Pink Robin, Squirrel Glider and Yellow-bellied Glider population on the Bago Plateau.	Key riparian crossings	Connectivity maintained	Ground corridor connectivity maintained by clearing model.
INL_14_63	Eastern Pygmy-possum, Koala and Squirrel Glider.	Key riparian crossings	Connectivity maintained	Corridor of scattered paddock trees along Wilson River Floodplain. Development will have minimal impact to existing connectivity.
SNO_GREH_1	Brush-tailed Phascogale, Eastern Pygmy-possum, Greater Glider, Koala, Smoky Mouse, Squirrel Glider and Yellow-bellied Glider population on the Bago Plateau.	Intact vegetation corridor	Connectivity maintained	Shrubby corridor for EPP, Broad-toothed Rat, Smoky Mouse and small woodland birds
SNO_1_72	Eastern Pygmy-possum, Greater Glider, Koala, Squirrel Glider and Yellow-bellied Glider population on the Bago Plateau.	Fragmented vegetation corridor	Connectivity maintained	No specific actions.

Corridor ID	Associated species	Existing connectivity	Humelink impact to connectivity	Ground Corridor recommendations
SNO_1_73	Brush-tailed Phascogale, Eastern Pygmy-possum, Greater Glider, Koala, Pink Robin and Yellow-bellied Glider population on the Bago Plateau.	Intact vegetation corridor	High	Further assessment to consider establishment of ground corridors for Eastern Pygmy-possum, Brush-tailed Phascogale and Small Woodland Birds across HumeLink and TL 64 and 66.
SNO_1_74	Brush-tailed Phascogale, Eastern Pygmy-possum, Greater Glider, Koala, Pink Robin, Squirrel Glider and Yellow-bellied Glider population on the Bago Plateau.	Intact vegetation corridor	High	Further assessment to consider establishment of ground corridors for Eastern Pygmy-possum, Brush-tailed Phascogale and Small Woodland Birds across HumeLink and TL 64 and 66.
SNO_1_93	Brush-tailed Phascogale, Eastern Pygmy-possum, Greater Glider, Koala, Pink Robin, Squirrel Glider, Yellow-bellied Glider population on the Bago Plateau and Yellow-spotted Tree Frog.	Intact vegetation corridor	High	Further assessment to consider establishment of ground corridors for Eastern Pygmy-possum, Brush-tailed Phascogale and Small Woodland Birds across HumeLink and TL 64 and 66.

Corridor ID	Associated species	Existing connectivity	Humelink impact to connectivity	Ground Corridor recommendations
SNO_1_94	Alpine She-oak Skink, Brush-tailed Phascogale, Eastern Pygmy-possum, Greater Glider, Koala, Pink Robin, Squirrel Glider and Yellow-bellied Glider population on the Bago Plateau.	Non-functional corridor (parallel transmission lines)	Moderate	Further assessment to consider establishment of ground corridors for Eastern Pygmy-possum, Brush-tailed Phascogale and Small Woodland Birds across HumeLink and TL 64 and 66.
SNO_1_96	Alpine She-oak Skink, Eastern Pygmy-possum, Greater Glider, Koala, Pink Robin and Yellow-bellied Glider population on the Bago Plateau.	Non-functional corridor (parallel transmission lines)	High	Further assessment to consider establishment of ground corridors for Eastern Pygmy-possum, Brush-tailed Phascogale and Small Woodland Birds across HumeLink and TL 64 and 66.
SNO_1_97	Alpine She-oak Skink, Eastern Pygmy-possum, Greater Glider, Koala, Pink Robin and Yellow-bellied Glider population on the Bago Plateau.	Non-functional corridor (parallel transmission lines)	High	Further assessment to consider establishment of ground corridors for Eastern Pygmy-possum, Brush-tailed Phascogale and Small Woodland Birds across HumeLink and TL 64 and 66.

Corridor ID	Associated species	Existing connectivity	Humelink impact to connectivity	Ground Corridor recommendations
SNO_1_98	Alpine She-oak Skink, Eastern Pygmy-possum, Greater Glider, Koala, Pink Robin, Squirrel Glider and Yellow-bellied Glider population on the Bago Plateau.	Non-functional corridor (parallel transmission lines)	High	Further assessment to consider establishment of ground corridors for Eastern Pygmy-possum, Brush-tailed Phascogale and Small Woodland Birds across HumeLink and TL 64 and 66.
SNO_1_75	Alpine She-oak Skink, Eastern Pygmy-possum, Greater Glider, Koala, Pink Robin, Squirrel Glider and Yellow-bellied Glider population on the Bago Plateau.	Non-functional corridor (parallel transmission lines)	High	Further assessment to consider establishment of ground corridors for Eastern Pygmy-possum, Brush-tailed Phascogale and Small Woodland Birds across HumeLink and TL 64 and 66.
SNO_1_99	Alpine She-oak Skink, Eastern Pygmy-possum, Greater Glider, Koala, Squirrel Glider and Yellow-bellied Glider population on the Bago Plateau.	Non-functional corridor (parallel transmission lines)	High	Further assessment to consider establishment of ground corridors for Eastern Pygmy-possum, Brush-tailed Phascogale and Small Woodland Birds across HumeLink and TL 64 and 66.

Corridor ID	Associated species	Existing connectivity	Humelink impact to connectivity	Ground Corridor recommendations
SNO_1_102	Brush-tailed Phascogale, Eastern Pygmy-possum, Greater Glider, Koala, Squirrel Glider, Yellow-bellied Glider population on the Bago Plateau and Yellow-spotted Tree Frog.	Non-functional corridor (parallel transmission lines)	High	Further assessment to consider establishment of ground corridors for Eastern Pygmy-possum, Brush-tailed Phascogale and Small Woodland Birds across HumeLink and TL 64 and 66.
SNO_1_100	Alpine She-oak Skink, Brush-tailed Phascogale, Eastern Pygmy-possum, Greater Glider, Koala, Squirrel Glider and Yellow-bellied Glider population on the Bago Plateau.	Non-functional corridor (parallel transmission lines)	High	Further assessment to consider establishment of ground corridors for Eastern Pygmy-possum, Brush-tailed Phascogale and Small Woodland Birds across HumeLink and TL 64 and 66.
SNO_1_101	Brush-tailed Phascogale, Eastern Pygmy-possum, Greater Glider, Koala, Squirrel Glider and Yellow-bellied Glider population on the Bago Plateau.	Non-functional corridor (parallel transmission lines)	High	Further assessment to consider establishment of ground corridors for Eastern Pygmy-possum, Brush-tailed Phascogale and Small Woodland Birds across HumeLink and TL 64 and 66.

Corridor ID	Associated species	Existing connectivity	Humelink impact to connectivity	Ground Corridor recommendations
SNO_1_76	Brush-tailed Phascogale, Eastern Pygmy-possum, Greater Glider, Koala, Squirrel Glider and Yellow-bellied Glider population on the Bago Plateau.	Non-functional corridor (parallel transmission lines)	High	Further assessment to consider establishment of ground corridors for Eastern Pygmy-possum, Brush-tailed Phascogale and Small Woodland Birds across HumeLink and TL 64 and 66.
SNO_1_103	Alpine She-oak Skink, Brush-tailed Phascogale, Eastern Pygmy-possum, Greater Glider, Koala, Pink Robin, Squirrel Glider and Yellow-bellied Glider population on the Bago Plateau.	Non-functional corridor (parallel transmission lines)	High	Further assessment to consider establishment of ground corridors for Eastern Pygmy-possum, Brush-tailed Phascogale and Small Woodland Birds across HumeLink and TL 64 and 66.
SNO_1_104	Alpine She-oak Skink, Brush-tailed Phascogale, Eastern Pygmy-possum, Greater Glider, Koala, Pink Robin, Squirrel Glider and Yellow-bellied Glider population on the Bago Plateau.	Non-functional corridor (parallel transmission lines)	High	Further assessment to consider establishment of ground corridors for Eastern Pygmy-possum, Brush-tailed Phascogale and Small Woodland Birds across HumeLink and TL 64 and 66.

Corridor ID	Associated species	Existing connectivity	Humelink impact to connectivity	Ground Corridor recommendations
SNO_1_105	Alpine She-oak Skink, Brush-tailed Phascogale, Eastern Pygmy-possum, Greater Glider, Koala, Pink Robin, Squirrel Glider and Yellow-bellied Glider population on the Bago Plateau.	Non-functional corridor (parallel transmission lines)	High	Further assessment to consider establishment of ground corridors for Eastern Pygmy-possum, Brush-tailed Phascogale and Small Woodland Birds across HumeLink and TL 64 and 66.
SNO_1_106	Alpine She-oak Skink, Brush-tailed Phascogale, Eastern Pygmy-possum, Greater Glider, Koala, Pink Robin, Squirrel Glider and Yellow-bellied Glider population on the Bago Plateau.	Non-functional corridor (parallel transmission lines)	High	Further assessment to consider establishment of ground corridors for Eastern Pygmy-possum, Brush-tailed Phascogale and Small Woodland Birds across HumeLink and TL 64 and 66.
SNO_1_107	Brush-tailed Phascogale, Greater Glider, Koala, Squirrel Glider and Yellow-bellied Glider population on the Bago Plateau.	Non-functional corridor (parallel transmission lines)	High	Further assessment to consider establishment of ground corridors for Eastern Pygmy-possum, Brush-tailed Phascogale and Small Woodland Birds across HumeLink and TL 64 and 66.

Corridor ID	Associated species	Existing connectivity	Humelink impact to connectivity	Ground Corridor recommendations
SNO_1_108	Alpine She-oak Skink, Brush-tailed Phascogale, Eastern Pygmy-possum, Greater Glider, Koala, Squirrel Glider and Yellow-bellied Glider population on the Bago Plateau.	Non-functional corridor (parallel transmission lines)	High	Further assessment to consider establishment of ground corridors for Eastern Pygmy-possum, Brush-tailed Phascogale and Small Woodland Birds across HumeLink and TL 64 and 66.
SNO_1_77	Alpine She-oak Skink, Brush-tailed Phascogale, Eastern Pygmy-possum, Greater Glider, Koala, Squirrel Glider and Yellow-bellied Glider population on the Bago Plateau.	Non-functional corridor (parallel transmission lines)	High	Further assessment to consider establishment of ground corridors for Eastern Pygmy-possum, Brush-tailed Phascogale and Small Woodland Birds across HumeLink and TL 64 and 66.
SNO_1_109	Alpine She-oak Skink, Brush-tailed Phascogale, Eastern Pygmy-possum, Greater Glider, Koala, Pink Robin, Squirrel Glider and Yellow-bellied Glider population on the Bago Plateau.	Non-functional corridor (parallel transmission lines)	High	Further assessment to consider establishment of ground corridors for Eastern Pygmy-possum, Brush-tailed Phascogale and Small Woodland Birds across HumeLink and TL 64 and 66.

Corridor ID	Associated species	Existing connectivity	Humelink impact to connectivity	Ground Corridor recommendations
SNO_1_110	Brush-tailed Phascogale, Eastern Pygmy-possum, Greater Glider, Koala, Squirrel Glider and Yellow-bellied Glider population on the Bago Plateau.	Non-functional corridor (parallel transmission lines)	High	Further assessment to consider establishment of ground corridors for Eastern Pygmy-possum, Brush-tailed Phascogale and Small Woodland Birds across HumeLink and TL 64 and 66.
SNO_1_111	Brush-tailed Phascogale, Eastern Pygmy-possum, Greater Glider, Koala and Squirrel Glider.	Non-functional corridor (parallel transmission lines)	High	Shrubby corridor for EPP and small woodland birds
SNO_1_112	Brush-tailed Phascogale, Eastern Pygmy-possum, Greater Glider, Koala, Squirrel Glider and Yellow-bellied Glider population on the Bago Plateau.	Non-functional corridor (parallel transmission lines)	High	Further assessment to consider establishment of ground corridors for Eastern Pygmy-possum, Brush-tailed Phascogale and Small Woodland Birds across HumeLink and TL 64 and 66.

Corridor ID	Associated species	Existing connectivity	Humelink impact to connectivity	Ground Corridor recommendations
SNO_1_113	Alpine She-oak Skink, Brush-tailed Phascogale, Eastern Pygmy-possum, Greater Glider, Koala, Pink Robin, Squirrel Glider and Yellow-bellied Glider population on the Bago Plateau.	Non-functional corridor (parallel transmission lines)	High	Further assessment to consider establishment of ground corridors for Eastern Pygmy-possum, Brush-tailed Phascogale and Small Woodland Birds across HumeLink and TL 64 and 66.
SNO_1_78	Alpine She-oak Skink, Brush-tailed Phascogale, Eastern Pygmy-possum, Greater Glider, Koala, Pink Robin, Squirrel Glider and Yellow-bellied Glider population on the Bago Plateau.	Non-functional corridor (parallel transmission lines)	High	Further assessment to consider establishment of ground corridors for Eastern Pygmy-possum, Brush-tailed Phascogale and Small Woodland Birds across HumeLink and TL 64 and 66.

4.3.2. Selection principles

General selection principles for Ground Corridors include:

- Final clearing footprints and layout plans.
- Connectivity on the regional landscape scale, particularly with areas of remnant native vegetation.
- Presence of representative woodland vegetation if limited or poorly represented, including Threatened Ecological Communities (TECs).
- Presence of major riparian areas, including KFH.
- Diversity and cover of native groundcovers and shrubs.
- Proximity of threatened flora and fauna records.
- Proximity to biodiversity stewardship sites, conservation reserve estates, National Parks and State Forests.
- Corridor width and configuration – corridors are often more effective in supporting biodiversity by reducing edge effects and providing larger, more connected habitats.
- Long-term viability and resilience – selection should account for the long-term viability of the corridor, including potential for climate change impacts, fire risk, and pest species. Prioritising areas with potential for ecological resilience and long-term stability is critical.
- Restoration potential – some corridors should be chosen based on their potential for restoration and improvement, particularly where transmission lines parallel. Areas that are currently degraded but have the capacity for rehabilitation should be considered.

Final selection of Ground Corridors will be undertaken in a two-step process: desktop review (Section 4.3.1) and field surveys (Section 4.3.2). Corridor widths will be extended to the greatest extent practicable.

4.3.3. Controls

The extent (within easement) of final Ground Corridors will be mapped following completion of the Corridor Inspection Report (refer Section 4.3.3) on all construction planning maps and clearly communicated to construction teams prior to clearing occurring in that area. Physical delineation (refer Annexure B: Clearing Protocol of the HLW BMP) will occur prior to vegetation clearing commencing in the area and involve tall marker posts installed at incremental distances, line of sight or maximum distance of 20 m, along the outer edge. This will allow safe movement of fauna and prevent entanglement while controlling inadvertent impacts from construction. Signage will be clear and simple in nature, for example ‘Connectivity Corridor’, and adequately sized so it can be seen from a distance of at least 20 m.

The following clearing restrictions will apply within Ground Corridors:

- Hand clearing/felling and limited low-impact machinery to minimise ground impacts if required.
- Prioritised retention of native grasses, sedges, herbs, logs, rocks and soil crusts to support ground-dwelling fauna and native plant regeneration (foraging habitat for species such as birds and the Key’s Matchstick Grasshopper).
- Prioritised retention of shrubs with a mature height up to 5.6 m, particularly targeting retention of clusters to provide:
    - Critical structural continuity (critical for birds, reptiles, terrestrial mammals)
    - Vegetated stepping stones for fauna with limited dispersal abilities (e.g., Eastern Pygmy-possum).
    - Shelter and thermal cover for fauna dispersing through the easement.
    - Stepwise vertical connectivity between shrub and groundcovers.
    - Nectar and seed resources for pollinators, birds and small mammals.

- Protection against edge effects (wind, weeds, desiccation).

Where access tracks are required to cross ground connectivity corridors, the location will be selected to minimise impact to the corridor and consideration would be given to the target species. New access tracks that intersect with Ground Corridors (and require vegetation clearing/management) will be rehabilitated following construction works (pending landowner approval and operational necessity; refer to Annexure G: Rehabilitation Plan of the HLW BMP). The short-term duration of use of the access tracks for construction, and the rare intermittent use during operation, are unlikely to impact on the proposed effectiveness of the Ground Corridors.

In accordance with Annexure G: Rehabilitation Plan of the HLW BMP: reuse of terrestrial resources (e.g., large and course woody debris, rock refugia, aquatic habitats) will be prioritised within Ground Corridors and in aquatic habitat impacted by HLW construction. Supplementary ground refugia provide shelter for ground dwelling species, while shorter felled timber lengths may be incorporated to provide off ground connectivity for species including Eastern pygmy possum, Brush-tailed Phascogale and smaller woodland birds. Short sections of felled timber (~3 m) may also be embedded into the ground at intervals across wider clearings to serve as temporary staging points for small birds until sufficient shrubby regrowth provides natural connectivity.

4.4. Glider Crossings

All Glider Crossings will also include Ground Corridors per Section 4.2.1, however clearing may be required for Glider pole installation. Rehabilitation would occur post-installation per Annexure G: Rehabilitation Plan of the HLW BMP as necessary. Glider poles are to be installed as early as possible following the clearing of vegetation occurs, where a period greater than 1 month is likely to occur between clearing completion and pole installation consideration will be given to retaining existing glide path corridors until installation is possible.

4.4.1. Glider crossing locations

The Transgrid Connectivity Review Letter (July, 2025) identified 43 glider corridors in the HumeLink West construction package in three geographic zones as described below. provides a summary of the

The outcomes of the Transgrid Connectivity Review Letter (July, 2025) for glider corridors is presented in Table 4-3 below. This identifies the corridor ID, target glider species, existing connectivity and impact to connectivity based on the approved disturbance areas and the likelihood that glider poles would be required to maintain connectivity.

All glider corridor locations must be reviewed through the final selection process outlined in Section 4.5.

4.4.1.1. Wagga Wagga to Green Hills State Forest: Squirrel Glider in the Wagga Wagga Local Government Area

The Wagga Wagga to Green Hills State Forest Glider Crossing Zone spans approximately 65 kilometres, extending from Wagga Wagga in the west to the western boundary of Green Hills State Forest in the east. This zone is associated with the Squirrel Glider population within the Wagga Wagga Local Government Area (LGA), primarily based on species records from the NSW BioNet Atlas.

Vegetation within this zone is highly cleared and fragmented. Nevertheless, remnant vegetation—including riparian corridors, roadside vegetation, scattered paddock trees, and isolated patches—plays a critical role in maintaining landscape connectivity for the Squirrel Glider population.

Seven connectivity corridors have been identified within this zone, all of which are designated as Glider Crossing Zones for further assessment during implementation of this Connectivity Strategy.

4.4.1.2. Green Hills State Forest: Southern Greater Glider and Squirrel Glider

The Green Hills State Forest Glider Crossing Zone extends approximately 26 kilometres through Green Hills State Forest, located west of Batlow. The zone is predominantly characterised by harvested plantation forest, interspersed with narrow bands of remnant native vegetation, primarily along drainage lines.

Small, scattered patches of suitable habitat for the Southern Greater Glider, Squirrel Glider, and/or Yellow-bellied Glider have been mapped near Batlow Road, Nursery Access Road, Lower Bago Road, and between Wondalga Road and Adelong Creek Road. A more substantial area of glider habitat is also intersected east of the HumeLink T-intersection.

Five connectivity corridors were identified within this zone in the BDAR, three of which were confirmed as glider corridors (BON_2_64, SNO_GREH_1, and SNO_GREH_2). An additional five corridors (SNO_TG_1 to SNO_TG_5) have been identified for further consideration as potential glider crossing points. These additional corridors will be assessed during implementation of the HumeLink West Biodiversity Management Plan (BMP) Connectivity Strategy.

4.4.1.3. Maragle and Bago State Forest: Southern Greater Glider and Yellow-bellied Glider population on the Bago Plateau

The Maragle and Bago State Forest Glider Crossing Zone spans approximately 26 kilometres, extending from the southern extent of the HumeLink alignment near Elliot Way (Maragle) to Snubba Road in the north. This zone is characterised by extensive tall native forests that provide high-quality, known habitat for several threatened glider species, including the Southern Greater Glider, Yellow-bellied Glider (on the Bago Plateau), and the Squirrel Glider.

The Biodiversity Development Assessment Report (BDAR) identified twenty-eight connectivity corridors within this zone, all of which were assessed as being associated with glider habitat using the methods outlined in this assessment.

Existing habitat connectivity in the area is already influenced by cleared transmission easements associated with Transmission Lines 64 and 66. Based on proximity to these existing easements, the zone has been divided into three sub-sections:

- Southern section (parallel to Line 64): Over the southernmost 10 km, HumeLink runs parallel to Line 64, which has an existing easement approximately 60 metres wide. The HumeLink easement will result in a combined cleared corridor of approximately 130 metres. Fifteen BDAR connectivity corridors were identified in this sub-section.
- Central section (parallel to Lines 64 and 66): Approximately 10 km north of Maragle, Lines 64 and 66 converge, forming a shared easement approximately 130 metres wide over a 4.5 km stretch. Within this area, HumeLink will introduce an additional 70-metre-wide easement, resulting in a total cleared width of approximately 200 metres. Eight BDAR connectivity corridors were identified in this sub-section.
- Northern section (not parallel to other lines): Beyond the convergence point, HumeLink diverges westward for an additional 10 km, no longer running parallel to existing lines. This northern section maintains high existing habitat connectivity, and the introduction of the 70-metre-wide HumeLink easement is expected to introduce new barrier effects for glider movement. Four BDAR connectivity corridors were identified in this sub-section.

Given the limited evidence regarding the effectiveness of glider pole arrays for facilitating movement of target species across long cleared spans, the installation of under-transmission glider poles in this section will adopt an adaptive management approach. This may involve a staged installation of glider pole crossings at selected locations, followed by targeted monitoring to assess usage by the target glider species. Monitoring results should be used to inform the necessity and placement of additional poles.

Alternatively, documented evidence of successful glider pole usage from other Transgrid projects—such as the Snowy Transmission Project or Project EnergyConnect—may be used to inform design

and placement decisions within this section.

Official

Table 4-3 Glider Crossing assessment

Corridor ID	Glider Connectivity Zone	Target species for glider crossings	Existing connectivity	Impact to existing connectivity	Likelihood glider poles required to maintain connectivity (desktop assessment)	Glider crossing recommendations
INL_23_92	Wagga Wagga to Green Hills State Forest	Squirrel Glider	Key riparian crossings	Connectivity impact - moderate	Possible	Not identified as Threatened Glider habitat, however located within landscape scale extent of the Squirrel Glider population within the Wagga Wagga LGA. Field verification to consider Glider Poles including under the adjacent transmission line.
INL_23_90	Wagga Wagga to Green Hills State Forest	Squirrel Glider	Key riparian crossings	Connectivity impact - high	Possible	Bionet record located on Tooles Creek ~2000m to east. Landscape connectivity around record maintained by clearing model.

Corridor ID	Glider Connectivity Zone	Target species for glider crossings	Existing connectivity	Impact to existing connectivity	Likelihood glider poles required to maintain connectivity (desktop assessment)	Glider crossing recommendations
INL_20_88	Wagga Wagga to Green Hills State Forest	Squirrel Glider	Non-functional corridor (parallel transmission lines)	Connectivity impact - moderate	Unlikely	Connectivity maintained by clearing model. Supplementary poles beneath existing TL to be assessed during field validation.
INL_17_86	Wagga Wagga to Green Hills State Forest	Squirrel Glider	Intact vegetation corridor	Connectivity maintained	Unlikely	Connectivity maintained by clearing model.
INL_17_85	Wagga Wagga to Green Hills State Forest	Squirrel Glider	Non-functional corridor (parallel transmission lines)	Connectivity maintained	Unlikely	Connectivity maintained by clearing model. Field verification to assess existing connectivity across TL to north between 500 - 1200m to east.

Corridor ID	Glider Connectivity Zone	Target species for glider crossings	Existing connectivity	Impact to existing connectivity	Likelihood glider poles required to maintain connectivity (desktop assessment)	Glider crossing recommendations
INL_17_83	Wagga Wagga to Green Hills State Forest	Squirrel Glider	Non-functional corridor (plantation)	Connectivity maintained	Unlikely	Current location unsuitable due to cleared plantation forest to the north. Field verification required to assess alternate location ~1400 m west for Squirrel Glider connectivity between towers..
INL_17_84	Wagga Wagga to Green Hills State Forest	Squirrel Glider	Fragmented vegetation corridor	Connectivity maintained	Unlikely	Corridor of scattered paddock trees along Turners Creek. Development will have minimal impact to existing connectivity.

Corridor ID	Glider Connectivity Zone	Target species for glider crossings	Existing connectivity	Impact to existing connectivity	Likelihood glider poles required to maintain connectivity (desktop assessment)	Glider crossing recommendations
SNO_TG_1	Green Hills State Forest	Greater Glider, Squirrel Glider	Fragmented vegetation corridor	Connectivity impact - high	Possible	Linear vegetation corridor through cleared landscape along Lower Bago Road. Potentially important connection for Squirrel and Greater Gliders. Review connectivity for Gliders based on Final Layout Plans.

Corridor ID	Glider Connectivity Zone	Target species for glider crossings	Existing connectivity	Impact to existing connectivity	Likelihood glider poles required to maintain connectivity (desktop assessment)	Glider crossing recommendations
SNO_TG_2	Green Hills State Forest	Greater Glider, Squirrel Glider	Fragmented vegetation corridor	Connectivity impact - high	Possible	Linear vegetation corridor through cleared landscape along Yaven Yaven Creek. Potentially important connection for Squirrel and Greater Gliders. Review connectivity for Gliders based on Final Layout Plans.
SNO_GREH_2	Green Hills State Forest	Greater Glider	Key riparian crossings	Connectivity impact - moderate	Possible	Recommend moving crossing 500m south to the Bago Creek crossing which provides better connectivity into the riparian network the Sailors Gully, Lower Bago Road and Batlow Road.

Corridor ID	Glider Connectivity Zone	Target species for glider crossings	Existing connectivity	Impact to existing connectivity	Likelihood glider poles required to maintain connectivity (desktop assessment)	Glider crossing recommendations
SNO_TG_3	Green Hills State Forest	Greater Glider, Squirrel Glider	Fragmented vegetation corridor	Connectivity impact - high	Possible	Linear vegetation corridor through cleared landscape along Germans Creek. Potentially important connection for Squirrel and Greater Gliders. Review connectivity for Gliders based on Final Layout Plans.

Corridor ID	Glider Connectivity Zone	Target species for glider crossings	Existing connectivity	Impact to existing connectivity	Likelihood glider poles required to maintain connectivity (desktop assessment)	Glider crossing recommendations
SNO_TG_4	Green Hills State Forest	Greater Glider, Squirrel Glider	Fragmented vegetation corridor	Connectivity impact - high	Possible	Linear vegetation corridor through cleared landscape along Adelong Creek. Potentially important connection for Squirrel and Greater Gliders. Review connectivity for Gliders based on Final Layout Plans.
SNO_GREH_3	Green Hills State Forest	Yellow-bellied Glider	Intact vegetation corridor	Connectivity impact - high	Possible	Assumed present and not bionet records, however could be providing linkage between larger patches of native vegetation within Bago SF.

Corridor ID	Glider Connectivity Zone	Target species for glider crossings	Existing connectivity	Impact to existing connectivity	Likelihood glider poles required to maintain connectivity (desktop assessment)	Glider crossing recommendations
SNO_TG_5	Green Hills State Forest	Greater Glider, Squirrel Glider	Fragmented vegetation corridor	Connectivity impact - high	Possible	Linear vegetation corridor through cleared landscape along Little Gilmore Creek. Potentially important connection for Squirrel and Greater Gliders. Review connectivity for Gliders based on Final Layout Plans.
BON_2_64	Green Hills State Forest	Greater Glider	Key riparian crossings	Connectivity maintained	Unlikely	The corridor is located to maintain connectivity along Adelong Creek where clearing is not required under the approved clearing area.

Corridor ID	Glider Connectivity Zone	Target species for glider crossings	Existing connectivity	Impact to existing connectivity	Likelihood glider poles required to maintain connectivity (desktop assessment)	Glider crossing recommendations
SNO_GREH_1	Maragle and Bago State Forest	Greater Glider & Yellow-bellied Glider	Intact vegetation corridor	Connectivity maintained	Likely	No parallel TM. Glider crossing to be assessed as part of the Bago State Forest connectivity review.
SNO_1_72	Maragle and Bago State Forest	Squirrel Glider	Fragmented vegetation corridor	Connectivity maintained	Unlikely	Connectivity maintained. This corridor crossed the existing Snubba Road only.
SNO_1_73	Maragle and Bago State Forest	Greater Glider & Yellow-bellied Glider	Intact vegetation corridor	Connectivity impact - high	Likely	No parallel TM. Glider crossing to be assessed as part of the Bago State Forest connectivity review.

Corridor ID	Glider Connectivity Zone	Target species for glider crossings	Existing connectivity	Impact to existing connectivity	Likelihood glider poles required to maintain connectivity (desktop assessment)	Glider crossing recommendations
SNO_1_74	Maragle and Bago State Forest	Greater Glider & Yellow-bellied Glider	Intact vegetation corridor	Connectivity impact - high	Likely	No parallel TM. Glider crossing to be assessed as part of the Bago State Forest connectivity review.
SNO_1_93	Maragle and Bago State Forest	Greater Glider & Yellow-bellied Glider	Intact vegetation corridor	Connectivity impact - high	Likely	No parallel TM. Glider crossing to be assessed as part of the Bago State Forest connectivity review.
SNO_1_94	Maragle and Bago State Forest	Greater Glider & Yellow-bellied Glider	Non-functional corridor (parallel transmission lines)	Connectivity impact - moderate	Likely	Bago State Forest Adjacent to TL 64 and 66 forming 200m wide easement. Glider crossing to be assessed as part of the Bago SF connectivity.

Corridor ID	Glider Connectivity Zone	Target species for glider crossings	Existing connectivity	Impact to existing connectivity	Likelihood glider poles required to maintain connectivity (desktop assessment)	Glider crossing recommendations
SNO_1_96	Maragle and Bago State Forest	Greater Glider & Yellow-bellied Glider	Non-functional corridor (parallel transmission lines)	Connectivity impact - high	Likely	Bago State Forest Adjacent to TL 64 and 66 forming 200m wide easement. Glider crossing to be assessed as part of the Bago SF connectivity.
SNO_1_97	Maragle and Bago State Forest	Greater Glider & Yellow-bellied Glider	Non-functional corridor (parallel transmission lines)	Connectivity impact - high	Likely	Bago State Forest Adjacent to TL 64 and 66 forming 200m wide easement. Glider crossing to be assessed as part of the Bago SF connectivity.

Corridor ID	Glider Connectivity Zone	Target species for glider crossings	Existing connectivity	Impact to existing connectivity	Likelihood glider poles required to maintain connectivity (desktop assessment)	Glider crossing recommendations
SNO_1_98	Maragle and Bago State Forest	Greater Glider & Yellow-bellied Glider	Non-functional corridor (parallel transmission lines)	Connectivity impact - high	Likely	Bago State Forest Adjacent to TL 64 and 66 forming 200m wide easement. Glider crossing to be assessed as part of the Bago SF connectivity.
SNO_1_75	Maragle and Bago State Forest	Greater Glider & Yellow-bellied Glider	Non-functional corridor (parallel transmission lines)	Connectivity impact - high	Possible	Bago State Forest Adjacent to TL 64 forming 120m wide easement. Glider crossing to be assessed as part of the Bago SF connectivity. This location will use the vegetation at the junction of the lines as a stepping stone.

Corridor ID	Glider Connectivity Zone	Target species for glider crossings	Existing connectivity	Impact to existing connectivity	Likelihood glider poles required to maintain connectivity (desktop assessment)	Glider crossing recommendations
SNO_1_99	Maragle and Bago State Forest	Greater Glider & Yellow-bellied Glider	Non-functional corridor (parallel transmission lines)	Connectivity impact - high	Likely	Bago State Forest Adjacent to TL 64 and 66 forming 200m wide easement. Glider crossing to be assessed as part of the Bago SF connectivity.
SNO_1_102	Maragle and Bago State Forest	Greater Glider & Yellow-bellied Glider	Non-functional corridor (parallel transmission lines)	Connectivity impact - high	Possible	Bago State Forest Adjacent to TL 64 and 66 forming 200m wide easement. Glider crossing to be assessed as part of the Bago SF connectivity.

Corridor ID	Glider Connectivity Zone	Target species for glider crossings	Existing connectivity	Impact to existing connectivity	Likelihood glider poles required to maintain connectivity (desktop assessment)	Glider crossing recommendations
SNO_1_100	Maragle and Bago State Forest	Greater Glider & Yellow-bellied Glider	Non-functional corridor (parallel transmission lines)	Connectivity impact - high	Possible	Bago State Forest Adjacent to TL 64 and 66 forming 200m wide easement. Glider crossing to be assessed as part of the Bago SF connectivity.
SNO_1_101	Maragle and Bago State Forest	Greater Glider & Yellow-bellied Glider	Non-functional corridor (parallel transmission lines)	Connectivity impact - high	Possible	Bago State Forest Adjacent to TL 64 and 66 forming 200m wide easement. Glider crossing to be assessed as part of the Bago SF connectivity.

Corridor ID	Glider Connectivity Zone	Target species for glider crossings	Existing connectivity	Impact to existing connectivity	Likelihood glider poles required to maintain connectivity (desktop assessment)	Glider crossing recommendations
SNO_1_76	Maragle and Bago State Forest	Greater Glider & Yellow-bellied Glider	Non-functional corridor (parallel transmission lines)	Connectivity impact - high	Possible	Bago State Forest Adjacent to TL 64 forming 120m wide easement. Glider crossing to be assessed as part of the Bago SF connectivity. This location will use the vegetation at the junction of the lines as a stepping stone.

Corridor ID	Glider Connectivity Zone	Target species for glider crossings	Existing connectivity	Impact to existing connectivity	Likelihood glider poles required to maintain connectivity (desktop assessment)	Glider crossing recommendations
SNO_1_103	Maragle and Bago State Forest	Greater Glider & Yellow-bellied Glider	Non-functional corridor (parallel transmission lines)	Connectivity impact - high	Possible	Bago State Forest Adjacent to TL 64 forming 120m wide easement. Glider crossing to be assessed as part of the Bago SF connectivity. This location will use the vegetation at the junction of the lines as a stepping stone.

Corridor ID	Glider Connectivity Zone	Target species for glider crossings	Existing connectivity	Impact to existing connectivity	Likelihood glider poles required to maintain connectivity (desktop assessment)	Glider crossing recommendations
SNO_1_104	Maragle and Bago State Forest	Greater Glider & Yellow-bellied Glider	Non-functional corridor (parallel transmission lines)	Connectivity impact - high	Possible	Bago State Forest Adjacent to TL 64 forming 120m wide easement. Glider crossing to be assessed as part of the Bago SF connectivity. This location will use the vegetation at the junction of the lines as a stepping stone.

Corridor ID	Glider Connectivity Zone	Target species for glider crossings	Existing connectivity	Impact to existing connectivity	Likelihood glider poles required to maintain connectivity (desktop assessment)	Glider crossing recommendations
SNO_1_105	Maragle and Bago State Forest	Greater Glider & Yellow-bellied Glider	Non-functional corridor (parallel transmission lines)	Connectivity impact - high	Possible	Bago State Forest Adjacent to TL 64 forming 120m wide easement. Glider crossing to be assessed as part of the Bago SF connectivity. This location will use the vegetation at the junction of the lines as a stepping stone.

Corridor ID	Glider Connectivity Zone	Target species for glider crossings	Existing connectivity	Impact to existing connectivity	Likelihood glider poles required to maintain connectivity (desktop assessment)	Glider crossing recommendations
SNO_1_106	Maragle and Bago State Forest	Greater Glider & Yellow-bellied Glider	Non-functional corridor (parallel transmission lines)	Connectivity impact - high	Possible	Bago State Forest Adjacent to TL 64 forming 120m wide easement. Glider crossing to be assessed as part of the Bago SF connectivity. This location will use the vegetation at the junction of the lines as a stepping stone.

Corridor ID	Glider Connectivity Zone	Target species for glider crossings	Existing connectivity	Impact to existing connectivity	Likelihood glider poles required to maintain connectivity (desktop assessment)	Glider crossing recommendations
SNO_1_107	Maragle and Bago State Forest	Greater Glider & Yellow-bellied Glider	Non-functional corridor (parallel transmission lines)	Connectivity impact - high	Possible	Bago State Forest Adjacent to TL 64 forming 120m wide easement. Glider crossing to be assessed as part of the Bago SF connectivity. This location will use the vegetation at the junction of the lines as a stepping stone.

Corridor ID	Glider Connectivity Zone	Target species for glider crossings	Existing connectivity	Impact to existing connectivity	Likelihood glider poles required to maintain connectivity (desktop assessment)	Glider crossing recommendations
SNO_1_108	Maragle and Bago State Forest	Greater Glider & Yellow-bellied Glider	Non-functional corridor (parallel transmission lines)	Connectivity impact - high	Possible	Bago State Forest Adjacent to TL 64 forming 120m wide easement. Glider crossing to be assessed as part of the Bago SF connectivity. This location will use the vegetation at the junction of the lines as a stepping stone.

Corridor ID	Glider Connectivity Zone	Target species for glider crossings	Existing connectivity	Impact to existing connectivity	Likelihood glider poles required to maintain connectivity (desktop assessment)	Glider crossing recommendations
SNO_1_77	Maragle and Bago State Forest	Greater Glider & Yellow-bellied Glider	Non-functional corridor (parallel transmission lines)	Connectivity impact - high	Possible	Bago State Forest Adjacent to TL 64 forming 120m wide easement. Glider crossing to be assessed as part of the Bago SF connectivity. This location will use the vegetation at the junction of the lines as a stepping stone.

Corridor ID	Glider Connectivity Zone	Target species for glider crossings	Existing connectivity	Impact to existing connectivity	Likelihood glider poles required to maintain connectivity (desktop assessment)	Glider crossing recommendations
SNO_1_109	Maragle and Bago State Forest	Greater Glider & Yellow-bellied Glider	Non-functional corridor (parallel transmission lines)	Connectivity impact - high	Possible	Bago State Forest Adjacent to TL 64 forming 120m wide easement. Glider crossing to be assessed as part of the Bago SF connectivity. This location will use the vegetation at the junction of the lines as a stepping stone.

Corridor ID	Glider Connectivity Zone	Target species for glider crossings	Existing connectivity	Impact to existing connectivity	Likelihood glider poles required to maintain connectivity (desktop assessment)	Glider crossing recommendations
SNO_1_110	Maragle and Bago State Forest	Greater Glider & Yellow-bellied Glider	Non-functional corridor (parallel transmission lines)	Connectivity impact - high	Possible	Bago State Forest Adjacent to TL 64 forming 120m wide easement. Glider crossing to be assessed as part of the Bago SF connectivity. This location will use the vegetation at the junction of the lines as a stepping stone.
SNO_1_111	Maragle and Bago State Forest	Greater Glider & Yellow-bellied Glider	Non-functional corridor (parallel transmission lines)	Connectivity impact - high	Possible	Bago State Forest. Adjacent to TL 64 easement at break in HL.

Corridor ID	Glider Connectivity Zone	Target species for glider crossings	Existing connectivity	Impact to existing connectivity	Likelihood glider poles required to maintain connectivity (desktop assessment)	Glider crossing recommendations
SNO_1_112	Maragle and Bago State Forest	Greater Glider & Yellow-bellied Glider	Non-functional corridor (parallel transmission lines)	Connectivity impact - high	Possible	Bago State Forest Adjacent to TL 64 forming 120m wide easement. Glider crossing to be assessed as part of the Bago SF connectivity. This location will use the vegetation at the junction of the lines as a stepping stone.

Corridor ID	Glider Connectivity Zone	Target species for glider crossings	Existing connectivity	Impact to existing connectivity	Likelihood glider poles required to maintain connectivity (desktop assessment)	Glider crossing recommendations
SNO_1_113	Maragle and Bago State Forest	Greater Glider & Yellow-bellied Glider	Non-functional corridor (parallel transmission lines)	Connectivity impact - high	Possible	Bago State Forest Adjacent to TL 64 forming 120m wide easement. Glider crossing to be assessed as part of the Bago SF connectivity. This location will use the vegetation at the junction of the lines as a stepping stone.

Corridor ID	Glider Connectivity Zone	Target species for glider crossings	Existing connectivity	Impact to existing connectivity	Likelihood glider poles required to maintain connectivity (desktop assessment)	Glider crossing recommendations
SNO_1_78	Maragle and Bago State Forest	Greater Glider & Yellow-bellied Glider	Non-functional corridor (parallel transmission lines)	Connectivity impact - high	Possible	Bago State Forest Adjacent to TL 64 forming 120m wide easement. Glider crossing to be assessed as part of the Bago SF connectivity. This location will use the vegetation at the junction of the lines as a stepping stone.

4.4.2. Design

The glide ability of the target Glider species, along with other species-specific behavioural considerations, must be taken into account when designing glider crossing zones:

- Squirrel Glider (Goldingay and Taylor, 2009):
  - Average glide angle = 28.5 ± 0.8°.
  - Average glide ratio (distance/height loss) = 1.84 m.
- Yellow-bellied Glider (Goldingay, 2014; Jackson, 2002):
  - Average glide angle = 27.3°.
  - Average glide ratio = 2 m (when gliding from a height of 18.5 m above ground)
- Southern Greater Glider (Dr. Ana Gracanin, personal communication, 3/04/2025):
  - Average glide angle = 44.58°.
  - Average glide ratio = 1.04 m.

The maximum glide distances achieved by these Gliders depends on launch/landing heights and tree height, as well as landscape positioning. Gliders typically launch from 2-3 m below the canopy height and land ≥ 5 m above ground (Goldingay, 2014; Goldingay and Taylor, 2009; Jackson, 2002).

The glide ratios indicate that the Squirrel Glider and Yellow-bellied Glider can travel farther per glide, therefore the design of Glider poles has been developed to achieve the minimum requirements of the Southern Greater Glider (glide ratio of 1.04). For a 12 m tall Glider pole, a Southern Greater Glider could launch from a launching pad (1 m below the top of the pole) and land at the bottom of the next pole at a distance of 11.44 m. However, Gliders land at ≥ 5 m above the ground therefore, the maximum distance a Southern Greater Glider could achieve would be 6.24 m (rounded down = 6 m). As a result, a large number of Glider poles will be required along the transmission easement, spaced at a maximum of 6 m apart.

There are no examples in the literature of Gliders utilising numerous poles across a gap. The expanse of open ground, along with potential abiotic effects, may deter Gliders from using the poles. As such, the use of the poles by Gliders is not guaranteed, and the monitoring program defined in Section 5 will assess the efficacy of this design.

Guidelines to be considered for the installation of 12 m tall Glider poles is provided in Table 4-4 below. Ongoing retention of large trees within the HTZ will occur that intersect glider corridors, subject to regular arboricultural assessment and ongoing tree maintenance/ pruning to minimise any safety risks.

Table 4-4 Glider pole design considerations

Consideration	Height	Comment
Height of Glider pole	12 m	Maximum pole height.
Height of launch	11 m	Launch pad should be placed 1 m below the top of the Glider pole.
Height of landing	5 m above ground	Based on literature review (Goldingay, 2014; Goldingay and Taylor, 2009; Jackson, 2002).

Consideration	Height	Comment
Achievable glide distance	6 m	Glider poles to be spaced at a maximum of 6 m apart. Pole spacing adjacent to retained vegetation may be greater, pending tree height of retained trees > 12 m.
Unique identifier	1-2 m above ground	A unique Glider pole identification number will be placed on the pole as a high-visibility marker.
Material	N/A	Non-conductive material due to proximity to conductors and the potential arcing risk.

An example of a Glider pole array is displayed in Plate 4-1. Each terminating glider pole (one at each end of the Glider Crossing) will be fitted with a motion detection monitoring camera to assist with ongoing monitoring.



Plate 4-1 Example Glider pole array (left) and launching pad with monitoring camera (right) (Kylie et al., 2015; Wildlife Preservation Society of Queensland, 2025)

4.5. Final selection process

4.5.1. Desktop review

A desktop review will be completed following the methods in the Transgrid Connectivity Review Letter (July, 2025) and the revised clearing footprints and final layout plans to guide the final location and design of Ground Corridors and Glider Crossings. It will confirm the assumptions regarding impact to connectivity for the target species based on the revised disturbance area. This should be conducted by a suitably qualified and experienced ecologist. The desktop review will guide field surveys detailed below.

4.5.2. Field surveys

Field surveys will be undertaken by a suitably qualified ecologist (minimum of two-year's experience) to confirm locations for Ground Corridors and Glider Crossings with reference to ground conditions. It is preferred that a CPHR glider expert is present at on-site field validation surveys for all potential glider crossing locations. to ensure that infrastructure placement is informed by expert assessment of habitat features and species movement patterns. To facilitate this, the project ecologists will provide a schedule of field surveys involving Glider Crossings two weeks ahead of surveys occurring to allow for scheduling and facilitate their access to site. In the event that the glider expert is unavailable the project ecologist will, where practicable, reschedule the survey or where an unreasonable delay would occur the project ecologist will provide a preliminary report for comment. Field surveys must be complete a minimum of 4 weeks prior to clearing works commencing and will involve the following methods:

- Confirm site values against Ground Corridor selection principles (refer Section 4.2.1.1), Glider Crossing design considerations (Section 4.2.2.1), indicative corridors and threatened species records.
- Validate selection and/or recommend necessary changes to connectivity corridors.
- Assess proximity to existing easements (Line 64 and 66) and retained vegetated gaps between easements.
- Identify the IBRA region and any associated previously mapped corridor number, the overall size of the corridor, logs, rocky outcrops, waterways, known species records, riparian areas, and proximity to a national park, nature reserve or stewardship site.
- Identify additional connectivity impairments (i.e., roads, tracks, waterways).
- Record retained trees within 20 m either side of the HLW easement, noting the following characteristics:
    - Species.
    - Height.
    - Diameter at Breast Height (DBH).
    - Canopy spread.
    - Distance from adjacent trees.
    - Potential Glider nest trees.
    - GPS location and photos.

The results of ground truthing surveys will be incorporated into a Corridor Inspection Report (detailed below).

4.5.3. Corridor Inspection Report

A Corridor Inspection Report will be prepared following desktop review and field surveys detailed above, at least one month prior to clearing commencing around the corridors. This must be prepared by a suitably qualified ecologist (minimum 2-years' experience) and be submitted to CPHR to demonstrate that the objectives of the connectivity strategy and the 29 July 2025 dated connectivity corridor review letter have been met.

The report will involve an assessment of assumptions made in the Transgrid Connectivity Review Letter (July, 2025) based on the final layout plans and field surveys to determine site-specific recommendations. The report will outline Ground Corridor and Glider Crossing locations and dimensions based on revised clearing footprints, final layout plans, selection principles (Section 4.2.1.1) and Glider design considerations (Section 4.2.2.1). Reports will detail; recommendations for protecting connectivity corridors during and after construction, the placement of any connectivity enhancement features and how connectivity will be maintained for glider species in the locations of glider poles pending their installation.

Where the BDAR connectivity corridors are found to be unsuitable, alternate locations should be

recommended. Additional suitable corridors may also be added and utilised.

Where connectivity will be maintained by retained vegetation, this must be confirmed and reported by the Project Ecologists. If this is incorrect, then recommendations should be made for these crossings to maintain connectivity for the target species.

4.5.4. Glider pole design

The results of the Corridor Inspection Report will then inform detailed design to check locations of final Glider Crossings against the tower and conductor locations, allow safety in design reviews and acceptance from asset management. This will include locations, pole heights and the required number of poles based on documented glide performance including glide angles, distances and heights (refer Section 4.2.2.1) for the identified species. Consultation with CPHR and relevant Glider experts will occur as part of this process and must be completed prior to the commencement of clearing around corridors.

4.6. Collision-risk

4.6.1. Collision risk deterrents

To minimise the risk of bird and bat collisions with transmission lines, TransGrid will prepare a Conductor Line-Marking Plan in consultation with CPHR. The outcomes of the Plan will be incorporated into the BMP upon finalisation. The plan will be spatially explicit and will identify all high-risk spans, device type, placement, and spacing.

TransGrid will undertake a review of collision risk for highly mobile and collision-prone species, including:

- Threatened forest owls, raptors, cockatoos
- Migratory birds
- Grey-headed Flying-fox and
- Microbats

The review will incorporate:

- Updated species distribution and movement data (including BDAR records, BAVR survey records and Bionet records within 10km)
- Mapped high-risk landforms and habitats (e.g. riparian corridors, ridge-to-ridge spans, wetland approaches, known roosts/nests)
- Records of stick nests or communal roosts identified during pre-clearing surveys
- Background and visibility factors (e.g. forested backdrops, low-light/fog-prone areas)

The review will be documented in a Conductor Line-Marking Plan, with the outcomes included in the BMP.

- This Plan will:
    - Confirm locations where conductor line-marking deterrent devices will be installed, applying clear spatial parameters:
        - 500 m from significant water bodies
        - 1 km from large wetlands, estuaries, or known roost/nest complexes
        - Spans crossing mapped riparian corridors or within 250m of wetlands or floodplains
        - Ridge-to-ridge or valley funnel spans used as known flightlines

        - Spans within 1 km of known or potential raptor nests (including those identified in pre-clearing surveys) or bat roosts where flight paths intersect the alignment
        - Any span with recorded collisions or similar habitat characteristics to known incident sites
        - Ground and glider corridors identified in the Connectivity Strategy
    - Detail protection measures, maintenance requirements, and monitoring commitments.

4.6.2. Collision risk measures

Vehicle strike and conductor line collision risk reduction measures will be considered during detailed design and implemented during construction as follows:

- Choose conductor line-marking technique (refer below).
- Work scheduling – minimised night works to the extent possible, staging and timing of habitat clearing in accordance with Annexure B: Clearing Protocol of the HLW BMP.
- Lighting:
    - Directional lighting will be used for any permanent lighting (i.e., substations) or temporary lighting (i.e., worker's accommodation) required to minimise light spill in accordance with *Australian Standard AS4282:2019*.
    - Artificial lighting required during construction will be directed towards the work site and minimise light spill, to the furthest extent practicable. Permanent lighting will be erected at least 50 m from remnant vegetation where practicable.
- Speed limits, implementation of Annexure D: Unexpected Finds Procedure and Annexure B: Clearing Protocol for appropriate fauna handling in case of vehicular collisions.
- Dismantlement of raptor nests (when not in use) in accordance with Annexure C: Hollow and Nest Strategy of the HLW BMP to reduce collision risk for raptors.
- Education and training programs in accordance with Section 7.4 of the HLW BMP.
- Enhanced signage and visibility – high-visibility road signage will be installed in areas known to have high wildlife activity. This may include signage indicating the presence of large fauna (e.g., kangaroos, wombats) and direct drivers to reduce speed during certain times of day or seasons when collisions are more likely.
- Construction best practices – construction practices will be implemented that minimise disruption to wildlife and reduce collision risk, including fencing or netting around construction zones to deter wildlife from entering high-risk areas.
- Monitoring and reporting of wildlife roadkill – all wildlife collisions will be reported in accordance with Annexure B: Clearing Protocol (Attachment 3: Fauna handling record sheet) of the HLW BMP to track the frequency and locations of wildlife collisions. This will help identify high-risk areas for fauna. Where multiple collisions occur at a location the track will be targeted for additional mitigation efforts such as the installation of an underpass (preferred option).
- Road and habitat restoration – in accordance with Annexure G: Rehabilitation Plan of the HLW BMP, any access roads not necessary for operations will be rehabilitated, in line with the relevant Property Management Plan, to encourage wildlife to move back to safer, more natural routes away from roads or transmission lines.
- Wildlife deterrents (e.g., fencing) – wildlife-proof fencing will be considered in areas known to have high wildlife activity to reduce the likelihood of animals entering dangerous areas.

4.6.3. Conductor line-marking techniques

Per UMM B11, conductor line-marking techniques are to be considered during design refinement to minimise bird and bat strike. TransGrid will undertake a review of the risk of collision with transmission lines by highly mobile species including threatened Forest Owls, Raptors and Cockatoos, Migratory Birds, Grey-headed Flying-fox and microbats to determine the location and type of adaptive

management measures for collision-risk species. Deterrent strategies would include conductor line-marking deterrents designed to improve visibility of transmission lines for avifauna and flying-foxes.

The review will be completed in consultation with CPHR and documented in a Conductor Line-Marking Plan. The plan will be spatially explicit and will identify all high-risk spans ('hot-spots'), device type, placement, and spacing. The outcomes of the Plan will be included in the Connectivity Strategy upon finalisation. The installation of conductor line markers will occur within 1 month following installation of OPGW / OHEW.

4.7. Summary of connectivity strategy measures

All connectivity measures outlined in this strategy have been summarised in Table 4-6 below. These specific management and mitigation measures have been developed to address the relevant requirements of applicable legislation, the MCoA, the CoMA, the UMMs and all Planning Approval Documentation, particularly the Revised BDAR. A summary of all management and mitigation measures relevant to the HLW BMP is provided in Section 7.12 of the BMP.

Table 4-5 Connectivity management and mitigation measures

ID	Measure/Requirement	When to implement	Responsibility	Reference	Evidence
BMP20	Retention of ground, shrub and habitat resources will be prioritised in areas of partial clearing (ECZ & HTZ).	Pre-construction and Construction	Environmental Manager Design Manager Construction Manager Supervisor Engineer	MCoA B25, B30 CoMA 2, 7 UMM B3, B6, B10, B11, B28	Post-clearing Reports
BMP21	Desktop review of connectivity corridors (Ground Corridors & Glider Crossings) to be followed by field surveys. Corridor Inspection Report prepared prior to clearing commencing, and is to include an assessment of assumptions made in this strategy and the desktop review, final corridor locations/dimensions and any associated recommendations.	Pre-construction	Environmental Representative Suitably qualified ecologist	MCoA B25, B30 CoMA 2, 7 UMM B3, B6, B10, B11, B28	Corridor Inspection Report

ID	Measure/Requirement	When to implement	Responsibility	Reference	Evidence
BMP22	As many Ground Corridors that can be successfully retained/established will be identified and protected via delineation and clearing restrictions.	Pre-construction and construction	Environmental Representative Project Ecologist	MCoA B25, B30 CoMA 2, 7 UMM B3, B6, B10, B11, B28	Corridor Inspection Report Post-clearing Reports
BMP23	As many Glider Crossings that can be successfully retained/established will be identified and undergo detailed design to identify locations, pole heights and the required number of poles based on documented glide performance including glide angles, distances and heights. Glider pole arrays to be installed within 3 months of final clearing.	Pre-construction and construction	Environmental Representative Construction Manager Project Ecologist	MCoA B25, B30 CoMA 2, 7 UMM B3, B6, B10, B11, B28	Corridor Inspection Report Glider Pole Installation Report
BMP24	Conductor line-markers to be installed at select locations and areas identified as higher strike risk following detailed design.	Detailed design and construction	Environmental Representative Construction Manager Project Ecologist	MCoA B25, B30 CoMA 2, 7 UMM B3, B6, B10, B11, B28	Detailed design and Project Ecologist confirmation

5. Compliance management

5.1. Monitoring

Monitoring of this strategy will occur during construction of HLW to determine the efficacy of connectivity measures, as detailed below. Monitoring will continue for 5 years post-installation, to be incorporated into the Operational Biodiversity Management Plan by Transgrid.

5.1.1. Ground Corridors

To monitor the efficacy of Ground Corridors, qualitative assessments of habitat values will be conducted biannually by the Project Ecologist. Ground Corridor monitoring is to continue through construction, until Transgrid operational monitoring phase begins. Each spring and autumn, monitoring will assess:

- Type, condition and extent of retained vegetation.
- Extent of disturbance within the corridor including weeds, clearing works, fragmentation from access tracks/roads and evidence of pest use.
- Delineation of corridors.

- Need for corrective actions (i.e., delineation, pest management, weed management, rehabilitation).

5.1.2. Glider Crossings

Terminating glider poles (one at each end of the Glider Crossing) will be fit with one motion detecting camera. These will be set to record continuously for the entire year, with data analysis to target three months of the year during the construction period, including the target Glider species breeding periods:

1. Greater Glider = March
2. Squirrel Glider & Yellow-bellied Glider = September

Monitoring will continue for 5 years post-installation, to be incorporated into the Operational Biodiversity Management Plan by Transgrid. Motion detecting cameras will be set to record 10 photos per motion trigger with a one second interval between images, and a quiet period of 30 second between triggers, set to record continuously. Successful Glider pole use will be determined through detection of Gliders on both terminating poles.

5.2. Reporting

5.2.1. Pre-clearing Report

Pre-clearing Reports will include an assessment of Ground Corridors established within a clearing permit area. The following will be reported on:

- Final location of established Ground Corridors, including GPS coordinates and figures.
- Width of corridor.
- Plant Community Types (PCTs) present within the corridor.
- Habitat features present and expected target species that will utilise the corridor.
- Assessment of incidents and non-compliances based on the TARP in Section 5.3.

5.2.2. Glider Pole Installation Report

The Glider Pole Installation Report will detail all Glider pole arrays installed for HLW. This report will be prepared by a suitably qualified ecologist (minimum 2-years' experience) following the installation of necessary Glider poles. The following minimum requirements are to be included in the Glider Pole Installation Report:

- Location of Glider pole array installations, including GPS coordinates and Unique Glider Pole IDs. Figures to be provided to display array locations.
- Number of poles installed at each Glider Crossing, including span of the array (m).
- Glider pole design specifications (i.e., pole, launch and landing height).
- Date of installation.
- Monitoring camera deployment details (e.g., height, exact location, angle) including installers.
- Assessment of incidents and non-compliances based on the TARP in Section 5.3.

5.2.3. Monitoring reports

During construction, monitoring data (as detailed in Section 5.1) will be provided to Transgrid as part of regular environmental reports, specifically:

- Biannually in spring and autumn = qualitative assessments of habitat values within connectivity corridors.
- Annually = results of glider pole camera monitoring.

Biannual Connectivity Monitoring Reports will be prepared and submitted to Transgrid as soon as they are available, including the following:

- Results of spring Ground Corridor monitoring.
- Results of 3 months Glider pole camera data analysis period.
- Qualitative assessments of habitat values within Ground Corridors.
- Assessment of glider utilisation of glider poles.
- Assessment of the overall success of the mitigation measures installed.
- Identification of gaps/limitations to the connectivity monitoring methodology. This includes monitoring components, method of data collection (frequency and location), method of data, analysis and reporting requirements.
- Provision of recommendations for adjustments to monitoring techniques, timing and locations.
- Details of any non-conformances, including recommended corrective measures. Incidents and non-compliances
- Findings of carcass searches.

It is possible that Gliders will be reluctant to cross such large gaps, even with the assistance of Glider poles. Additional abiotic impacts may affect Gliders' ability to cross the easement, such as increased wind and precipitation. The monitoring program detailed above will be undertaken as part of the continual improvement process of this strategy. If there is no indication of successful crossings after 12-months (from camera data), further action may be required. Non-conformances, incident reporting and subsequent investigation will be undertaken as required in accordance with the Trigger Action Response Plan (TARP) provided in Table 5-1 below. HLWJV will promptly advise Transgrid on events that are non-conforming with this strategy. Where the monitoring commitment is beyond the construction timeline, monitoring procedures and commitments will be novated to the Operational Environmental Management Plan.

Table 5-1 Connectivity strategy TARP

Objective	Target	Performance indicator	Method of monitoring	Frequency	Trigger	Action/response plan
Maintain landscape connectivity for fauna.	Ground Corridors established and retained.	Retention of Ground Corridors within designated areas.	Pre-clearing Survey	Once, before clearing in an area.	Corridor cleared, narrowed or fragmented >10% of final Ground Corridor limits.	Stop works. Review vegetation clearing against GIS. Re-establish linkage via planting or adjust corridor route.
	Vegetation and habitat features support fauna movements.	Groundcover, shrubs and habitat resources present and connected.	Post-clearing Report Ground Corridor Monitoring	Annually	Groundcover, shrub and habitat resource impacts >10% compared to baseline. Evidence of pest use.	Rehabilitate native ground layer and shrubs. Monitor regrowth. Undertake pest control.

Objective	Target	Performance indicator	Method of monitoring	Frequency	Trigger	Action/response plan
	Glider poles installed at correct locations, heights and numbers.	Glider poles installed within 3 months of clearing at final Glider crossing zone locations. Cameras installed at terminating poles (one at each end of the corridor).	Glider Pole Installation Report	Once, following the installation of necessary Glider poles.	Correct number of Glider poles not installed within 3 months of clearing works at that location. Remote cameras not installed at each glider pole.	Halt nearby works. Determine why poles and/or cameras cannot be installed, address any barriers and complete installation. Reinspect to confirm installation has been complete.
	Poles show evidence of use within 2 years.	Remote cameras show evidence of pole use by Gliders.	Glider pole camera monitoring.	Annually	No Glider evidence after 2 full breeding seasons.	Review pole spacing and height. Assess surrounding vegetation. Conduct additional Glider surveys in areas surrounding Glider Crossings to compare Glider activity. Development of a mitigation plan in consultation with NSW DCCEEW Environment and Heritage, addressing causes of decline as determined in initial investigation. This may include

Objective	Target	Performance indicator	Method of monitoring	Frequency	Trigger	Action/response plan
						increased monitoring or additional construction related mitigation measures.
Reduce the spread of invasive species within connectivity corridors.	Invasive species are managed within Ground Corridors.	No new weeds established.	Ongoing weed monitoring per Annexure E: Biosecurity Management Plan	Annually	New weed species/location identified within Ground Corridor.	Report new weed presence to Transgrid. Develop and implement weed management options to control new weeds. Investigate the source of weed spread and implement improvements to weed management measures. Transgrid will report any new weed presence to NSW DPI, if the species is a Prohibited Matter such as *Parthenium hysterophorus*.
Reduce collision risk for birds and bats.	Conductor line-markers installed at designated spans.	Visual diverters installed and visible.	Reported incidents during construction will be undertaken in accordance with Annexure B: Clearing	Ongoing	Any collision of target threatened species.	Report incident, investigate cause (i.e., lighting, visibility). Revise converter type or span.

Objective	Target	Performance indicator	Method of monitoring	Frequency	Trigger	Action/response plan
			Protocol.			
	Post-installation monitoring of performance measures of bird deterrents along with the connectivity corridor monitoring and identified 'hot spot' areas e.g. close to recorded stick nests or known raptor flightlines.	If collision incidents persist above a defined threshold (to be set in consultation with CPHR), increase device density, mark additional wires, or extend treated span length. (at the next available transmission line de-energisation)	Carcass searches, during construction (post stringing) will be undertaken by the project ecologists, post construction will be outlined in the TransGrid operational management plan	6 monthly	Any collision of target threatened species	Project ecologist If collision of threatened species persist the TG Asset Manager will organise installation of additional line marking at the next available scheduled de-energisation.

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UGL CPB Joint Venture

Annexure G

Rehabilitation Plan

HumeLink West

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TransGrid

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Signed	
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3	28/07/2025	Updates following ER & CPHR review	

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Attachments

Attachment 1 Indicative seed collection schedule

Abbreviations

Abbreviation	Expanded text
BAM	Biodiversity Assessment Method
BC Act	*Biodiversity Conservation Act 2016* (NSW)
BCS	Biodiversity Conservation and Science group within DCCEEW – NSW (now referred to as CPHR)
BCT	Biodiversity Conservation Trust
BDAR	Biodiversity Development Assessment Report
BMP	Biodiversity Management Sub-plan
CEMP	Construction Environmental Management Plan
CoMA	Commonwealth Conditions of Ministerial Approval
Cth	Commonwealth
CPHR	Conservation Programs, Heritage & Regulation Division (formerly BCS)
CWD	Coarse Woody Debris
DAWE	Commonwealth Department of Agriculture, Water and Environment (now known as DCCEEW - Cth)
DCCEEW – Cth	Commonwealth Department of Climate Change, Environment, Energy and Water
DCCEEW – NSW[1]	The NSW Department of Climate Change, Energy, the Environment and Water (formerly DPE)
DPE	Department of Planning and Environment (now known as DPHI)
DPI	Department of Primary Industries
DPIE	Department of Planning, Industry and Environment (now known as NSW DCCEEW)
DPHI	Department of Planning, Housing and Infrastructure
EIS	Environmental Impact Statement
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999* (Cth)
GIS	Geographic Information System
GPS	Global Positioning System
HLW	The HumeLink West Stage of the HumeLink project
HLWJV	HumeLink West Joint Venture (UGL Limited and CPB Contractors)
KFH	Key Fish Habitat
KMG	Key's Matchstick Grasshopper

[1] As of the 1st January 2024 the NSW Department of Planning and Environment has split into the Department of Climate Change, Energy, the Environment and Water (NSW) and the Department of Planning, Housing and Infrastructure. DCCEEW (NSW) includes the environmental regulators (such as NSW EPA, BCS, NPWS, DPE-Water), while the Department of Planning, Housing and Infrastructure (DPHI) includes planning regulatory services.

Abbreviation	Expanded text
LWD	Large Woody Debris
MCoA	NSW Minister's Conditions of Approval
NSW	New South Wales
OEH	Office of Environment and Heritage
PCT	Plant Community Type
Revised BDAR	*HumeLink Biodiversity Development Assessment Report Rev 0* (Niche Environment and Heritage Pty Ltd, June 2024)
SAII	Serious and Irreversible Impact
TARP	Trigger Action Response Plan
TCZ	Total Clearing Zone
TEC	Threatened Ecological Community
TSSC	Threatened Species Scientific Commission
UMM	Updated Environmental Management Measure as outlined in the Planning Approvals Documentation
WoNS	Weeds of National Significance

1. Introduction

1.1. Context

This Rehabilitation Plan forms part of the Biodiversity Management Sub-plan (BMP) of the HumeLink West project (HLW) Construction Environmental Management Plan (CEMP). This plan has been prepared to outline and describe how the UGL Limited and CPB Contractors Joint Venture (HLWJV), during the construction of HLW, will comply with the Minister's Conditions of Approval (MCoA), the Federal Minister for Water and Environment Condition of Ministerial Approval (CoMA), the Updated Management Measures (UMM), and undertake its duties in accordance with the Planning Approval Documentation listed under the MCoA A2.

1.2. Purpose

The HLW project involves sites of temporary disturbance required for the construction of transmission line structures as well as construction compounds and temporary workforce accommodation facilities. Disturbance includes any temporary impacts to vegetation required during enabling works required to establish such features. Measures detailed within this plan aim to rehabilitate temporary disturbance areas to facilitate natural regeneration of suitable native species. Furthermore, this plan aims to maximise the salvage and reuse of resources within the approved disturbance area for beneficial reuse (such as fauna habitat enhancement) during the rehabilitation and revegetation of the site.

As such, this plan has been prepared based on current best practices to guide the salvage and reuse of resources, and the rehabilitation of temporarily disturbed areas during the construction of HLW. The plan aims to address relevant actions and mitigation measures outlined in the following documents:

- Updated mitigation measures B3, B9, B18 and B19 of the *Biodiversity Development Assessment Report Rev 0* (Revised BDAR; Niche Environment and Heritage Pty Ltd, June 2024).
- Conditions B25, B30, B62 and B63 of the Minister's Conditions of Approval (MCoA) A2.
- Condition 2 and 7 of the Federal Minister for Water and Environment Condition of Ministerial Approval (CoMA).
- *Key's Matchstick Grasshopper (*Keyacris scurra*) Expert Report – HumeLink project* (Yagui, 2024).

1.3. Objective

The objective of this plan is to facilitate rehabilitation of temporarily disturbed areas to such a point that the disturbed ecosystem will have high resilience and the ability to rely on natural process to recover from any later disturbances. This includes rehabilitation of *Keyacris scurra* (Key's Matchstick Grasshopper) habitat. To achieve this, this plan:

- Identifies temporary disturbance areas associated with the enabling and construction works of HLW, including areas of Key's Matchstick Grasshopper habitat.
- Outlines pre-disturbance biodiversity conditions.
- Details rehabilitation measures including :
    - Site preparation.
    - Seed collection.
    - Salvage, storage and reuse of resources.
- Details compliance management measures and procedures through monitoring.
- Prescribes threshold triggers for the implementation of adaptive management measures.

2. Environmental requirements

2.1. Relevant documents and guidelines

The main documents and guidelines relevant to this plan include:

- Revised BDAR (Niche Environment and Heritage Pty Ltd, June 2024).
- *Rehabilitation Guidelines for the Resort Areas of Kosciuszko National Park* (DEC, 2007).
- *Conservation Advice for Keyacris scurra (Key's Matchstick Grasshopper)* (TSSC, 2022).
- *A Revegetation Guide for Temperate Grasslands* (Greening Australia, 2017).
- *Key's Matchstick Grasshopper (Keyacris scurra) Expert Report* – HumeLink project (Yagui, 2024).

Refer to Section 6 for a full list of references.

2.2. Preparation of this plan

In accordance with MCoA B30a, this plan has been prepared by suitably qualified and experienced biodiversity experts of RPS AAP Consulting Pty Ltd:

- Polina Zadorojnaya (BSc; BAM Accredited Assessor BAAS 23014).
- Chelsea Tiller (BSc).
- Heather Duff (BScHons Geology; BSc).

2.3. Consultation

Consultation undertaken in preparation of this plan is summarised in Section 4 and Annexure J: Consultation Report of the HLW BMP. If consultation with relevant stakeholders or regulators is required to assess the efficacy of mitigation strategies detailed in this plan, these will be undertaken in accordance with Section 8.3 of the HLW BMP.

2.4. Minister's Conditions of Approval

The MCoA relevant to this plan are listed in Table 2-1. A cross reference is also included to indicate where and how the conditions are addressed in this plan or other HLW management documents.

Table 2-1 MCoA relevant to this plan

MCoA No.	Condition Requirements	Document Reference
Restrictions of Clearing and Habitat		
B25	Unless otherwise agreed with the Planning Secretary, the Proponent must: (a) ensure that the vegetation and habitat clearing limits specified in Table 2-1, Table 2-2 and Table 2-3 of Appendix 2 are not exceeded; and	Not addressed in this plan – refer to the HLW BMP, including Annexure B: Clearing Protocol.
	(b) minimise: (i) The impacts of the development on hollow-bearing trees. (ii) The impacts of the development on threatened flora and fauna populations. (iii) The clearing of native vegetation and key habitat.	This plan includes provisions for minimising impacts on threatened fauna populations via the salvage (Section 4.1.2) and reuse of habitat features (Section 4.3.2).
	(c) not undertake any works that result in ground disturbance within a minimum setback distance of 50 metres from PCT 637 – Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion and 30 metres from known locations of *Prasophyllum bagoense, Prasophyllum keltonii* and *Pterostylis oreophila* as mapped in the BDAR.	Not addressed in this plan – refer to the HLW BMP, including Annexure B: Clearing Protocol.
Biodiversity Management Plan		
B30	Prior to carrying out any development (excluding Enabling Works, if the relevant requirements of this condition are adequately addressed in the Enabling Works Management Plan of condition B64) that could impact biodiversity values that require offsetting, the Proponent must prepare a Biodiversity Management Plan for the development to the satisfaction of the Planning Secretary. This plan must:	This plan forms part of the HLW BMP.
	(a) be prepared by a suitably qualified and experienced biodiversity expert/s;	Section 2.2.

MCoA No.	Condition Requirements	Document Reference
	(b) be prepared in consultation with CPHR and FCNSW;	Section 2.3.
	(c) be prepared generally in accordance with the Revised Biodiversity Development Assessment Report (Revision 0, dated 21 June 2024);	Section 1.2, 2.1 and Table 2-3.
	(d) include a description of the measures that would be implemented for: (i) meeting the biodiversity mitigation requirements in condition B25 and as required by condition B29;	Not addressed in this plan – refer to HLW BMP.
	(ii) minimising: ▪ the amount of vegetation clearing on site; ▪ the loss of key fauna habitat (including tree hollows); ▪ the impacts of fauna on site, including undertaking pre-clearance surveys; and ▪ potential indirect impacts on threatened flora and fauna species;	This plan includes provisions for minimising the loss of key fauna habitat via habitat salvage (Section 4.1.2), storage (Section 4.1.4) and re-use (Section 4.3.2). It also includes provisions for minimising impacts to the Key's Matchstick Grasshopper through rehabilitation of temporarily disturbed habitats (Section 4.3.3.1).
	(iii) ensuring the development does not adversely affect the native vegetation and habitat outside the disturbance footprint;	Not addressed in this plan – refer Annexure B: Clearing Protocol of the HLW BMP.
	(iv) protocols for unexpected finds of threatened species and threatened ecological communities within the disturbance footprint including the requirements for:	Not addressed in this plan – refer to Annexure D: Unexpected Finds

MCoA No.	Condition Requirements	Document Reference
	• all work in the associated location to stop to prevent further impact, and • notification to the Planning Secretary and CPHR (and AG DCCEEW where relevant) in writing on any additional mitigation measures to be implemented; and • relevant agencies to be consulted and the Planning Secretary to endorse recommencement of work;	Procedure of the HLW BMP.
	(v) connectivity strategy for the potentially impacted species identified in the Revised Biodiversity Development Assessment Report (Revision 0, dated 21 June 2024) and a Supplementary Hollow and Nest Strategy;	Not addressed in this plan – refer to Annexure C: Hollow and Nest Strategy & Annexure F: Connectivity Strategy of the HLW BMP.
	(vi) protecting the conservation values of McPhersons Plain and avoiding impacts to Prasophyllum bagoensis, Prasophyllum keltonni and Pterostylis oreophila;	Not addressed in this plan – refer Annexure B: Clearing Protocol of the HLW BMP.
	(vii) rehabilitating temporary disturbance areas to facilitate natural regeneration of suitable native species;	This plan has been prepared to address MCoA B30(vii), and forms part of the HLW BMP.
	(viii) progressively monitoring the areas of partial clearance following the commencement of construction and provision of a verification report every three months during construction to confirm the assumptions made in the BDAR regarding partial clearance within the Easement Clearing Zone and whether any changes are required to this plan;	Not addressed in this strategy – refer Annexure H: Biodiversity Monitoring Program of the HLW BMP.
	(ix) maximising the salvage of resources within the approved disturbance area – including vegetative and soil resources – for beneficial reuse (such as fauna	Salvage of vegetative resources (Section 4.1.2 and 4.1.3) and soil

MCoA No.	Condition Requirements	Document Reference
	habitat enhancement) during the rehabilitation and revegetation of the site;	resources (Section 4.1.1). Reuse of vegetative resources (Section 4.3.2 and 4.3.3) and soil resources (Section 4.3.1).
	(x) collecting and propagating seed (where relevant);	Section 4.1.3 and 4.3.3.
	(xi) controlling erosion, weeds and feral pests;	This plan includes provisions for controlling erosion through soil preparation (Section 4.2.2) and the salvage (Section 4.1.1), storage (Section 4.1.4) and re-use (Section 4.3.1) of soil resources within temporary disturbance areas. It also includes provisions for weed management (Section 4.2.4) and fauna exclusion (Section 4.2.3) in such areas. Refer Annexure H: Biodiversity Monitoring Program of the HLW BMP for additional measures to address this condition.

MCoA No.	Condition Requirements	Document Reference
	(xii) bushfire management;	Not addressed in this strategy – refer to Section 7.6 of the HLW BMP.
	(xiii) minimising impacts on entities at risk of a serious and irreversible impact (SAII), including for Box Gum Woodland, Rice Flower (*Pimelea bracteata*) and Sooty Owl (Tyto tenebricosa) and other entities that are identified as requiring mitigation measures in the Biodiversity Assessment Verification Report required by condition B29 and the additional mitigation measures outlined in the additional information (Transgrid proposal dated 2 September 2024) within three years of the date of the Project Approval (over and above the relevant credit obligations); and	This plan includes provisions for the rehabilitation of temporarily disturbed areas of Box Gum Woodland (Section 3.1.1.1, and Section 4).
	(e) include a program to monitor, evaluate and publicly report on the effectiveness of these measures.	Section 5
	Following the Planning Secretary's approval, the Proponent must implement the Biodiversity Management Plan. *Note: The Biodiversity Management Plan must incorporate all relevant aspects of the development, including Enabling Works consistent with the requirements of condition B67.*	Section 2.2.
Rehabilitation		
B62	Unless the Planning Secretary agrees otherwise, within 12 months of commencing operation of the project, the Proponent must decommission and rehabilitate the accommodation camps to the satisfaction of the Planning Secretary. This rehabilitation must comply with the objectives in Table 3. **Table 3:** *Rehabilitation Objectives* **Feature** | **Objective**	This plan has been prepared to address MCoA B62.

<table>
<tr><th>MCoA No.</th><th>Condition Requirements</th><th>Document Reference</th></tr>
<tr><td></td><td>
<table>
<tr><td>Accommodation camp</td><td>• Safe, stable and non-polluting
• All infrastructure including above and below ground to be decommissioned and removed to a depth of 500 mm, unless the Planning Secretary agrees otherwise
• Restoring land capability to pre-existing productive capacity
• Ensure public safety at all times</td></tr>
</table>
</td><td></td></tr>
<tr><td>B63</td><td>Unless the Planning Secretary agrees otherwise, within 6 months of the completion of construction, upgrading or decommissioning, the Proponent must rehabilitate the areas where ancillary facilities and earthwork material sites are located. This rehabilitation must comply with the objectives in Table 4.
Table 4: Rehabilitation Objectives
<table>
<tr><th>Feature</th><th>Objective</th></tr>
<tr><td>Ancillary facilities</td><td>• Safe, stable and non-polluting
• progressively rehabilitate the site as soon as possible following disturbance
• to be decommissioned and removed, unless the Planning Secretary agrees otherwise</td></tr>
<tr><td>Land Use</td><td>• Restore or maintain land capability to pre-existing use</td></tr>
<tr><td>Community</td><td>• Ensure public safety</td></tr>
</table>
</td><td>This plan has been prepared to address MCoA B63.</td></tr>
</table>

2.5. Federal Minister for Water and Environment Condition of Ministerial Approval

The CoMA relevant to this plan are listed in Table 2-2. A cross reference is also included to indicate where and how the conditions are addressed in this plan or other HLW management documents.

Table 2-2 CoMA relevant to this plan

CoMA No.	Condition Requirements	Document Reference
Clearing Limits		
2	To avoid and mitigate harm to protected matters, the approval holder must comply with condition B25 of the NSW approval to the extent that it relates to protected matters.	Refer Table 2-1.

CoMA No.	Condition Requirements	Document Reference
Biodiversity Management Plan		
7	The approval holder must comply with condition B30 of the NSW Approval. The Biodiversity Management Plan must be prepared in accordance with the Environmental Management Plan Guidelines and condition B30 of the NSW Approval.	Refer Table 2-1.

2.6. Updated Management Measures

UMMs relevant to this plan are listed in Table 2-3 below. A cross reference is also included to indicate where and how the conditions are addressed in this plan or other HLW management documents.

Table 2-3 UMMs relevant to this plan

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
Biodiversity				
B3	A Biodiversity Management Plan (BMP) will be prepared in consultation with NSW DCCEEW Environment and Heritage and approved by DPHI prior to construction. The BMP will be prepared by a qualified ecologist and include a plan for implementing, evaluating and reporting on the effectiveness of all mitigation measures outlined in *Technical Report 1 – Revised Biodiversity Development Assessment Report*, including:	Detailed design and construction	All locations	This plan forms part of the HLW BMP.
	▪ Measures to minimise impacts to biodiversity, including measures to reduce disturbance to sensitive flora and fauna procedures for clearing of vegetation, including pre-clearing inspections and procedures for the relocation of flora and fauna.			This plan includes provisions for minimising impacts on threatened fauna populations via the salvage (Section 4.1.2) and reuse of habitat features

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
				(Section 4.3.2).
	▪ Preparation of a fauna handling and rescue procedure to be implemented during construction and operation for the ethical handling of injured or displaced fauna. Further, the fauna handling and rescue procedure would include an incident reporting protocol for fauna relocations, rescue and rehabilitation, euthanasia and/or fatality.			Not addressed in this plan – refer Annexure B: Clearing Protocol of the HLW BMP.
	▪ Procedures for the demarcation and protection of retained vegetation, including vegetation adjacent to construction areas and during weed management.			
	▪ Vegetation clearing procedures for a two staged habitat removal process required for removal of key habitat features (hollow-bearing trees, habitat trees, and bushrock) identified in *Technical Report 1 – Revised Biodiversity Development Assessment Report* and/or pre-clearing inspection. Including procedures to record the effort and outcomes of the habitat removal process.			
	▪ Retention of habitat features such as rocky outcrops, surface rock, dead wood, logs, wherever practicable.			This plan includes provisions for the retention of habitat features (4.1.2). Refer the HLW BMP, including Annexure B: Clearing Protocol & Annexure F: Connectivity Strategy for additional measures to address this condition.

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
	▪ Proposed rehabilitation of temporary disturbance areas including management and maintenance measures.			This plan has been prepared to address this condition.
	▪ Unexpected species finds protocol to be implemented if threatened ecological communities, flora and fauna species, not assessed in *Technical Report 1 – Revised Biodiversity Development Assessment Report*, are encountered during pre-clearing inspections.			Not addressed in this plan – refer Annexure D: Unexpected Finds Procedure of the HLW BMP.
	▪ A description of biosecurity protocols for plant and equipment movement between sites, including species specific measures.			Not addressed in this plan – refer Annexure E: Biosecurity Management Plan of the HLW BMP.
	▪ Education of construction teams regarding the presence of native fauna and risks of vehicle collision, particularly early in the morning and late in the afternoon/at night; implementation of speed limits on sealed and unsealed tracks and roads.			Not addressed in this plan – refer Section 7.4 of the HLW BMP.
	▪ Outline monitoring and compliance management requirements.			Section 5.
	▪ Approach to relocation of nests by suitably qualified ecologist where found within construction work sites (ie nests found in hazardous areas will be translocated to nearby safe areas, direct handling of eggs and chicks will be avoided where possible). This could include potentially new poles/nest platforms.			Not addressed in this plan – refer Annexure C: Hollow and Nest Strategy of the HLW BMP.
	▪ Details on the pre-clearing and clearing supervision process.			Section 4.1.2. Refer Annexure B: Clearing Protocol of the HLW

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
				BMP for additional measures to address this condition.
	▪ Procedures for consultation with DPI Fisheries and pre-construction survey (where required) for threatened aquatic species should be established (and Commonwealth DCCEEW for Riek's Crayfish, as required), along with processes for reporting and consideration of recommendations into design and construction methods, as relevant.			Section 4.3.2.1. Refer Section 7.7 of the HLW BMP for additional measures to address this condition.
	▪ Procedures for reporting the outcomes of pre-construction aquatic biodiversity surveys (where required under mitigation measure B33) at CLASS 1 crossing locations (new and upgraded tracks) potentially supporting threatened aquatic species and any management measures to be implemented (eg timing construction outside of breeding seasons, crossing type, micro siting).			Not addressed in this plan – refer Section 7.7 of the HLW BMP.
	Procedures for the stockpiling and supply of felled trees for KFH rehabilitation or improvement works, including procedures for consultation with DPI Fisheries.			Section 4.3.2.1.
	The BMP will include adaptive management measures for uncertain/ indirect/ prescribed impacts and a biodiversity monitoring program. The adaptive management measures would detail procedures for uncertain impacts, risk associated with potential failure of mitigation, circumstances where avoidance may not be achievable and prescribed impacts. The adaptive management measures would be underpinned by monitoring programs, to provide early warning of ineffective measures and/or uncertain impacts occurring. The adaptive management measures would include: ▪ performance criteria to guide monitoring			Not addressed in this plan – refer Annexure H: Biodiversity Monitoring Program of the HLW BMP.

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
	▪ measurable thresholds to identify when remedial action is triggered ▪ adaptive management response/actions ▪ a trigger for additional credit obligations and/or conservation measures for uncertain, indirect or prescribed impacts, where these impacts cannot be adaptively managed ▪ reporting requirements. The adaptive management measures and monitoring program will be developed to target specific species considered to be most at risk of significant impacts, as determined during the detailed design phase. The BMP will stipulate objectives for monitoring, reporting and evaluation, and how baseline data will be captured and represented.			
B9	The detailed design will consider opportunities to avoid and minimise impacts to Golden Sun Moth and Key's Matchstick Grasshopper within transmission line easements to be implemented during construction. As a part of the BMP (refer to mitigation measure B3), a rehabilitation plan would be developed for threatened insect habitat temporarily disturbed during construction. Planting specifications and requirements for post-care, including weed control, are to be outlined in the plan and would be subject to agreement of the relevant landowner.	Detailed design and construction	Within mapped habitats	Golden Sun Moth is not relevant to the HLW stage of the HumeLink Project. Refer to Section 7.2 of the HLW BMP for avoiding and minimising impacts to Key's Matchstick Grasshopper habitats. This strategy addresses the rehabilitation of temporarily disturbed Key's Matchstick

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
				Grasshopper habitats (Section 4.3.3.1).
B18	All disturbed lands/areas must be managed throughout the construction work (in accordance with the relevant *Managing Urban Stormwater* (Landcom, 2004) (Blue Book) or comparable best practice guidelines, including: • vegetation removal, restoration, and management • stockpiling, erosion and sediment management • stabilisation / rehabilitation of disturbed lands/areas must be undertaken within suitable timeframes • temporary erosion and sediment controls must be maintained (and not removed) until rehabilitation measures are providing effective stabilisation of disturbed lands/areas. Disturbed areas (including areas not required for operation) will be stabilised/rehabilitated to a standard either: • as agreed with the landowner • in accordance with the relevant Managing Urban Stormwater (Blue Book) or comparable best practice guidelines.	Construction	All locations	This plan includes provisions for all components of this condition within temporarily disturbed areas.

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
B19	Logs and tree hollows that could provide fauna habitat (the total length of wood at least 10 cm in diameter and at least 0.5 m long) will be relocated to adjacent and/or suitable woodland locations where available/feasible. Opportunities to retain felled trees as habitat on-easement will be considered in select areas (ie connectivity corridors and riparian lands). The opportunity to stockpile and supply felled trees for KFH rehabilitation or improvement work will be discussed with DPI Fisheries. Trees within the boundaries of State forests, Crown Lands, Travelling Stock Reserves, public roads or within 40 m of the bank of any river will be disposed of strictly in accordance with the requirements of the appropriate authorities. These requirements will be determined by the contractors before carrying out such work.	Construction	Transmission line corridor	Section 4.1.2 and 4.3.2.
B32	Any sections of stream or waterway banks that are impacted or modified by the project will be reformed or remediated to resemble the pre-work condition and form wherever possible or alternatively to a stable design form, as appropriate following the completion of construction work. This may include revegetation to stabilise bank sediments.	Construction and operation	Transmission line corridor - access track waterway crossing	Section 4.2 & 4.3.2.1.
	Waterway banks impacted by the project will be reinstated such that bank stability at the crossing location is the same or better than prior to construction. Stabilising materials such as rock armouring, hydro mulch, jute matting, or other suitable geotextile materials may be utilised where necessary.			
	Any temporary stream crossings will be removed and rehabilitated at the completion of their operational use.			

3. Background

3.1. Temporarily disturbed areas

Annexure B: Clearing Protocol of the HLW BMP provides specified disturbance zones and their clearing methodologies, informed by the *HumeLink Vegetation Clearing Method and Management Memorandum* (Rev 1; Transgrid, 2023). Temporarily disturbed areas are associated with the Total Clearing Zone (TCZ) as follows:

1. Brake and winch sites used during construction stringing activities – typically 60 m by 80 m.
2. Construction compounds and temporary workforce accommodation facilities.
3. Access tracks that are not required for operational maintenance and that are approved for removal by the appropriate landowner.

These areas are displayed in Figure 3-1 below (note: temporarily disturbed access tracks are excluded due to ongoing consultation with relevant landowners, however would be subject to measures detailed in this plan if deemed temporary).

3.1.1. Vegetation

Rehabilitation of temporary disturbance areas is required to restore land capability to pre-existing productive capacity, facilitating natural regeneration post-construction. Vegetation within temporary disturbance areas within the TCZ (i.e., brake and winch sites, construction compounds and temporary workforce accommodation facilities) is summarised below and detailed in Table 3-1:

- 34.66 ha of native vegetation.
- 95.43 ha of non-native vegetation. Largely consistent with Category 1 (exempt land) per the *Local Land Services Act 2013*.

3.1.1.1. Threatened Ecological Communities

Three Threatened Ecological Communities (TECs) will be impacted by temporary disturbances, thereby rehabilitated as part of this plan (Table 3-1):

- Critically Endangered & entity at risk of Serious and Irreversible Impact (SAII): White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland per BC Act & EPBC Act.
- Endangered & SAII: Tableland Basalt Forest in the Sydney Basin and South Eastern Highlands Bioregions per BC Act.
- Endangered: Montane Peatlands and Swamps per BC Act & EPBC Act.

Table 3-1 Pre-clearing vegetation within temporary disturbance areas

Vegetation	TEC	Temporary disturbance area (ha)
PCT 266	Part BC Act: White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Critically Endangered Ecological Community [CEEC] & SAII) Part EPBC Act: part White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland (CEEC)	0.33
PCT 268	Part BC Act: White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland (CEEC & SAII) Part EPBC Act: part White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland (CEEC)	0.09

Vegetation	TEC	Temporary disturbance area (ha)
PCT 277	Part BC Act: White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland (CEEC & SAII) Part EPBC Act: part White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland (CEEC)	13.79
PCT 285	N/A	0.37
PCT 287	N/A	0.77
PCT 290	N/A	7.17
PCT 297	N/A	0.68
PCT 299	N/A	0.16
PCT 300	N/A	0.16
PCT 306	N/A	2.04
PCT 319	N/A	1.09
PCT 343	N/A	0.50
PCT 352	BC Act: White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland (CEEC & SAII)	1.33
PCT 638	N/A	0.34
PCT 679	N/A	0.62
PCT 939	BC Act: Montane Peatlands and Swamps (EEC) EPBC Act: Alpine Sphagnum Bogs and Associated Fens (EEC)	0.13
PCT 953	Part BC Act: Part Tableland Basalt Forest (EEC & SAII)	4.52
PCT 1196	N/A	0.57
TOTAL PRE-DISTURBANCE NATIVE VEGETATION		**34.66**
Non-native vegetation	N/A	95.43

3.2. Key's Matchstick Grasshopper (*Keyacris scurra*)

Species specialist reports prepared as part of the Revised BDAR (Yagui, 2024) identified that rehabilitation efforts should be considered to minimise and mitigate impacts to the Key's Matchstick Grasshopper (KMG). This species is detailed below.

3.2.1. Description and distribution

The Key's Matchstick Grasshopper is listed as Endangered under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) and *Biodiversity Conservation Act 2016* (BC Act). It is a small, slender, wingless grasshopper recognised for its slanted face, splayed hind femora and ensiform antennae (TSSC, 2019). The species does not have a high dispersibility.

The species is historically distributed from Victoria to Orange in NSW, associated with the sheep/wheat belt (TSSC, 2020). Its extant distribution has been reduced by ongoing threats, including severe fragmentation of habitat, historical and inferred ongoing declined in abundance, habitat availability and quality, and poorly understood management requirements (TSSC, 2019). While

disturbance is known to contribute to species decline, there is a notable presence of KMG in disturbed areas which undergo infrequent disturbance (i.e., cemeteries, railway easements, travelling stock routes) but still contain the relevant native grasses. Disturbance appears to be an important determinant of site occupancy, and it is noted that the species is absent from sites that are disturbed at the incorrect time of the year or erratically which interrupts the short non-overlapping lifecycle (TSSC, 2022).

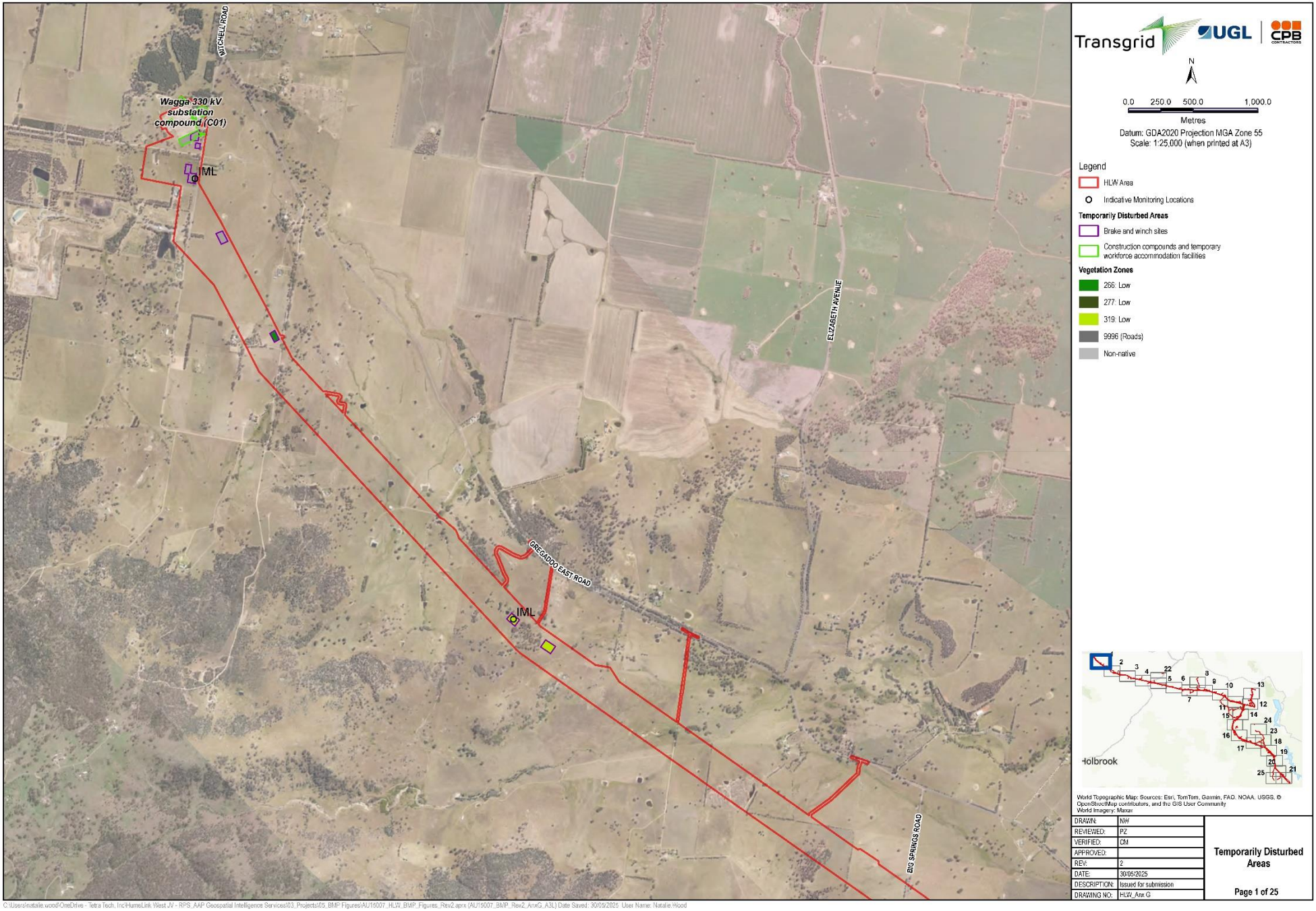
3.2.2. Habitat

Historical records of KMG are typically associated with primary and secondary native grasslands, dominated by tall stands of *Themeda triandra* (Kangaroo Grass) and species within the *Asteraceae* family (TSSC, 2020). The species has also been recorded in other vegetation types containing a native grass understory. In some reported locations there is an absence of *T. triandra* and very few or no *Asteraceae* species (TSSC, 2020).

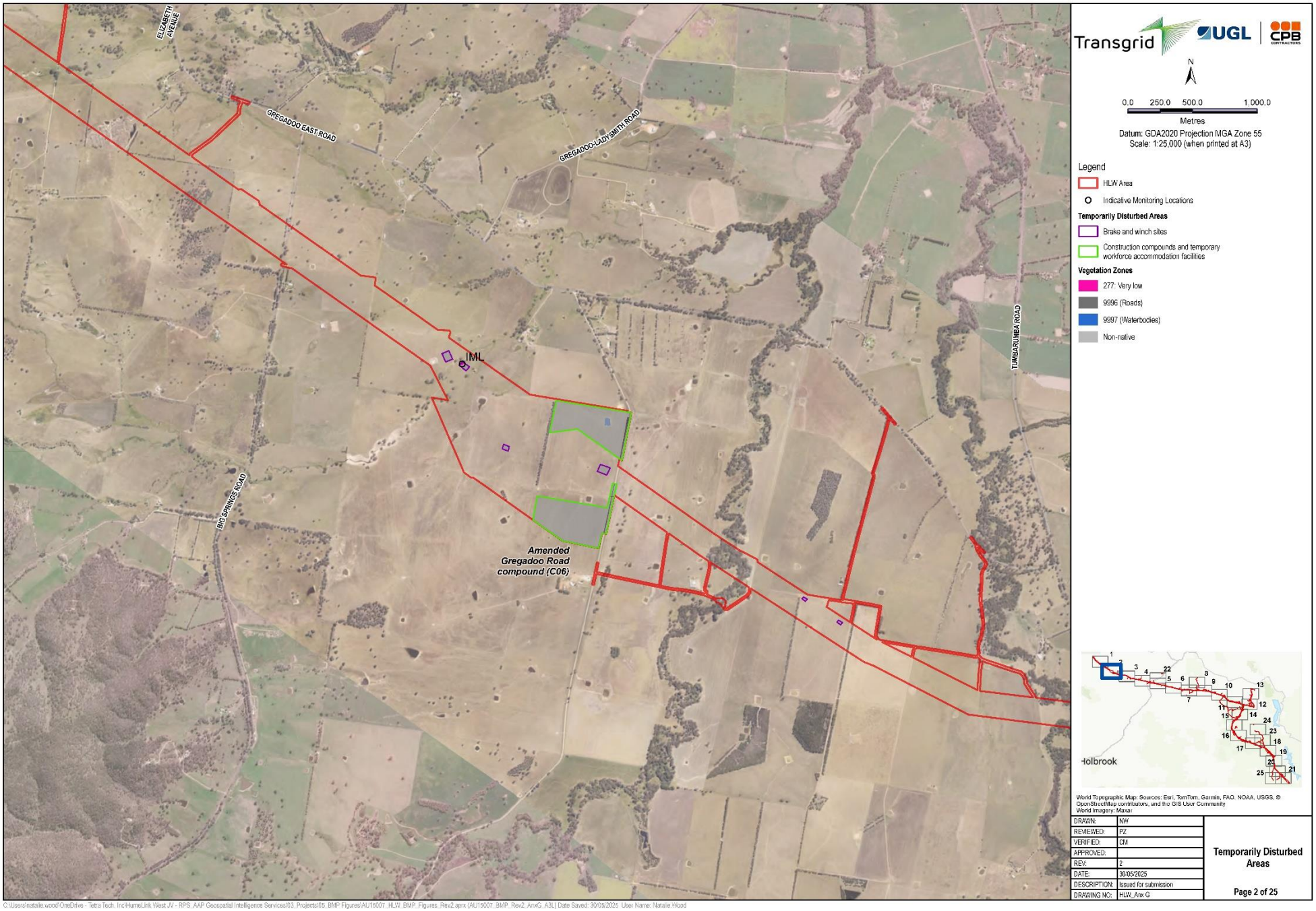
The species feeds on a range of native and introduced species, preferring small ephemeral plants to the larger perennial species, such as *Asteraceae* species, *Helichrysum apiculatum* (Common Everlasting), *Podolepis jaceoides* (Showy Copper-wire Daisy) and *Craspedia uniflora* (TSSC, 2020). The relationship to *T. triandra* is considered only for shelter from predators or climactic stressors and it is not part of the species' food requirements.

3.2.2.1. Temporarily disturbed areas

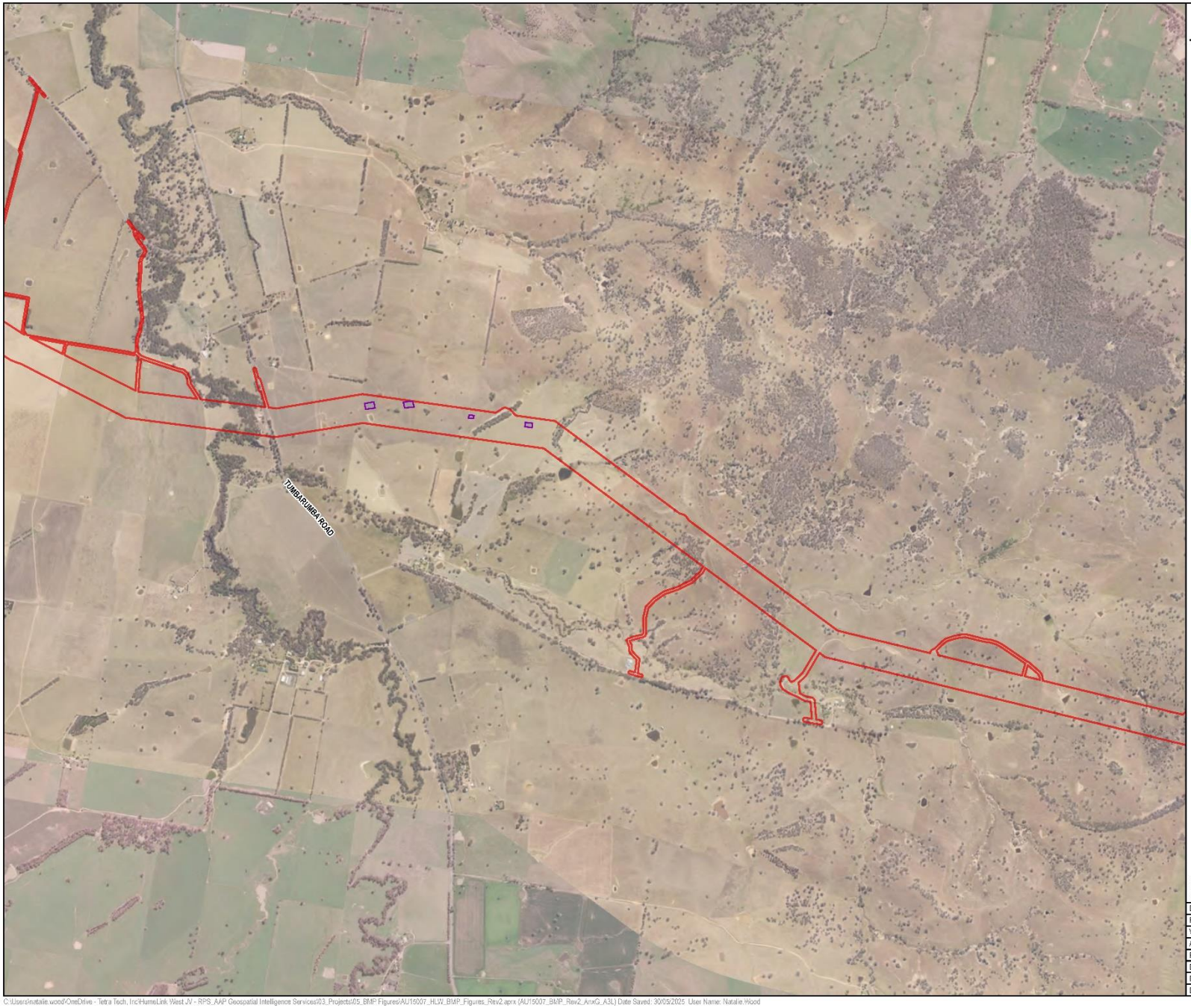
Per UMM B9, a rehabilitation plan would be developed for threatened insect habitat temporarily disturbed during construction. Key's Matchstick Grasshopper has been assumed present via the *Key's Matchstick Grasshopper (*Keyacris scurra*) Expert Report – HumeLink project* (Yagui, 2024). Only one patch of this species' polygon intersects with the Easement Clearing Zone, which may experience collateral temporary impacts to suitable habitat for this species (displayed in Figure 3-1 below).



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Metres

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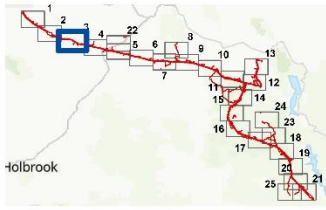
HLW Area

Temporarily Disturbed Areas

Brake and winch sites

Vegetation Zones

Non-native



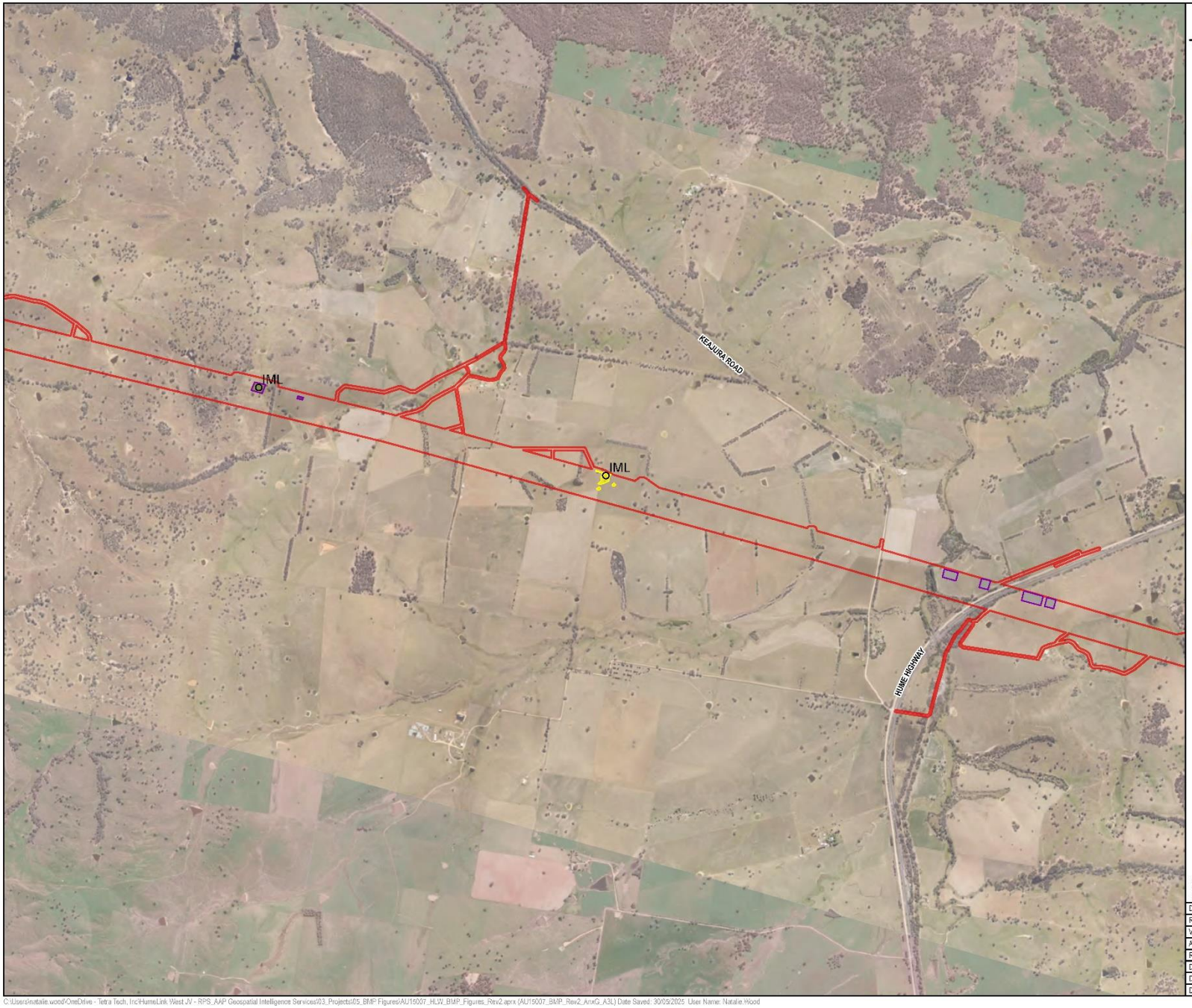
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World Topographic Map: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

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Temporarily Disturbed Areas

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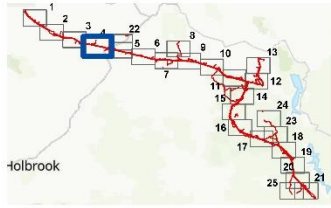
- HLW Area
- Indicative Monitoring Locations
- Key's Matchstick Grasshopper Habitat

Temporarily Disturbed Areas

- Brake and winch sites

Vegetation Zones

- 277: Low
- 343: Moderate
- 343: Very low
- 9996 (Roads)
- Non-native



World Imagery: Earthstar Geographics
World Topographic Map: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

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Temporarily Disturbed Areas

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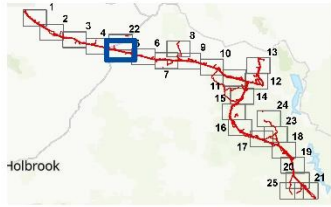
- HLW Area
- Indicative Monitoring Locations

Temporarily Disturbed Areas

- Brake and winch sites

Vegetation Zones

- 277: Low
- 277: Very low
- Non-native



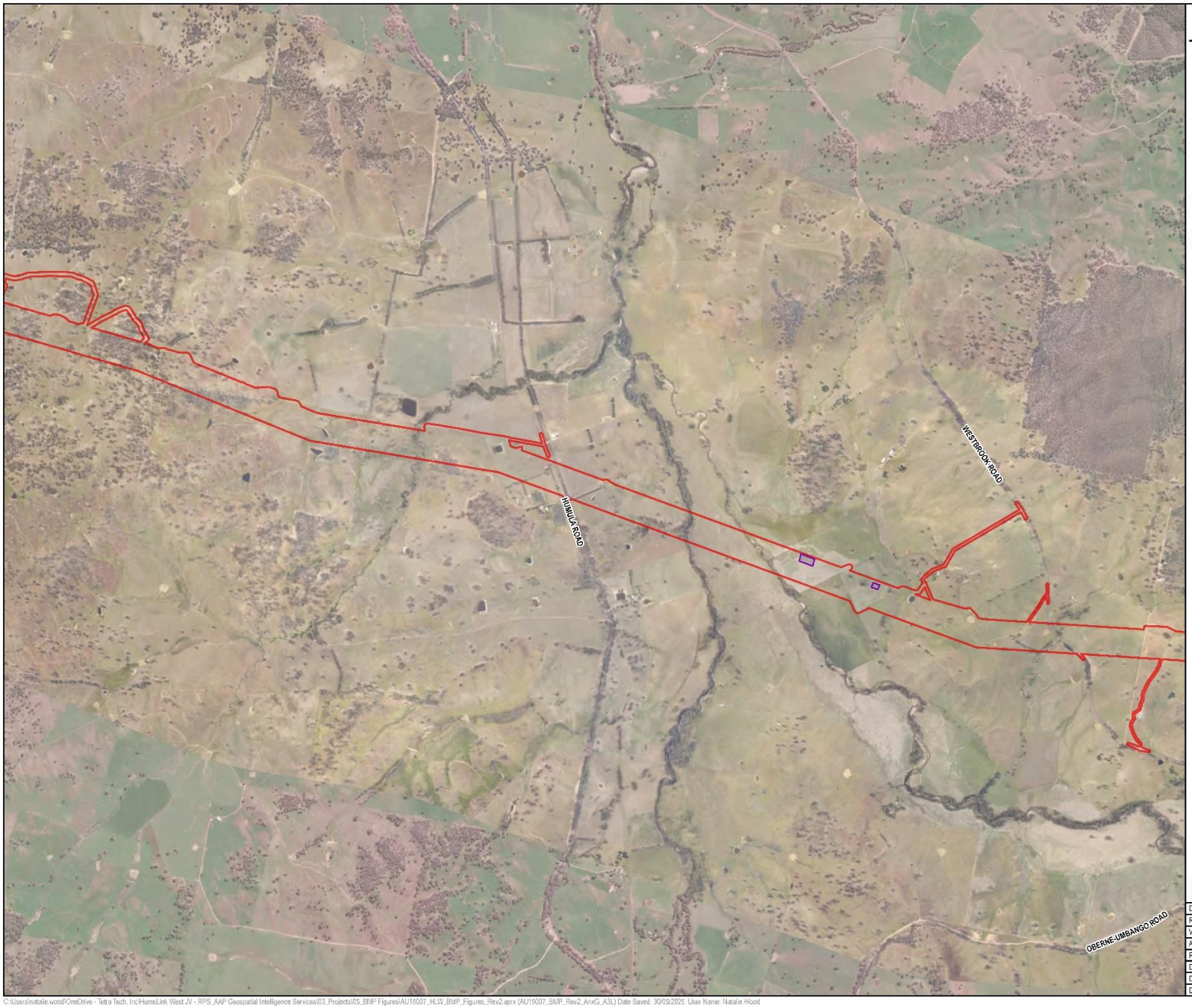
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Temporarily Disturbed Areas

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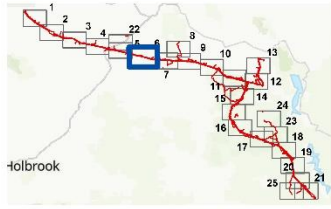
- HLW Area

Temporarily Disturbed Areas

- Brake and winch sites

Vegetation Zones

- Non-native



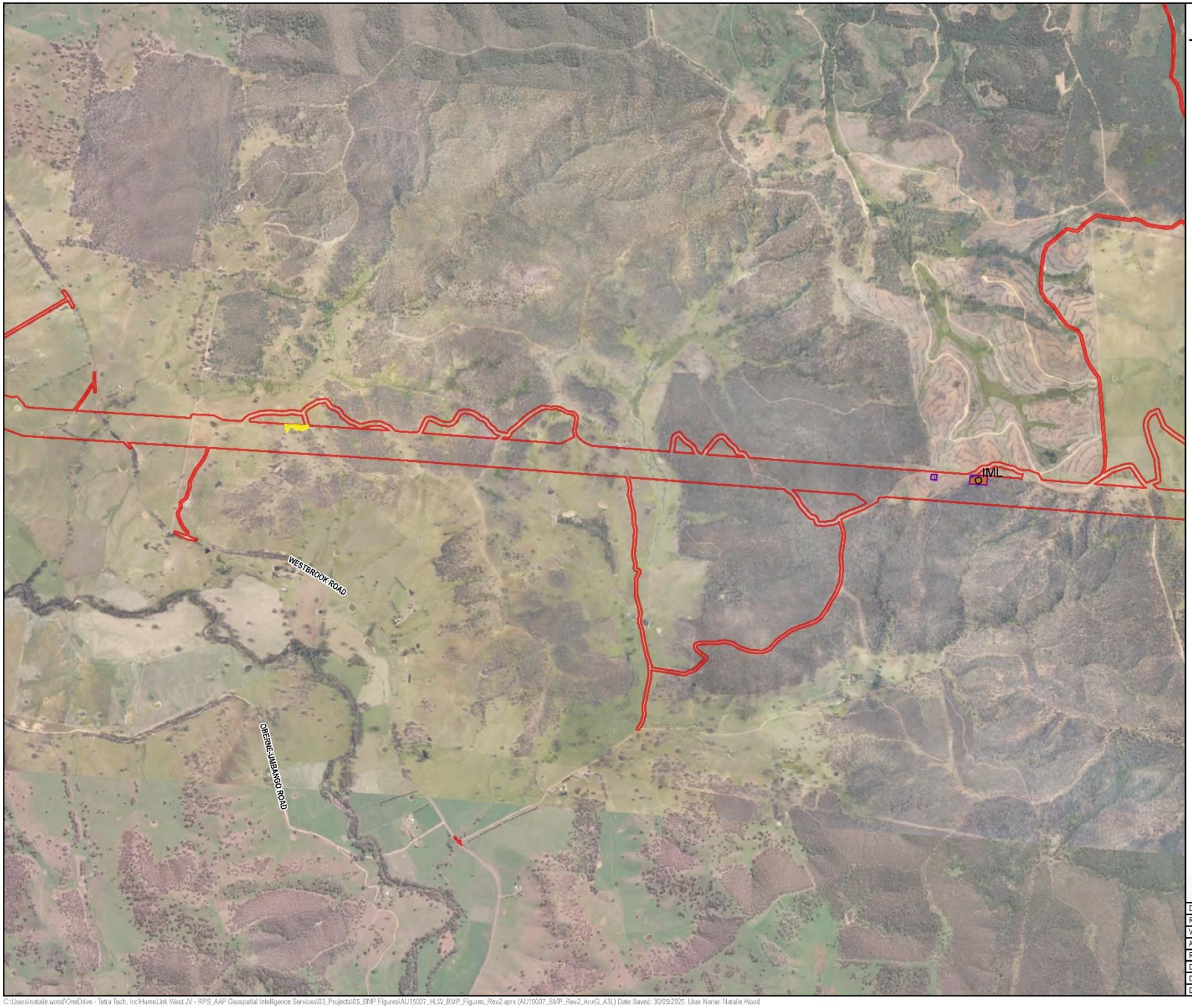
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Temporarily Disturbed Areas

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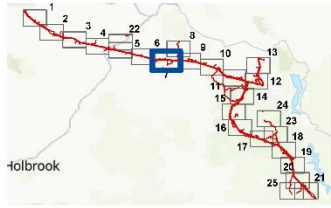
- HLW Area
- Indicative Monitoring Locations
- Key's Matchstick Grasshopper Habitat

Temporarily Disturbed Areas

- Brake and winch sites

Vegetation Zones

- 290: Very low
- 297: Moderate
- 9996 (Roads)
- Non-native



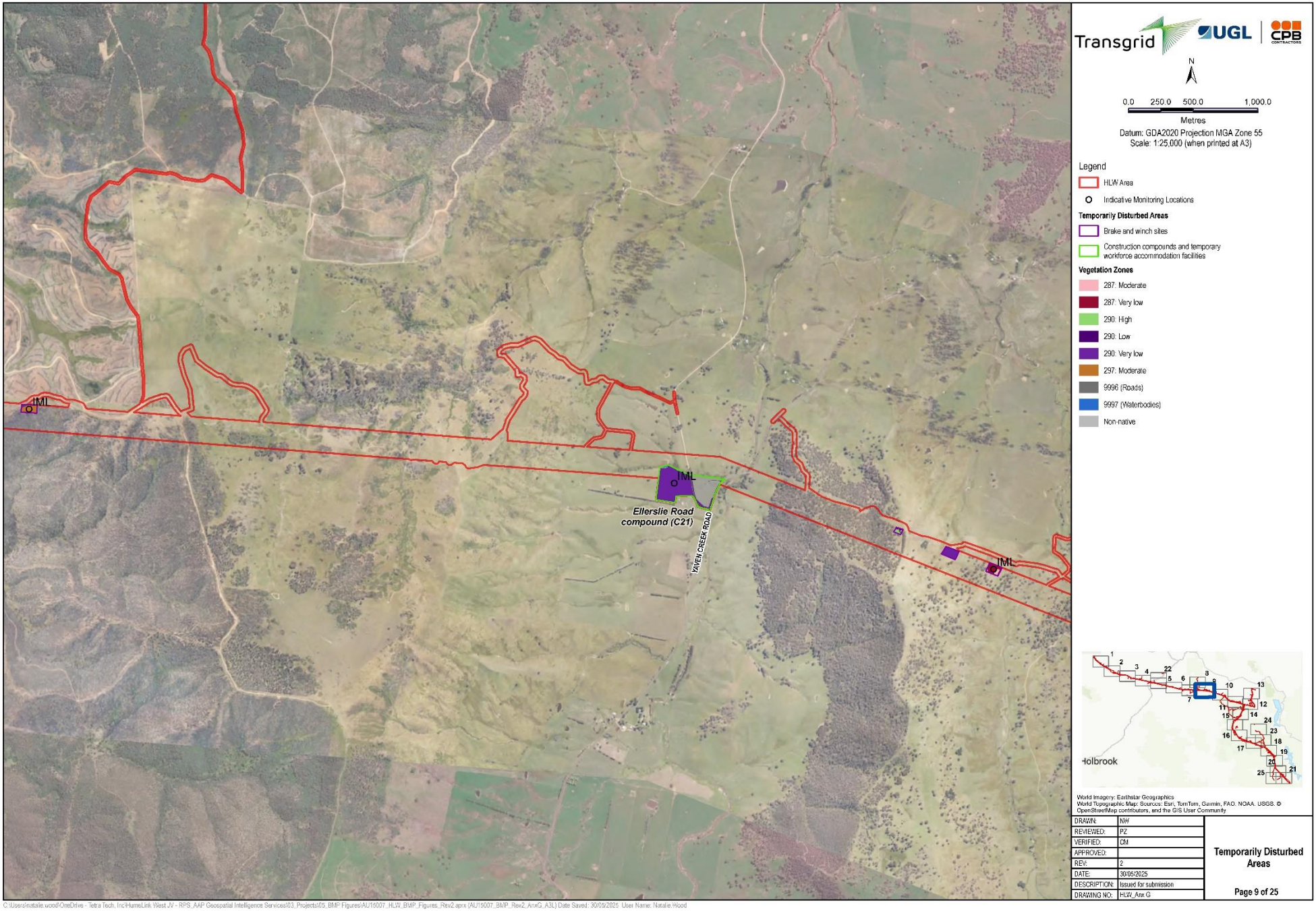
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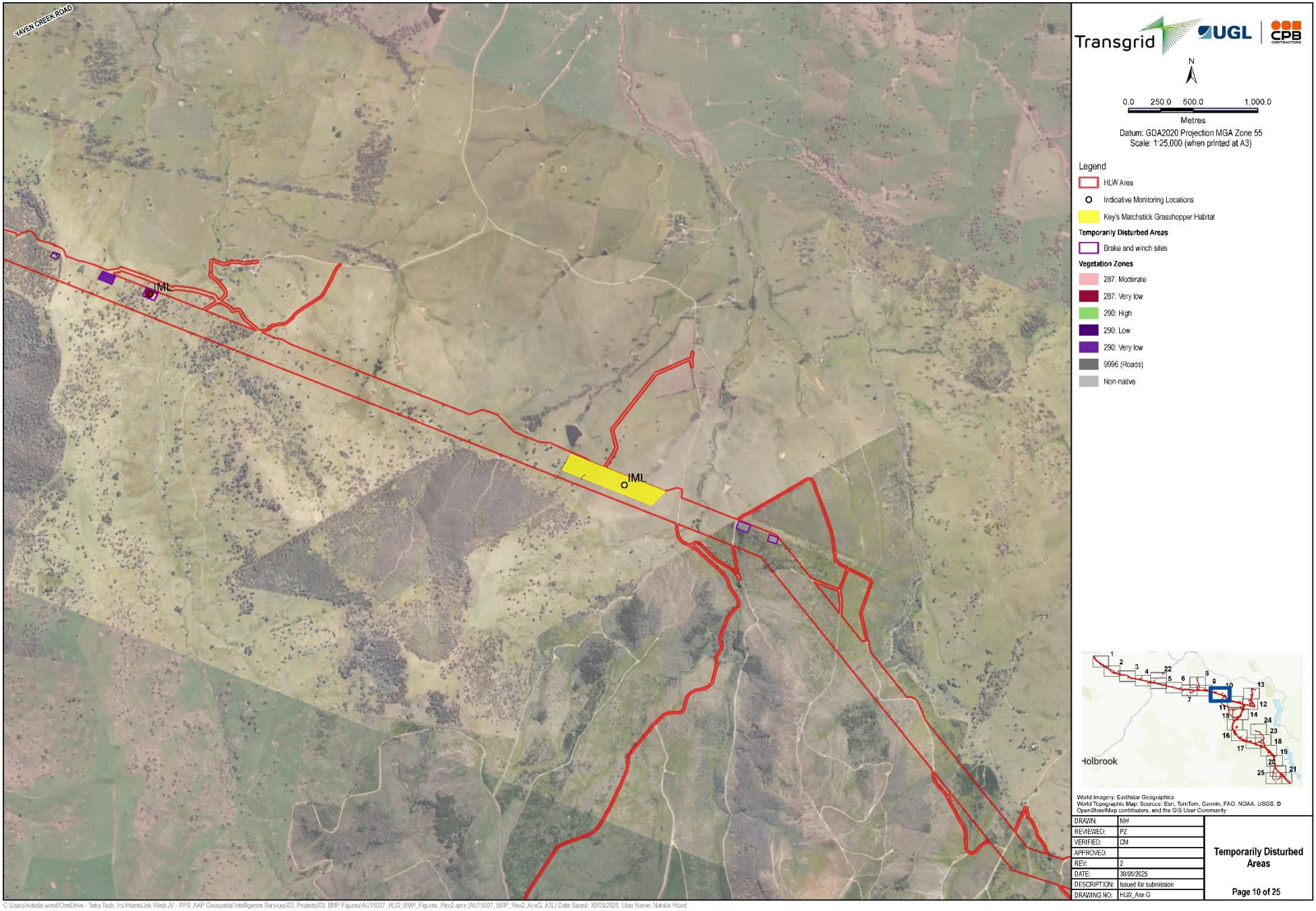
Temporarily Disturbed Areas

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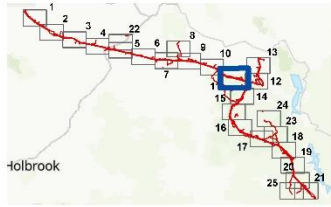
- HLW Area
- Indicative Monitoring Locations

Temporarily Disturbed Areas

- Brake and winch sites

Vegetation Zones

- 285: Low
- 9996 (Roads)
- Non-native



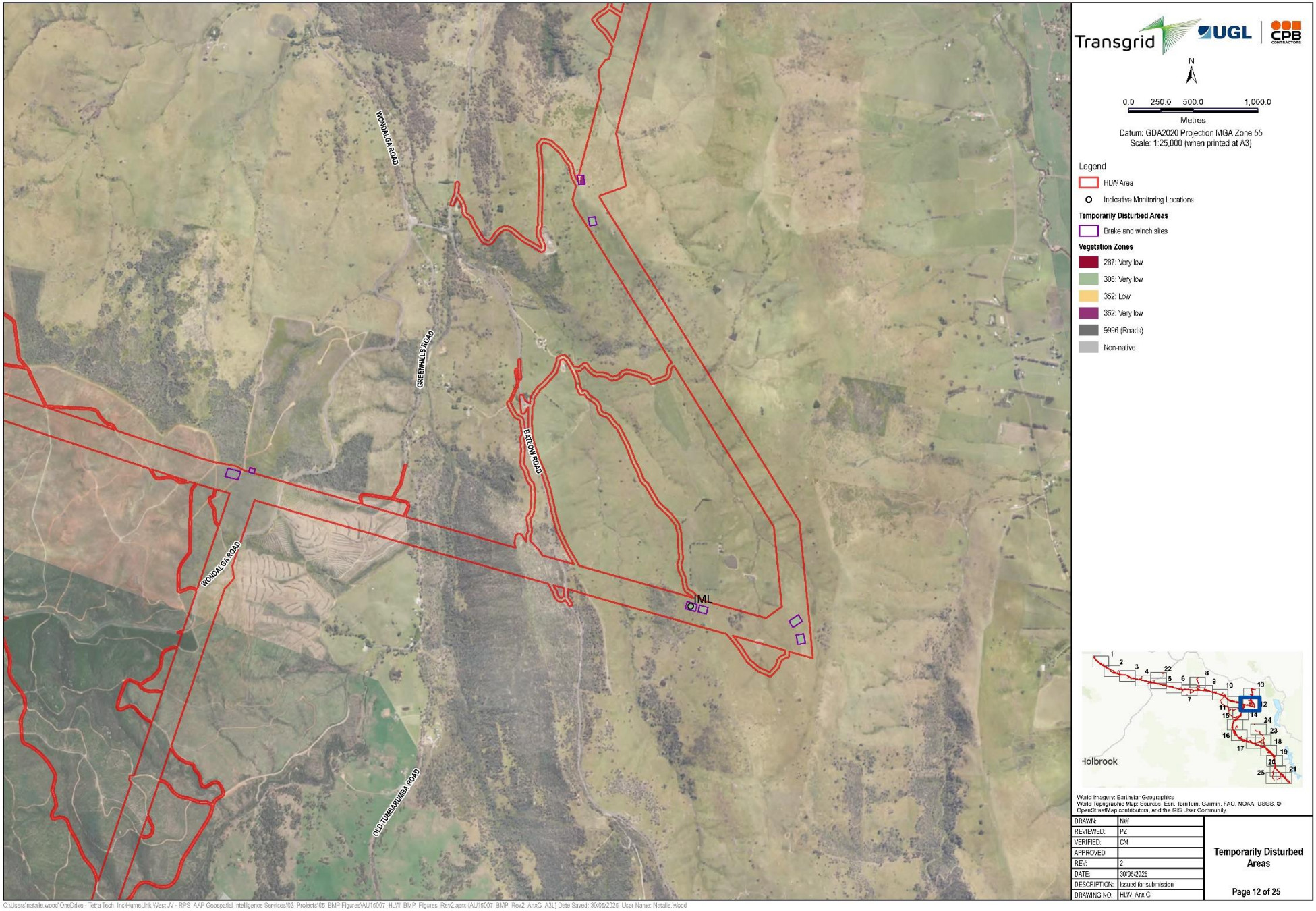
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Temporarily Disturbed Areas

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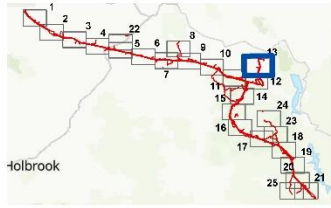
- HLW Area
- Indicative Monitoring Locations

Temporarily Disturbed Areas

- Brake and winch sites

Vegetation Zones

- 277: Very low
- 352: Low
- 352: Very low
- 9996 (Roads)



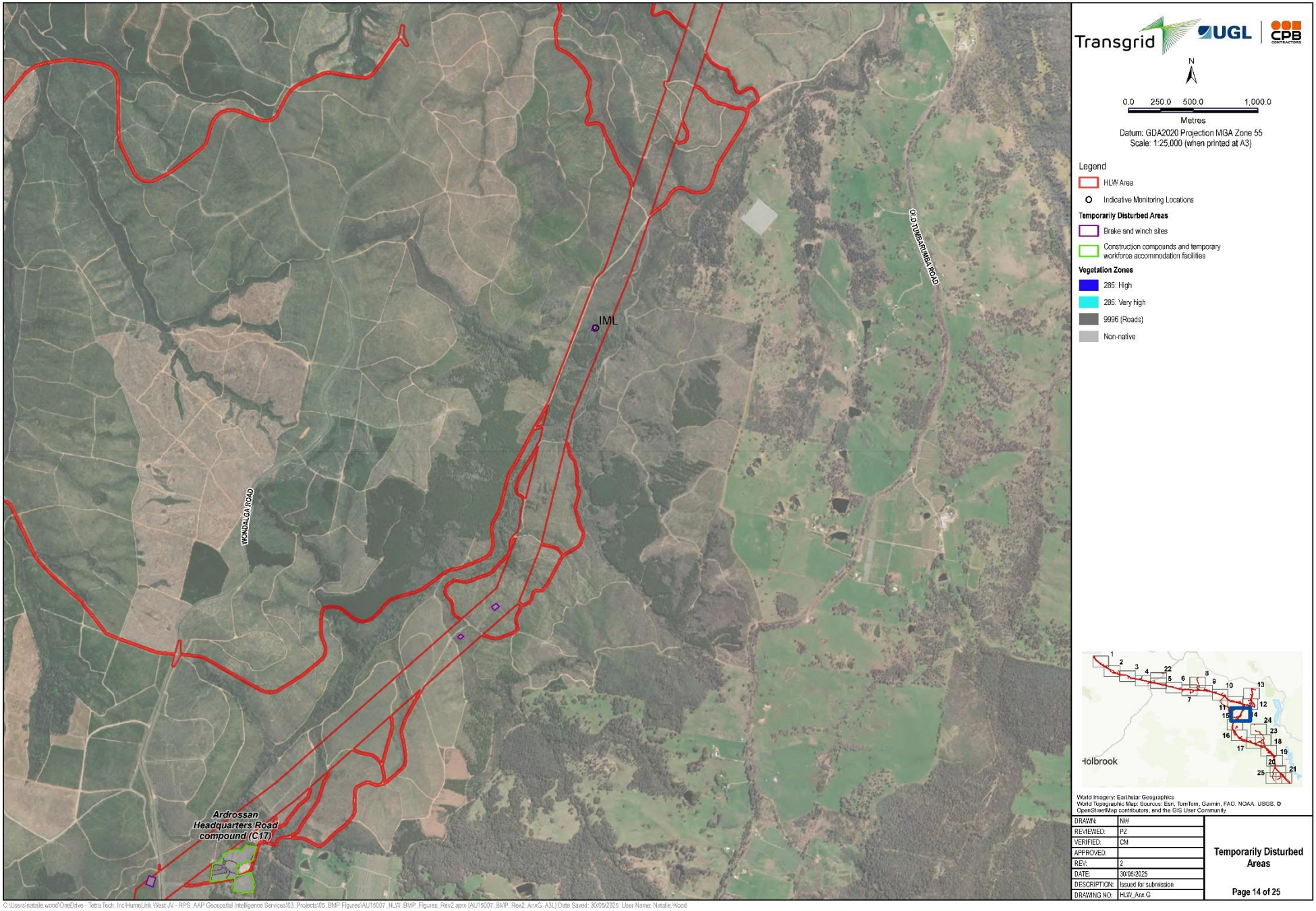
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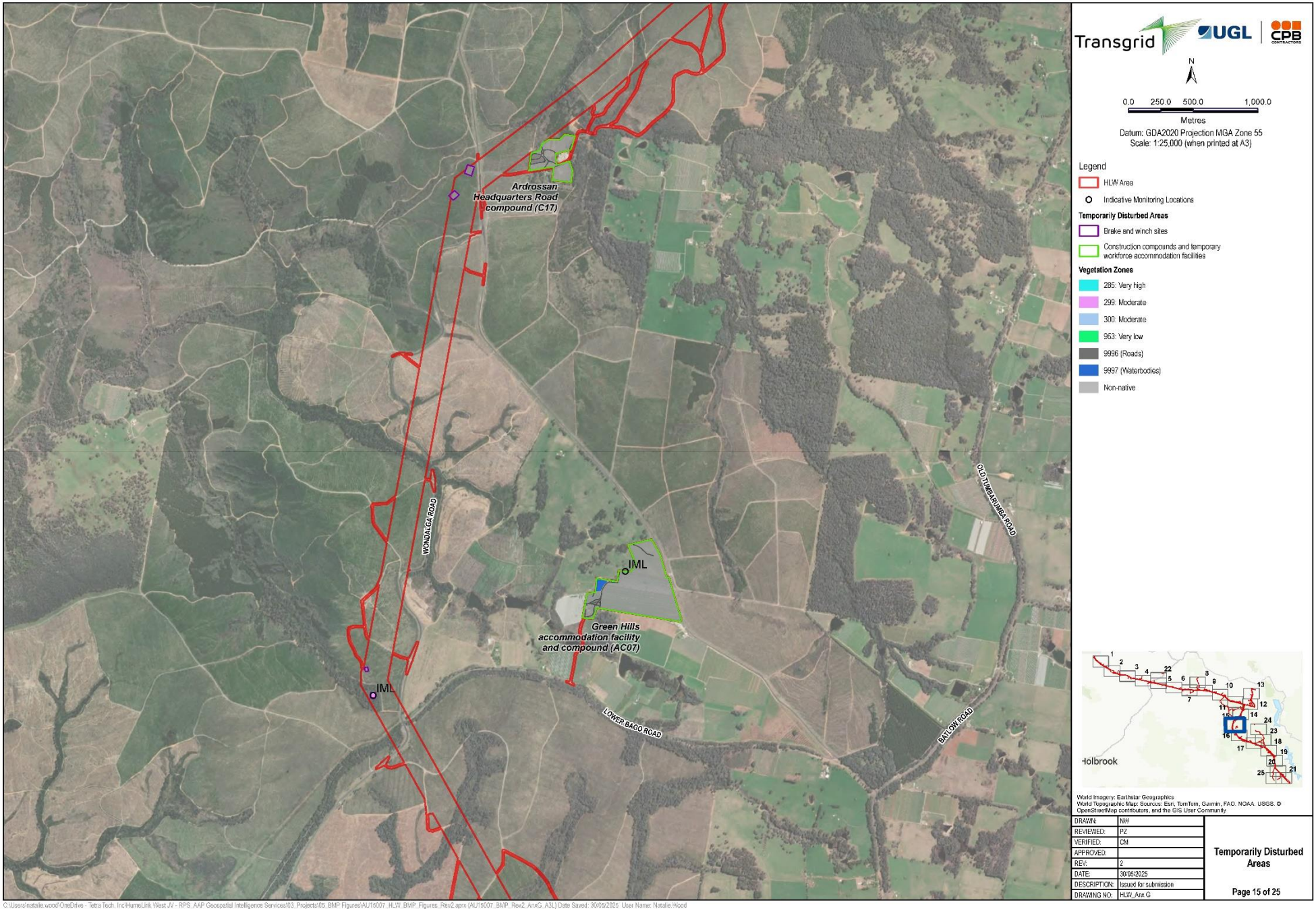
Temporarily Disturbed Areas

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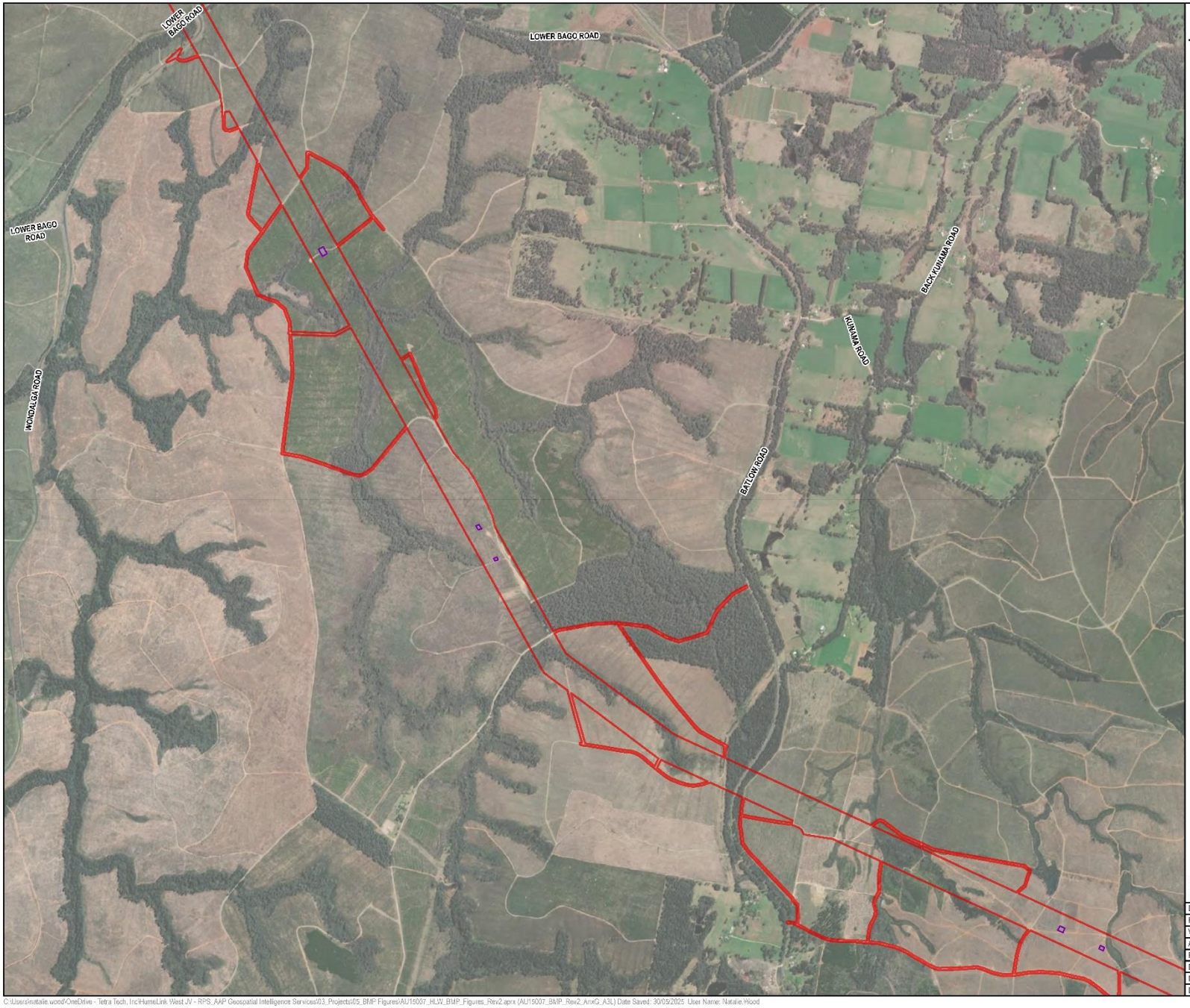
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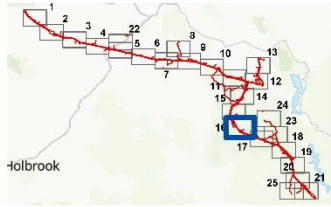
- HLW Area

Temporarily Disturbed Areas

- Brake and winch sites

Vegetation Zones

- Non-native



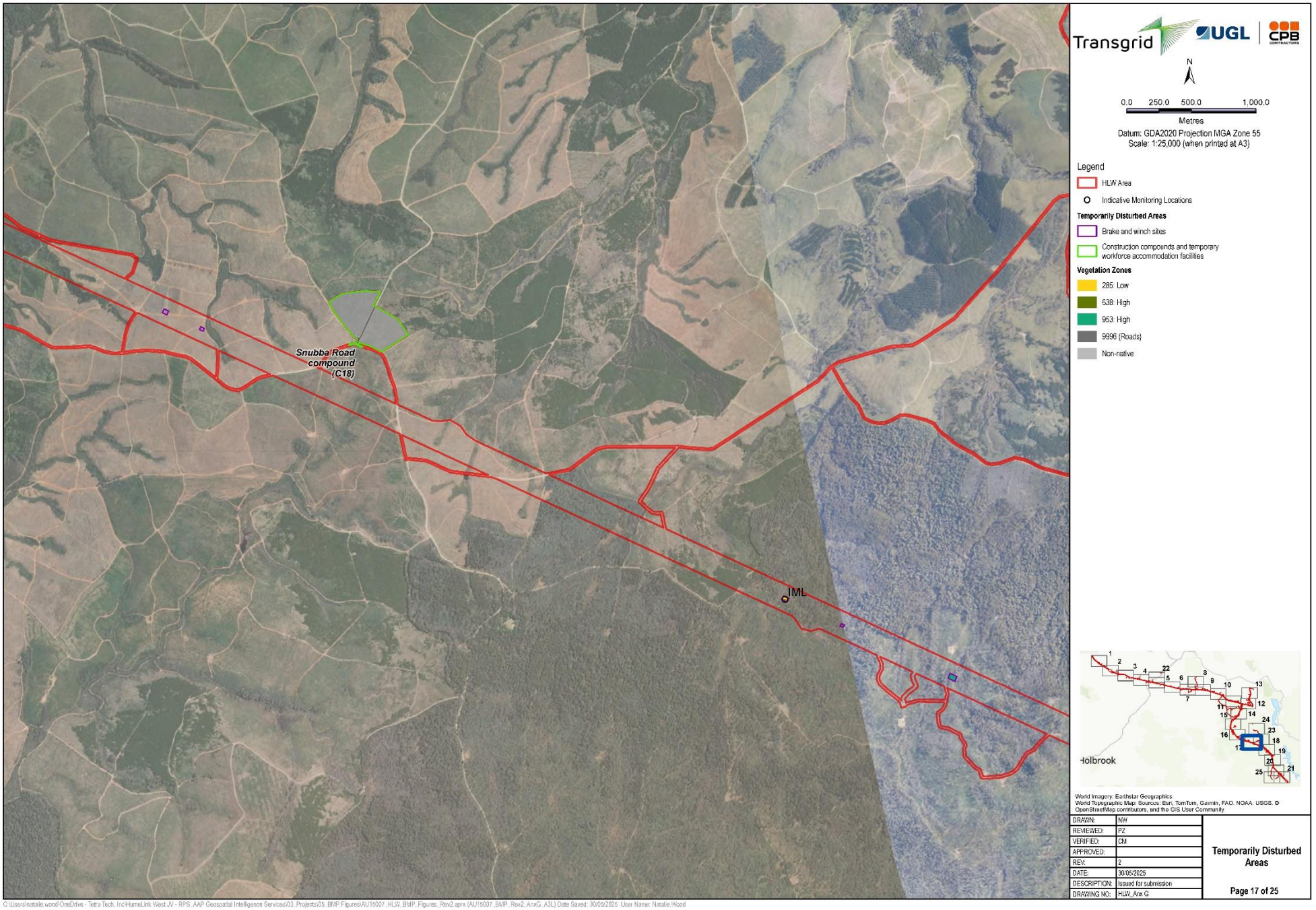
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Temporarily Disturbed Areas

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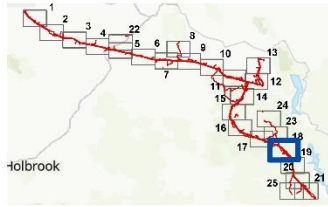
- HLW Area
- Indicative Monitoring Locations

Temporarily Disturbed Areas

- Brake and winch sites

Vegetation Zones

- 638: High
- 939: High
- 953: High



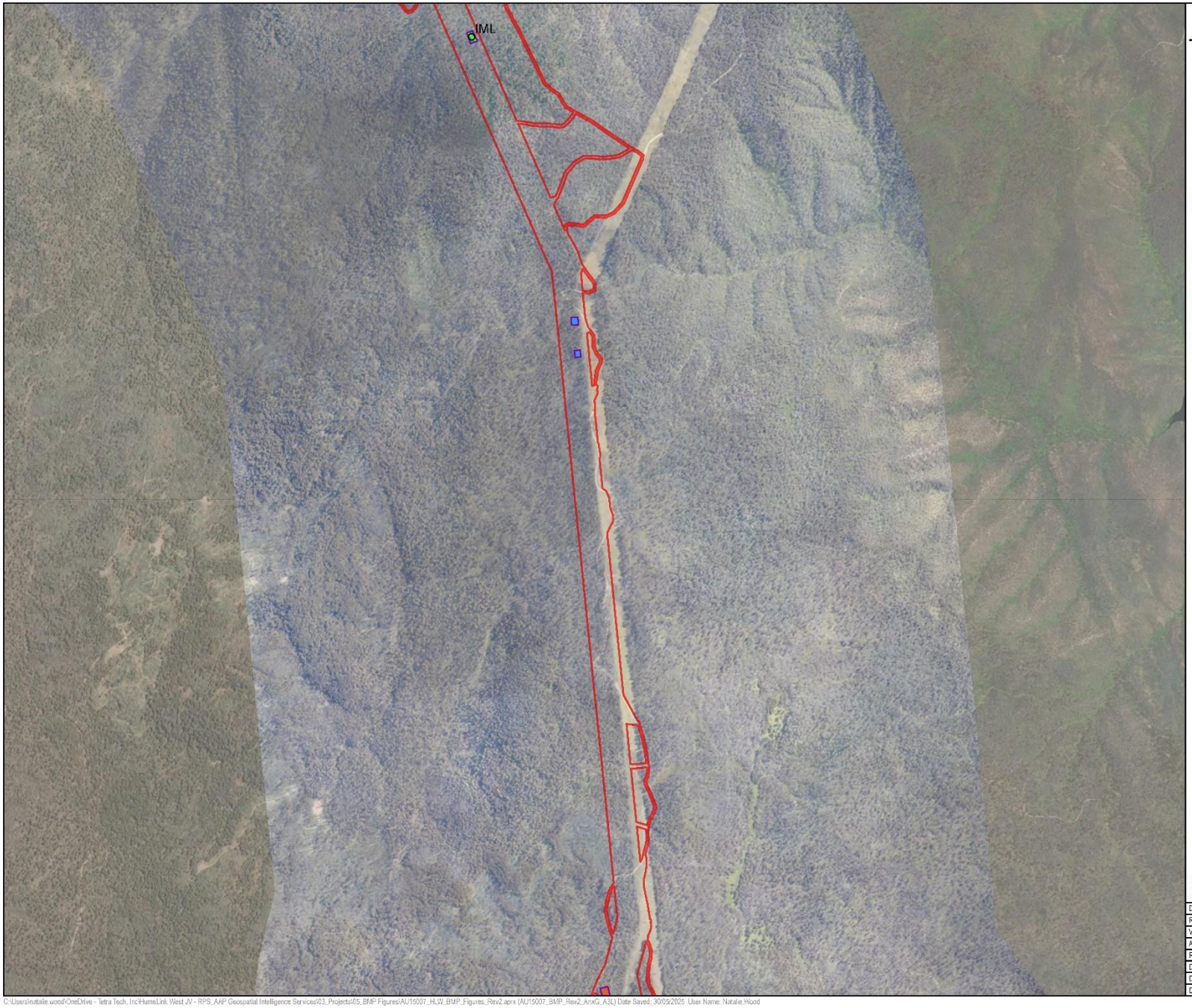
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Temporarily Disturbed Areas

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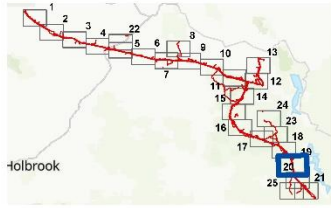
- HLW Area
- Indicative Monitoring Locations

Temporarily Disturbed Areas

- Brake and winch sites

Vegetation Zones

- 1196: High
- 939: High
- 953: High
- 953: Very high



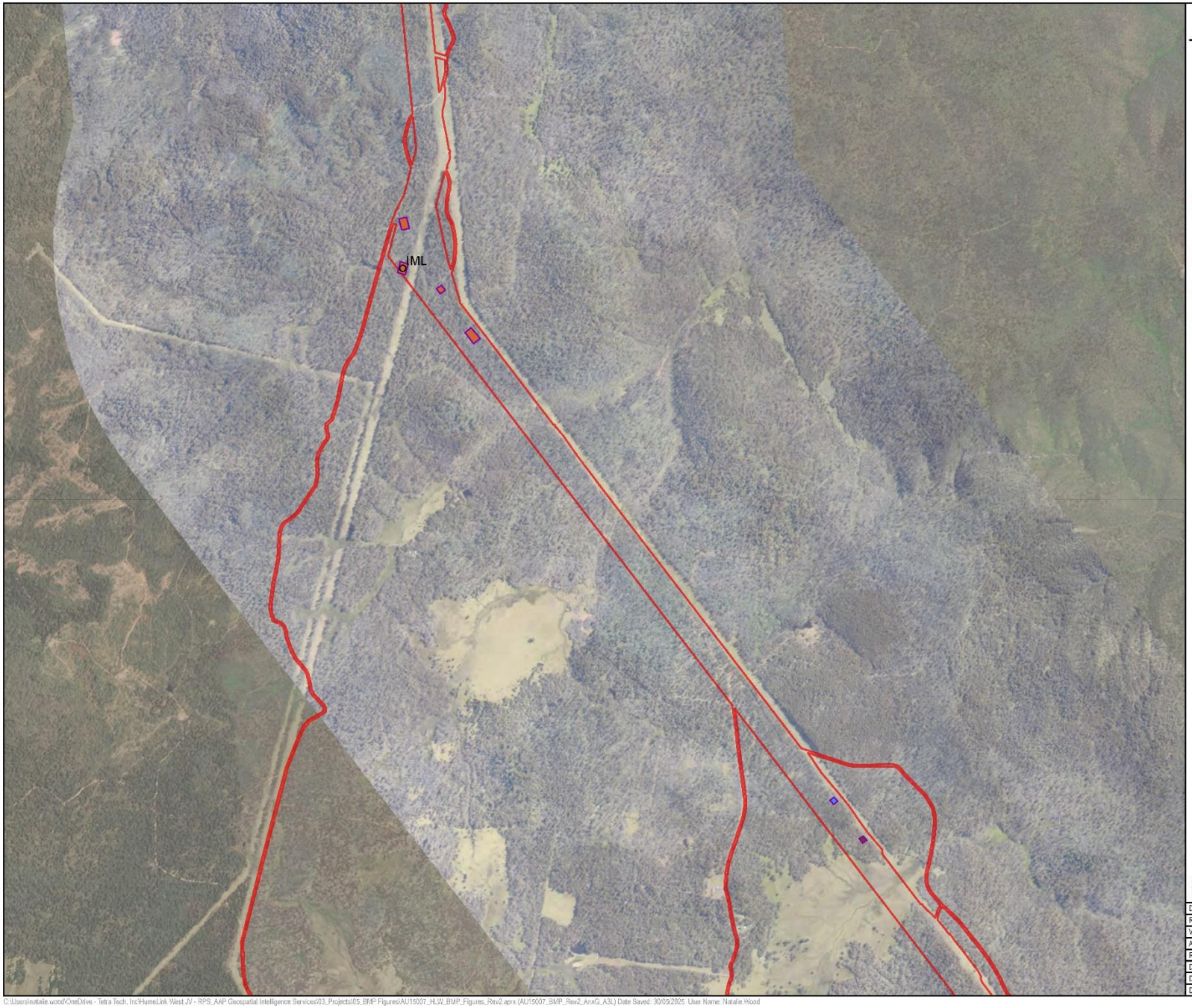
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Temporarily Disturbed Areas

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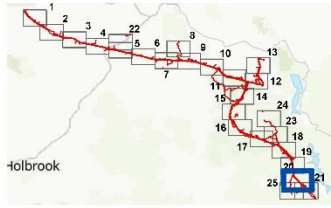
- HLW Area
- Indicative Monitoring Locations

Temporarily Disturbed Areas

- Brake and winch sites

Vegetation Zones

- 1196: High
- 679: High
- 953: Very high
- 9996 (Roads)



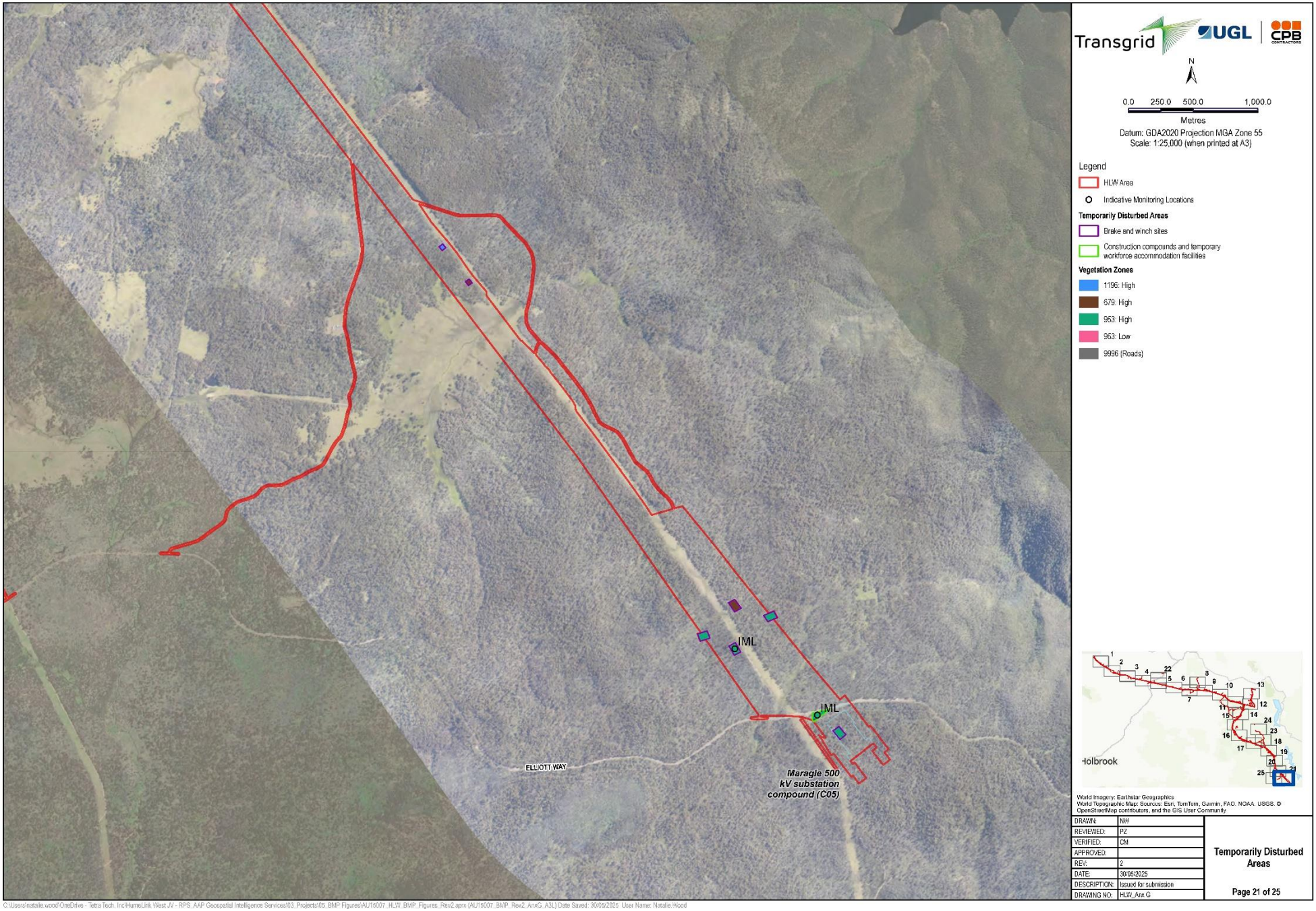
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World Topographic Map: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

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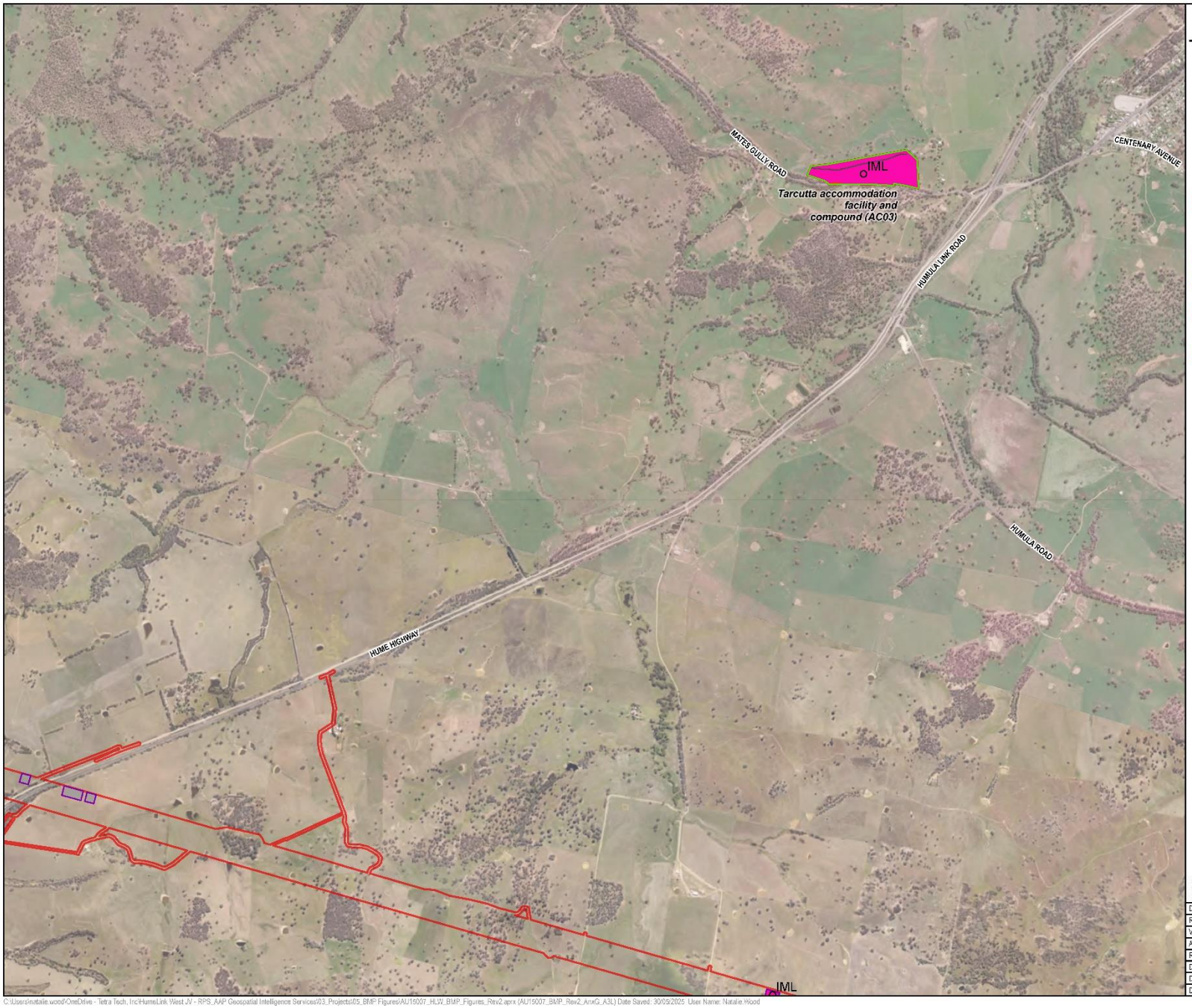
Temporarily Disturbed Areas

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Transgrid UGL CPB CONTRACTORS

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Metres

Datum: GDA2020 Projection MGA Zone 55
Scale: 1:25,000 (when printed at A3)

Legend

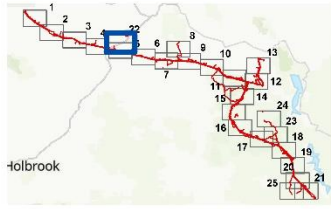
- HLW Area
- Indicative Monitoring Locations

Temporarily Disturbed Areas

- Brake and winch sites
- Construction compounds and temporary workforce accommodation facilities

Vegetation Zones

- 268: Very low
- 277: Low
- 277: Very low
- 9996 (Roads)
- Non-native



World Imagery: Earthstar Geographics
World Topographic Map: Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

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Temporarily Disturbed Areas

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4. Rehabilitation measures

Natural regeneration is the process by which native vegetation recovers in an area after disturbance or clearing without human intervention. It's a natural process relying on seeds or vegetative parts remaining in the ground to re-establish themselves. This is more likely to occur in areas of high resilience through biotic and abiotic factors such as soil health and the presence of a native seed bank. As such, this plan outlines measures to ensure temporarily disturbed areas are rehabilitated to a point of high resilience providing the ability to rely on natural process to recover from any later disturbances.

A large proportion of temporary disturbance areas occur on historically disturbed non-native vegetation with low resilience, consistent with Category 1 (exempt land) that will remain as agricultural and private lands. As such, rehabilitation measures detailed below prioritise areas of native vegetation pre-disturbance as displayed in Figure 3-1.

Rehabilitation efforts must be completed within 6 months of the completion of construction, upgrading or decommissioning of HLW. If for any reason rehabilitation cannot be achieved as per this plan (e.g. rejection by relevant land holder), evidence will be supplied and reasoning detailed per Section 5.2.

Due to potential safety and bushfire risks, all works must be undertaken in accordance with the HLW Bush Fire Emergency Management and Evacuation Plan as a priority. To ensure minimal indirect impacts to adjoining land, all works must be undertaken in accordance with:

- *Managing Urban Stormwater: Soils and construction - Volume 1* (the 'Blue Book'; Landcom 2004).
- HLW Erosion and Sediment Control Sub-Plan.
- HLW Soil and Water Management Sub-Plan.
- Relevant property management plans.

4.1. Salvage of resources

4.1.1. Soil

Soil management differs for areas of native vegetation and non-native vegetation (Category 1 exempt land), such as agricultural land. As detailed in Section 3.1.1, over 95 ha of temporarily disturbed land contains non-native vegetation at pre-disturbance conditions (accounting for 73% of temporarily disturbed areas). Topsoil stripping is not necessary for rehabilitation in such areas as they generally lack a native seedbank, however may be completed as required for earthworks/levelling.

The remaining 34.66 ha of temporarily disturbed areas contain native vegetation at pre-disturbance conditions and will require topsoil preservation or stripping and reuse to facilitate natural regeneration. Areas of temporary disturbance (such as some brake and winch sites) may undergo topsoil protection via geofabric or protective matting, thereby retaining soil seedbank, microbes and root balls. Topsoil stripping zones will be clearly marked prior to works commencing, with priority given to topsoil and root ball retention where practicable.

Native topsoil stripping will be undertaken in all areas of temporary disturbance, unless topsoil protection is undertaken as per above. This will involve the salvage of the top 10 cm of soil, including leaf litter and humus. This depth typically captures the seed bank and organic-rich layer without digging into the sterile subsoil. In wooded areas with thick leaf litter, collect the litter layer separately (for use as mulch later), then strip the underlying topsoil. Retaining the upper layer's integrity maximises the viability of seed and soil biota.

Stripping will be undertaken when soils are moist (i.e. not dry and susceptible to erosion, nor saturated and susceptible to runoff). If prolonged dry weather precedes stripping, light watering may be applied to achieve a workable moisture content, and conversely, wait for soils to drain after heavy rains. Soils will be removed in layers so that they may be returned in sequential order as part of rehabilitation,

ensuring separate handling of topsoil and subsoil (NSW RR, 2021).

Whenever possible, directly reuse stripped topsoil onto adjacent areas that are ready for rehabilitation, instead of stockpiling long-term. Direct transfer (i.e., strip and place) preserves seed viability and soil microbes by minimising storage time. If possible, coordinate construction scheduling so that restoration of one segment can occur soon after stripping, using the freshly stripped topsoil for the next segment. If direct placement is not feasible, proceed to proper stockpiling (refer Section 4.1.4 below).

4.1.2. Habitat features

Prior to the commencement of any works that would require vegetation removal, ground disturbance or stream crossing works (including during enabling works), the presence of materials that may be used in future rehabilitation efforts would be identified and marked by a suitable ecologist to maximise opportunities for salvage of biological and habitat resources (NSW RR, 2021). These efforts will be undertaken during pre-clearing surveys as detailed in Annexure B: Clearing Protocol of the HLW BMP. The salvage of hollow-bearing trees, hollow logs, tree stumps, fallen timber or boulders will be undertaken during the clearing process. Material that has not been marked during this process may also be salvaged for rehabilitation during any construction stage of HLW. Cleared logs and tree hollows that could provide fauna habitat include those where the total length of wood at least 10 cm in diameter and at least 0.5 m long. Opportunities to retain habitat features on-easement will be prioritised, particularly within connectivity corridors per Annexure F: Connectivity Strategy of the HLW BMP.

4.1.3. Seed

Local seed collection involves gathering seeds from native plants within the proximate healthy bushland areas. Collecting seeds locally ensures that the plants used during the rehabilitation process are well adapted to the local environment and the genetic diversity of local native plant populations are preserved, aiding in habitat restoration and promoting biodiversity for areas where native vegetation has been historically cleared, fragmented or heavily degraded.

Seed collection for HLW rehabilitation may be deemed necessary by suitably qualified specialists, such as for large temporary disturbance areas with pre-construction native vegetation (i.e., construction compounds and temporary workforce accommodation facilities; refer Figure 3-1). Only appropriate seed collection contractors will be utilised for such works, such as [TBD].

Standard seed collection methodology will be followed, including (OEH, 2011):

- Do not collect more than 20% of seed from any one plant.
- Avoid unnecessary damage (i.e., trampling of understory plants).
- Ensure nesting sites, tree hollows or other animal habitats are not disturbed.
- Do not remove more than 20% of the fruit from any one plant.
- Do not take more than 10% of plant material from any one plant.
- Avoid bringing weeds into the collection site.
- Take particular care when collecting from rare or threatened plants.

At minimum, seeds would be collected with the date, location and taxonomy recorded with samples.

The two most abundant PCTs required for rehabilitation constitute over 60% of temporary disturbance areas: PCT 277 & 290. While collection may be required from other communities listed in Table 3-1, seed collection from these two PCTs are considered likely to form the bulk of collection requirements.

Where possible, initial priority species for collection will consist of canopy and mid storey species, particularly slower growing species and species not commonly held in existing commercial seed banks. Collection of ground covers will also commence, however since the lead time for propagation of grasses and sedges is shorter, collection of this material will be a lower priority at the early stages of collection. The impact of recent bushfires will determine the availability of seed for collection. Grass

and forb species are expected to proliferate following the recent bushfire and this opportunity for collection should be maximised. A seed collection schedule is provided in Attachment 1 as guidance.

Seed collection may occur in any HLW Area prior to clearing. Given the relatively limited extent of the enabling works and subsequent rehabilitation, collection and propagation of seed will not be undertaken during enabling works.

4.1.4. Storage of materials

Adequate storage of salvaged materials is imperative for ensuring temporary disturbance areas will facilitate natural regeneration post-construction. Soil stockpiles will be designated in advance, away from traffic areas and at an appropriate distance from watercourses, on land that is level or gently sloping to minimise the potential for erosion and soil loss. Prioritisation of soil storage will be given to areas that are adjacent to the target community to preserve potential soil seed composition. Preference will be given to storing materials where those same materials will be used directly for rehabilitation at that location, eliminating the need for storage and re-handling, and maximising the viability of seed bank and topsoil biota (NSW RR, 2021).

Each stockpile will be kept as small and low as practicable, ideally no more than ~2 m high. Long, low windrows are preferred over tall mounds as they maximise surface area exposed to air and rainfall, sustaining aerobic microbes and allowing some seeds to germinate to the surface (NSW RR, 2020). If subsoil is also excavated for the project, stockpiles for topsoil and subsoil will be kept separately and clearly marked to avoid confusion during reuse. Erosion and sediment control will be implemented around soil stockpiles in line with the HLW Erosion and Sediment Control Sub-Plan. Compaction of the stockpiles will be avoided, and ongoing weed monitoring will occur per Annexure E: Biosecurity Plan of the HLW BMP.

If stockpiles will remain unused for >10 days, or if they are stored adjacent to any areas that have the potential to contaminate materials with exotic flora species by seed or other (i.e., agricultural lands), stockpiles will be stabilised via one of the following:

- Organic cover – spreading mulch or baled straw (certified weed-free straw/mulch) over the stockpile to help reduce erosion, insulate against extreme heat and retain moisture.
- Vegetative cover – seeding the stockpile with a quick-growing cover crop (e.g., sterile cereal grass, local native grass mix) to reduce wind/water erosion and maintain microbial activity.
- Geofabric – best for shorter-term coverage, using light coloured (heat reflecting) jute mating or geotextile fabric to prevent erosion and weed colonization.

The storage of woody debris and leaf litter within the area of disturbance or adjacent to construction sites may not be appropriate, given the potential increase of bushfire hazard by the storage of flammable material. The location of woody debris storage will be prioritised on sites that are not adjacent to native or planted vegetation, or adjacent to construction sites. The location of storage will be nominated prior to vegetation clearance.

Collected seeds will be stored in a controlled environment to maintain viability until they are required for propagation or direct seeding. Where necessary, pre-treatment methods such as soaking will be applied to improve germination rates. Selected species will be propagated at [TBD] with seedlings grown to an appropriate stage for out-planting. Nursery stock will be monitored for health, and planting will be aligned with optimal seasonal conditions to maximise survival rates.

4.2. Site preparation

4.2.1. Decommissioning

The restoration of land to pre-existing condition will occur progressively following completion of construction works at a temporary disturbance site. This would include the removal/remediation of the construction compounds and camp sites; removal of temporary facilities, site buildings and temporary environmental controls in accordance with the HLW Erosion and Sediment Control Sub-Plan and

landowner agreements. Works will be undertaken to:

- Decommission and remove all infrastructure including above and below ground to a depth of 500 mm.
- Restore fences, gates, etc., which may have been damaged during construction.
- Reform or remediate any sections of stream or waterway banks that are impacted or modified during construction works to resemble the pre-work condition and form wherever possible.
- Reinstate waterway banks impacted during construction such that bank stability at the crossing location is the same or better than prior to construction. Stabilising materials such as rock armouring, hydro mulch, jute matting, or other suitable geotextile materials may be utilised where necessary.

Construction access tracks and access points will be retained for operational access, where required and practicable, in consultation with the relevant landowner.

4.2.2. Soil preparation

Soil preparation may be required in areas with overly compacted soil or high runoff. Soil preparation increases the likelihood of seeds germinating and preventing wash out from rainfall events. Types of soil preparation may include (GVA, 2003):

- Mounding in areas that are waterlogged and require drainage improvements.
- Grading of soils for water harvesting in regions with low rainfall.
- Furrow lining to improve water retention and reduce erosion.

Soil preparation will not be undertaken in any areas with established biodiversity values, such as patches of native grass (BCT, 2019). Soil preparation will not be undertaken in any areas with sandy or loamy soils that are susceptible to erosion. Soil preparation is not necessary in areas of non-native vegetation pre-disturbance (refer to Figure 3-1).

4.2.3. Fauna exclusion

Fauna exclusion fencing (including livestock exclusion fencing where practical) will be temporarily installed in line with relevant guidelines (BCT, 2019; BCT, 2021; BCT, 2024) following decommissioning at native rehabilitation sites (Figure 3-1), pending landowner approval. Fencing will reduce excessive disturbance and control pest animals from grazing on recovering vegetation (BCT, 2019). Fencing will remain installed until the ground cover and grass species populations are considered stable and resilient, as determined by the Project Ecologist.

4.2.4. Weed management

Temporarily disturbed areas will undergo weed management as detailed in Annexure E: Biosecurity Plan of the HLW BMP. Weed management across the disturbed areas would comprise identification of Weeds of National Significance (WoNS), Priority Weeds and invasive species, followed by weed control. Weed control may be required in areas of pre-disturbance non-native vegetation as agreed upon via relevant Property Management Plans.

4.3. Reuse of materials

4.3.1. Soil

Reusing topsoil is a critical component of rehabilitation as it preserves the native seed bank, soil microbial communities and organic matter necessary to facilitate natural regeneration. For reuse within pre-disturbance native vegetation areas (refer to Figure 3-1), topsoil must:

- Be adequately covered for a short period of time (<12 months).
- Be stockpiled proximal to the impact site (e.g., <1 km distance).

- Contain <10% high threat weed cover, and
- Contain no known or suspected pathogens.

Topsoil will be spread to a uniform depth of 50 mm for optimal seed germination. Only topsoil in dry or slightly moist conditions will be spread to prevent clumping, compaction or rutting. Machinery may involve a tracked excavator, backhoe or loader with a tilt bucket for gentle placement; avoiding driving heavy machinery directly over placed topsoil once spread. Topsoil reuse will ensure complete and uniform coverage of the temporarily disturbed area. After respreading, the soil will be scarified / roughened to create shallow furrows along the contour; promoting water infiltration, preventing runoff and creating microsites for seed to lodge and germinate.

Following application, erosion protective measures may be required on sloped/exposed areas. This may include light jute mesh, coir blanket, or salvaged mulch (<50 mm depth & <50% coverage of target area; refer Section 4.3.2). Sediment fencing will be installed and maintained around rehabilitated areas.

In areas of non-native vegetation (Figure 3-1), land will be returned to pre-disturbance conditions in accordance with the relevant Property Management Plan. This may include the following:

- Regrading and stabilising soil.
- Allowing natural return to pasture or cropping unless otherwise agreed with landowner.

4.3.2. Habitat features

Reuse of terrestrial resources will be prioritised within designated connectivity corridors per Annexure F: Connectivity Strategy of the HLW BMP. However, such resources will also be distributed through areas of partial impact (i.e., Easement Clearing Zone, Hazard Tree Zone) and rehabilitated temporary disturbance areas to maximise rehabilitation efforts. Placement should prioritise areas immediately adjacent to that where collected, with similar suitable breeding habitat present. Placement must have regard for relevant HLW bushfire controls (refer Section 7.6 of the HLW BMP). Mulch will be a by-product of vegetation clearing activities. Where practicable, this material will be reused in the progressive rehabilitation works following replacement of topsoil. Guidelines for reuse of terrestrial resources is provided below.

Large Woody Debris (LWD; diameter >5 cm):

- Objective = provide shelter, basing and foraging habitat for ground-dwelling fauna.
- Reuse LWD to the maximum extent possible, in line with relevant HLW bushfire controls (refer Section 7.6 of the HLW BMP).
- Place LWD partially embedded in soil to mimic natural fall.
- Orient east-west to create microclimate variations.
- Place in clusters (not regular rows) across different microhabitats.
- Avoid full burial or excessive coverage with mulch.
- GPS and photo-document all installed features
- Trees within the boundaries of State forests, Crown Lands, Travelling Stock Reserves, public roads or within 40 m of the bank of any river will be disposed of strictly in accordance with the requirements of the appropriate authorities (e.g., Forestry HumeLink License and landowner conditions). These requirements will be determined by the contractors prior to carrying out such works. Recommendations for placement of terrestrial microhabitats are detailed below.

Course Woody Debris (CWD; diameter <5 cm) & Mulch:

- Objective = promote nutrient cycling and microhabitat structure.
- Distribute thinly (<50 mm depth) and do not cover over 50% of the application area to avoid smothering of seedlings.

Rock refugia:

- Objective = provide shelter for reptiles, small mammals and invertebrates.
- Reuse rock refugia to the maximum extent possible.
- Layer rocks with air gaps and irregular cavities.
- Ideally place on north-facing slopes or sunlit areas.
- Create inset refuges at the base of native shrub clusters of riparian zones.
- GPS and photo-document all installed features

4.3.2.1. Aquatic habitats

Areas where crossing upgrades/in-stream works are required in Key Fish Habitat, the following rehabilitation efforts will be undertaken:

- Remediation of aquatic habitat that have been impacted or modified by HLW construction, to the condition prior to construction (or as close as practicable).
- Remediation of bank stability at waterway locations that have been impacted or modified by HLW construction, to condition equal or greater than prior construction.
- Installation of rocks, hydro mulch, jute matting or other suitable materials to stabilise banks where necessary.
- Return of excavated bed material to waterways (where practicable).
- Redeployment of aquatic habitat (CWD, LWD, boulders) within the waterway.

Placement of salvaged aquatic materials will be undertaken with guidance by the Project Ecologist. General guidance for in-stream placement of aquatic habitat features include:

- All works within Key Fish Habitat must be approved by DPI Fisheries.
- Placement must not obstruct fish passage, unless a natural barrier already exists.
- Install features once final grading, erosion controls and sediment removal are complete.
- Avoid in-stream works during fish breeding season (generally September-January for NSW inland rivers).

Rehabilitation will be undertaken with consideration of numerous target species habitat requirements and the character of the stream prior to disturbance, as detailed in Section 7.6.2 of the BMP. Consultation with NSW DPI Fisheries will occur as part of this process regarding crossing designs and the potential occurrence of threatened aquatic species. Consultation will also confirm the appropriate method for storage and installation of aquatic habitat following the completion of construction.

Considerations may include incorporation of larger or smaller habitat features distributed in a way that mimics a natural distribution. Logs, trees or larger stumps (if used) may be cabled into position to reduce future erosion and loss of habitat features during flooding periods. Logs and woody vegetation debris may also be placed within the riparian zone to maintain channel structure.

The habitat requirements of specific aquatic species predicted to be associated with any one area should be used to further guide the placement of habitat features, as described in Section 7.6.2. of the BMP.

Where sufficient aquatic habitat is not able to be salvaged prior to construction, felled trees will be used to restore the waterway. Felled trees material may be acquired from HLW Areas where removal of vegetation has previously occurred, with a preference for vegetation sources from similar vegetation types that is present at each waterway crossing.

Care will be taken during rehabilitation to avoid creating physical or hydraulic barriers that would impede fish movement. Where in-stream or near-bank structures (i.e., erosion control devices, log placement or sediment traps) are installed, they will be assessed for their potential impact on fish passage. Structures will be designed to allow for continuous longitudinal movement of aquatic fauna, particularly during base flow conditions.

4.3.3. Seeding

Direct seeding involves sowing seed directly into the ground rather than transplanting already established seedlings. The benefits of direct seeding include its ability to generate large amounts of vegetation across large areas in a relatively short timeframe. It is also easy to customise the seed mix to suit local conditions and conservation outcomes (BCT, 2019).

Seeds may be sourced from local nurseries or obtained through seed collection detailed in Section 4.1.3. If necessary, a seed collection schedule provided in Attachment 1.

The following will be implemented during seeding:

- Seed mixture is to comprise a mix of flora species listed in Attachment 1. Optimal seeding times and climatic conditions should be considered and prioritised for each species.
- Preparation of soils will be completed (refer Section 4.2.2).
- On reasonably flat slopes, apply 15-20 g/m^2 of seed.
- On steep slopes, much higher rates would be required. Utilise mulch mat or straw mulch secured with jute matting to protect the seed and soil.
- Watering must be conducted immediately after seeding, followed by daily watering until establishment. Watering activities may be paused in wet weather conditions.
- Inspection of fauna exclusion fencing prior to seeding to ensure fence lines are stock proof.

If required, seeding in areas of non-native vegetation pre-disturbance will be completed in accordance with the relevant Property Management Plan. Areas of temporary disturbance within easement will be limited to seeding of groundcovers and low-lying shrubs (if needed) to maintain maximum line operating conditions.

4.3.3.1. KMG habitat

Direct seeding will be used in temporarily disturbed areas that are associated with KMG habitats (Figure 3-1). Flora species selected for direct seeding will provide a diverse range of grasses able to establish a native ground cover. Seed composition will be comprised of at a minimum the relevant flora species summarised in Table 4-1.

Table 4-1 Flora species selection for direct seeding in KMG habitats

Target species	Flora species selection
Key's Matchstick Grasshopper	*Acaena ovina* *Bulbine bulbosa* *Chrysocephalum apiculatum* & *Trifolium* sp.[2] *Lomandra filiformis* subsp. *coriacea* *Podolepis jaceoides* *Poranthera microphylla* *Ranunculus lappaceus* *Themeda triandra* *Wurmbea dioica*

It is noted that whilst KMG is a generalist feeder that will use native and exotic species, it does not feed on *Themeda triandra* (TSSC, 2020). Revegetation efforts are to include *T. triandra* in combination with other selected food species (such as *Acaena ovina*).

[2] A common native pioneer species and readily available fodder crop that is suitable for direct seeding (Greening Australia, 2014). This species is not associated with targeted PCTs, therefore, this species should only be used if efforts to source seeds has been unsuccessful, or revegetation efforts have failed for the other listed species.

4.3.3.2. Timing

Where possible, seeding should occur in October, November and autumn months. This timing allows for adequate establishment/root growth before the heavy summer rainfall period but also allows the plants to go through a growth period soon after planting resulting in quicker establishment. Re-planting will be undertaken by a suitably qualified and experienced contractor who will be able to assess the site and develop a site-specific approach.

4.3.4. Maintenance

Areas of native topsoil reuse and/or seeding will require maintenance by suitably qualified specialists to achieve the objectives of this plan (refer Section 5.3). Maintenance activities include:

- Watering must be conducted immediately after application, followed by routine watering until establishment. Watering activities may be paused in wet weather conditions.
- Regular irrigation during warmer months to meet the recommended moisture level for the particular area, with consideration of the species present. The irrigation method and amount may vary between sites.
- Ongoing weed maintenance as per Annexure E: Biosecurity Plan of the HLW BMP.
- Inspection of fauna exclusion fencing to ensure fence lines are stock proof.
- Inspection of regenerating flora for signs of grazing/browsing and implement pest control as required.

4.4. Summary of rehabilitation measures

Rehabilitation measures outlined in this plan have been summarised in Table 4-2 below. These will be implemented to minimise construction impacts from HLW and ensure all commitments and requirements of approval will be adhered to. These specific management and mitigation measures have been developed to address the requirements of applicable legislation, the MCoA, the CoMA, the UMM and all Planning Approval Documentation, particularly the Revised BDAR.

Table 4-2 Rehabilitation measures

ID	Measure/Requirement	When to implement	Responsibility	Reference	Evidence
BMP35	Topsoil stripping zones will be clearly marked prior to works commencing at a temporary disturbance site, with priority given to topsoil and root ball retention where practicable. If deemed necessary, seed collection will occur. Storage of salvaged soil and seeds will follow guidelines provided in this plan.	Pre-construction	Environmental Manager Construction Manager Suitably qualified specialists	MCoA B30, B62, B63 CoMA 7 UMM B3, B18	Environmental Control Map Erosion and Sediment Control Plan
BMP36	Habitat features such as rocky outcrops, surface rock, dead wood, logs and course woody debris will be salvaged and relocated to adjacent and/or suitable woodland locations, pending consultation with the Project Ecologist. Relocation will prioritise areas of connectivity corridors per Annexure F: Connectivity Strategy of the HLW BMP, then areas of partial impact (i.e., Easement Clearing Zone, Hazard Tree Zone) and rehabilitated temporary disturbance areas. Placement will have regard for relevant bushfire controls.	Pre-construction and construction	Environmental Manager Construction Manager Project Ecologist	MCoA B25, B30, B62, B63 CoMA 2, 7 UMM B3, B18, B19	Pre-clearing Reports BMP Monitoring Report
BMP37	The restoration of land to pre-existing use will occur progressively following completion of constructions works at a location. This would include works within waterways, the removal/remediation of the construction compounds and camp sites, removal of temporary facilities and site buildings and temporary environmental controls.	Construction	Environmental Manager Construction Manager	MCoA B30, B62, B63 CoMA 7 UMM B3, B18	BMP Monitoring Report

ID	Measure/Requirement	When to implement	Responsibility	Reference	Evidence
BMP38	Soil preparation, fauna exclusion fencing and weed management must be completed within 6 months of the completion of construction, upgrading or decommissioning of HLW.	Construction	Environmental Manager Construction Manager Suitably qualified specialists	MCoA B30, B62, B63 CoMA 7 UMM B3, B18	BMP Monitoring Report
BMP39	Rehabilitation is to include the reuse of natural resources including topsoil and mulch as well as seed collection (where relevant). This will be followed by maintenance such as watering and weeding to achieve targets listed in Table 5-2.	Construction	Environmental Manager Construction Manager Suitably qualified specialists	MCoA B30, B62, B63 CoMA 7 UMM B3, B18	BMP Monitoring Report
BMP40	Direct seeding will be used in temporarily disturbed areas that are associated with Keys Matchstick Grasshopper habitats (Figure 3-1). Seeding will be followed by maintenance to achieve appropriate survival rates.	Construction	Environmental Manager Construction Manager Suitably qualified specialists	MCoA B30 CoMA 7 UMM B3, B9	BMP Monitoring Report

5. Compliance management

5.1. Monitoring

Given the staged construction and decommissioning of HLW, monitoring and reporting of vegetation changes may be required during construction activities to ensure rehabilitation efforts in temporary disturbance areas facilitate natural regeneration of suitable native species. Any longer-term monitoring (post-construction) would be detailed within the Transgrid Operational Environmental Management Plan and should incorporate components of monitoring detailed below.

Monitoring will be completed by the Project Ecologist annually (spring) during construction works and will be compared against performance indicators listed in Section 5.3. This will involve two methods: plots and photo monitoring points, further detailed below. Monitoring locations are to be established and demarcated during the initial monitoring visit at each vegetation site via corner stakes, marked with GPS and flagging tape, to ensure repetition of monitoring events. Indicative monitoring locations are provided in Figure 3-1, targeting the following minimum monitoring locations:

- 1 monitoring location is required within the patch of rehabilitated KMG habitat.
- 1 monitoring location is required at each accommodation camp/ancillary facility.
- 1 monitoring location every 10 linear km of the alignment for all other temporary disturbance areas (i.e., brake and winch sites, rehabilitated temporary access tracks).

5.1.1. Plot-based monitoring

Plot-based monitoring must follow the methods outlined in the *Biodiversity Assessment Method* (BAM; DPIE 2020a). Established 20 m x 20 m plots (or 400 m^2 equivalent for linear areas) must be assessed with the information outlined in Table 5-1 recorded.

Table 5-1 Survey data required for plot-based monitoring (modified from the BAM [DPIE 2020a])

Attribute	Survey requirement
Growth form	Growth form for each recorded native species
Species name	Scientific name of each native and exotic species
Cover	Estimate the foliage cover of each native and exotic species within the boundaries of the plot including all attached plant material, alive or dead, rooted in or overhanging the plot. Cover should be recorded: • In decimals if less than 1% (e.g. 0.1, 0.2). • In whole numbers up to 5% (e.g. 1, 2, 3). • To the nearest 5% if >5% cover (e.g. 5, 10, 15, 20, 25).
Abundance rating	Count (when ≤10) or estimate (when >10) the number of individuals of each native and exotic species rooted within the plot. Record abundance as: • Counts of 1, 2, 3… • Estimates of 10, 20, 30… • 100, 200, 300… • 1000, 2000, 3000.
Erosion	Visual assessment of soil stability; record presence/absence and dimensions (length × width × depth) of: • Rills or gullies. • Exposed subsoil. • Sediment plumes downslope.

5.1.2. Photo monitoring points

Photo monitoring points will provide an indication of the success or failure of any areas of rehabilitation conducted. The quadrat used for Photo Monitoring Points is diagrammatically shown in Plate 5-1.

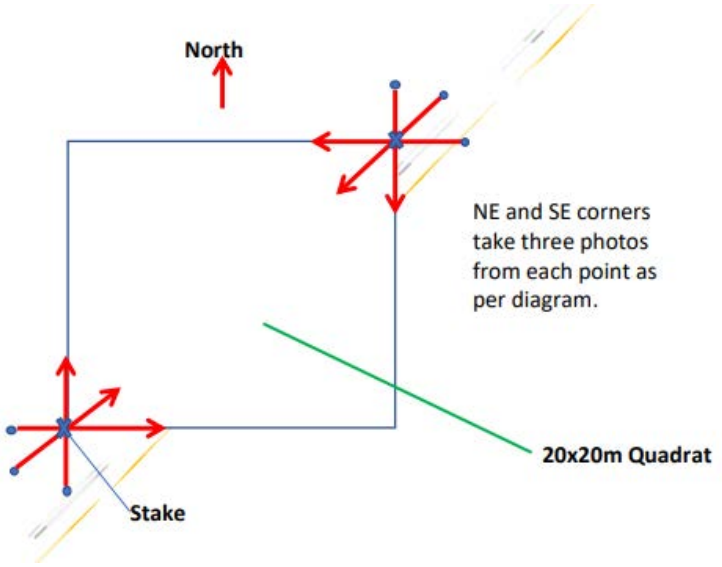


Plate 5-1 Photo monitoring point setup

5.2. Reporting

Following the completion of monitoring, all data will be collated and presented within the annual BMP Monitoring Report (refer to Section 8.6 of the HLW BMP). The report will include the following:

- Details of monitoring methods per Section 5.1.
- Assessment of rehabilitation success by annual plot data and reporting, with reference to performance indicators provided in Table 5-2. Photographic evidence of condition by photo points.
- Comparison of annual monitoring with previous year (if construction monitoring extends 2-years), as well as Revised BDAR data.
- Assessment of incidents and non-compliances based on the Trigger Action Response Plan in Table 5-2.
- Recommendations for future rehabilitation and/or corrective efforts (if necessary).
- If for any reason rehabilitation cannot be achieved as per this plan, evidence will be supplied and reasoning detailed within.

5.3. Incidents and non-compliances

Non-conformances, incident reporting and subsequent investigation associated with this rehabilitation plan will be undertaken as required in accordance with the Trigger Action Response Plan (TARP) provided in Table 5-2 below. HLWJV will promptly advise Transgrid on events that are non-conforming with this plan.

Table 5-2 Rehabilitation Plan TARP

Objective	Target	Performance indicator	Method of monitoring	Frequency	Trigger	Action/response plan
Rehabilitated KMG habitats	Maintain 85% survival rate of target seedings. Maintain ≤10% cover of High Threat Weeds and ≤20% total weed cover.	Seedlings germinate at required rate. ≥85% survivorship of plantings.	Vegetation plots and photo monitoring points.	Annually	>15% target seedling mortality. >10% High Threat Weeds OR >20% total weed cover.	Implement supplementary seeding. Increase frequency of weed control per Annexure E: Biosecurity Plan of the HLW BMP. Reassess weed source pathways (e.g., vehicles, stockpiles) and address any barriers
Soil stability	Maintain a stable, non-eroding soil surface across rehabilitated temporary disturbance areas.	No rill or gully erosion >5 cm deep or 1 m long in >95% of the site.	Vegetation plots and photo monitoring points.	Annually	Visible rill/gully erosion in >5% of the site area.	Install/repair erosion controls (e.g., jute matting, coir logs). Regrade of contour site to slow runoff. Reapply topsoil or mulch as needed.
Groundcover re-establishment	Re-establish ≥80% total groundcover of which ≥80% is native.	Measured cover of live vegetation and abundance of native species.	Vegetation plots and photo monitoring points.	Annually	<70% native groundcover after 18 months OR total live vegetation cover <80%.	Infill with native mulch or topsoil. Targeted seeding with native grasses and forbs. Maintain fauna exclusion fencing and exclude human traffic.
Native	Facilitate recruitment	Number and	Vegetation plots	Annually	<5 native species	Evaluate seedbank condition.

Objective	Target	Performance indicator	Method of monitoring	Frequency	Trigger	Action/response plan
species regeneration	of ≥5 native species, including at least 2 functional groups (e.g., grass, forb, shrub).	diversity of naturally regenerating native species.	and photo monitoring points.		detected after 2 growing seasons.	Targeted seeding with native species. Consider soil inoculation or scarification.
Weed suppression	Maintain ≤10% cover of High Threat Weeds and ≤20% total weed cover.	Weed cover and abundance.	Vegetation plots and photo monitoring points.	Annually	>10% High Threat Weeds OR >20% total weed cover.	Increase frequency of weed control per Annexure E: Biosecurity Plan of the HLW BMP. Reassess weed source pathways (e.g., vehicles, stockpiles) and address any barriers.
Self-sustainability	Rehabilitated sites are stable and trending towards natural regeneration without further intervention.	No active management required beyond routine monitoring.	Vegetation plots and photo monitoring points.	Annually	Any site requiring re-intervention after year 2.	Reassess ecological function and soil-health. Implement secondary rehabilitation (e.g., deep ripping, re-mulching, seeding). Consider active revegetation. Extend monitoring and maintenance timeline.

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Attachment 1 Indicative seed collection schedule

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Acacia dealbata	x										x	x
Acacia kettlewelliae	x											x
Acacia melanoxylon	x											x
Acacia rubida	x										x	x
Acaena novae-zelandiae											x	x
Acrotriche serrulata											x	x
Aristida ramosa	x											
Asperula scoparia	x											x
Austrodanthonia eriantha	x											x
Austrostipa bigeniculata	x	x	x							x	x	x
Austrostipa scabra subsp. scabra	x											x
Austrostipa verticillata	x	x								x	x	x
Bothriochloa macra			x	x								
Brachyloma daphnoides											x	x
Brachyloma daphnoides subsp. daphnoides											x	x
Carex appressa	x											x
Cassinia aculeata		x	x									

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Cassinia longifolia	x	x										
Cassinia uncata		x	x									
Daviesia latifolia												x
Dillwynia phylicoides	x	x								x	x	x
Echinopogon ovatus											x	x
Eucalyptus albens	x	x	x	x	x	x	x	x	x	x	x	x
Eucalyptus blakelyi	x	x										
Eucalyptus bridgesiana	x	x										x
Eucalyptus camphora subsp. *humeana*	x	x										
Eucalyptus dalrympleana subsp. *dalrympleana*	x	x	x	x	x							x
Eucalyptus dives											x	x
Eucalyptus goniocalyx	x	x	x	x	x	x	x	x	x	x	x	x
Eucalyptus macrorhyncha	x	x	x	x	x	x	x	x	x	x	x	x
Eucalyptus melliodora			x	x								
Eucalyptus microcarpa	x	x	x	x	x						x	x
Eucalyptus pauciflora			x	x								
Eucalyptus polyanthemos						x	x	x	x	x	x	
Eucalyptus robertsonii subsp. *robertsonii*			x									
Eucalyptus rossii			x									
Eucalyptus stellulata	x	x										x

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Eucalyptus viminalis			x									
Exocarpos strictus			x									
Geranium solanderi var. solanderi	x	x										x
Glycine clandestina			x									
Gonocarpus tetragynus			x									
Goodenia hederacea subsp. hederacea	x	x								x	x	x
Hibbertia obtusifolia			x									
Hovea linearis										x	x	x
Juncus holoschoenus			x									
Lagenifera stipitata			x									
Leptospermum continentale	x	x	x	x	x	x	x	x	x	x	x	x
Lomandra filiformis subsp. *coriacea*			x									
Lomandra filiformis subsp. *filiformis*	x	x	x									
Lomandra longifolia			x									
Lomatia myricoides							x					
Microlaena stipoides var. *stipoides*						x	x	x				
Mirbelia oxylobioides						x	x	x				
Panicum effusum	x	x	x									
Persoonia chamaepitys						x	x	x				

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Phragmites australis					x	x	x					
Platylobium formosum subsp. *formosum*												x
Poa induta	x	x								x	x	x
Poa meionectes	x	x								x	x	x
Poa sieberiana	x	x								x	x	x
Poa sieberiana var. *sieberiana*	x	x								x	x	x
Polystichum proliferum						x	x	x	x	x		
Pteridium esculentum		x	x									
Rubus parvifolius	x	x										x
Senecio bathurstianus	x	x										x
Stellaria pungens						x	x	x	x			
Stypandra glauca											x	
Themeda australis	x											x
Xanthorrhoea glauca subsp. *angustifolia*				x								

Annexure H Biodiversity Monitoring Program

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Annexure H

Biodiversity Monitoring Program

HumeLink West

Document Number: HLW-HLJV-PRW-ENM-PLN-000001H

Revision: 5

Document Control

Approvals

Title	HumeLink West Biodiversity Monitoring Program
Endorsed by Environment Representative	[redacted] (Wolfpeak Group Ltd Pty)
Approved on behalf of HLWJV by	[redacted]
Signed	
Dated	11/09/2026

Date 11/09/2026

Version Control

Revision	Date	Description
A	3/07/2024	Preliminary draft
B	19/08/2024	Update following TG review
1	20/12/2024	Updates following receipt of final MCoA & CoMA
2	4/06/2025	Updates following ER, FCNSW & CPHR review
3	28/07/2025	Updates following ER & CPHR review
4	28/05/2026	Minor updates for operational improvement, incorporating CPHR comment
5	11/09/2026	Minor amendments following FcNSW review

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Abbreviations

Abbreviation	Expanded text
BACI	Before-After-Control-Impact
BAM	Biodiversity Assessment Method
BC Act	*Biodiversity Conservation Act 2016* (NSW)
BCS	Biodiversity Conservation and Science group within DCCEEW – NSW (now referred to as CPHR)
BCT	Biodiversity Conservation Trust
BDAR	Biodiversity Development Assessment Report
BMP	Biodiversity Management Sub-plan
BAVR	Biodiversity Assessment Verification Report
CEMP	Construction Environmental Management Plan
CoMA	Commonwealth Conditions of Ministerial Approval
Cth	Commonwealth of Australia
CPHR	Conservation Programs, Heritage & Regulation Division (formerly BCS)
DCCEEW - Cth	The Commonwealth Department of Climate Change, Energy, the Environment and Water
DCCEEW – NSW[1]	The NSW Department of Climate Change, Energy, the Environment and Water (formerly DPE)
DPE	Department of Planning and Environment (now known as NSW DCCEEW)
DPI	Department of Primary Industries
DPIE	Department of Planning, Industry and Environment (now known as NSW DCCEEW)
DPHI	Department of Planning, Housing and Infrastructure
ECZ	Easement Clearing Zone
EHNV	Epizootic Haematopoietic Necrosis Virus
EIS	Environmental Impact Statement
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999* (Cth)
FCNSW	Forestry Corporation New South Wales
FPM	Faecal Pellet Monitoring
GPS	Global Positioning System
HLW	The HumeLink West Stage of the HumeLink project
HLWJV	HumeLink West Joint Venture (UGL Limited and CPB Contractors)

[1] As of the 1st January 2024 the NSW Department of Planning and Environment has split into the Department of Climate Change, Energy, the Environment and Water (NSW) and the Department of Planning, Housing and Infrastructure. DCCEEW (NSW) includes the environmental regulators (such as NSW EPA, CPHR, NPWS, DPE-Water), while the Department of Planning, Housing and Infrastructure (DPHI) includes planning regulatory services.

Abbreviation	Expanded text
HLW Area	Approved disturbance footprint of the HumeLink West Stage of the HumeLink project
HTZ	Hazard Tree Zone
KFH	Key Fish Habitat
MCoA	NSW Minister's Conditions of Approval
NPWS	National Parks and Wildlife Service
NSW	New South Wales
PCT	Plant Community Type
PCVR	Partial Clearing Validation Report
RAA	Rapid Aquatic Assessment
RCMS	Remote Camera Monitoring Sites
Revised BDAR	*HumeLink Biodiversity Development Assessment Report Rev 0* (Niche Environment and Heritage Pty Ltd, June 2024)
RPS	RPS AAP Consulting Pty Ltd
SAII	Serious And Irreversible Impact
SAT	Spot Assessment Technique
SBAS	Supplementary Biodiversity Strategy
SWMP	Soil and Water Management Plans
TARP	Trigger Action Response Plan
TCZ	Total Clearing Zone
TEC	Threatened Ecological Community
UMM	Updated Environmental Management Measure as outlined in the Planning Approvals Documentation

1. Introduction

1.1. Context

This Biodiversity Monitoring Program forms part of the Biodiversity Management Sub-plan (BMP) of the HumeLink West project (HLW) Construction Environmental Management Plan (CEMP). The program has been prepared to outline and describe how the UGL Limited and CPB Contractors Joint Venture (HLWJV), during the construction of HLW, will comply with the Minister's Conditions of Approval (MCoA), the Federal Minister for Water and Environment Condition of Ministerial Approval (CoMA), the Updated Environmental Management Measures (UMM), and undertake its duties in accordance with the Planning Approval Documentation listed under the MCoA A2.

1.2. Purpose

The purpose of this program is to detail the biodiversity monitoring requirements which are to be implemented during construction of HLW. Specifically, this program details the monitoring activities that shall be undertaken to track indirect and prescribed impacts of project construction activities. Monitoring will provide feedback on the efficacy of the implemented environmental management measures at mitigating indirect biodiversity impacts of construction.

This program describes the HLWJV program for monitoring during construction in order to minimise potential indirect and prescribed impacts on threatened species and their habitats. The program aims to address relevant actions and mitigation measures outlined in the following documents:

- Mitigation measures B3, B8, B12 and B22 of the HumeLink Biodiversity Development Assessment Report Rev 0 (BDAR; Niche Environment and Heritage Pty Ltd, June 2024).
- Condition B25, B28, B29 and B30 of the Minister's Conditions of Approval (MCoA) A2.
- Condition 6 and 7 of the Federal Minister for Water and Environment Condition of Ministerial Approval.

1.3. Objective

The objective of this program is to provide early warning of ineffective measures and/or uncertain impacts that may compromise the mitigation measures and threaten exceedance of the predicted impacts of HLW construction. The scope includes the following:

- Identify entities that require monitoring during construction.
- Specify the existing extent of monitoring entities.
- Detail the monitoring methods including performance criteria.
- Provide measurable thresholds to identify when remedial action is triggered.
- Provide adaptive management response/actions.

2. Environmental requirements

2.1. Relevant documents and guidelines

The main document relevant to this program is the *HumeLink Biodiversity Development Assessment Report Rev 0* (Revised BDAR; Niche Environment and Heritage Pty Ltd, June 2024). Refer to Section 5 for a full list of referenced documents and research articles.

Results of the Supplementary Biodiversity Strategy (SBAS) & Biodiversity Assessment Verification Report (BAVR) will be incorporated as an addendum to this program within three months (as necessary).

2.2. Permits and licences

The permits and licences relevant to this program include:

- All Project Ecologists must, at a minimum, hold a Scientific Licence under Part 2 of the *Biodiversity Conservation Act 2016* (including Animal Ethics Approval) for fauna handling, rescue and monitoring/survey works.

2.3. Preparation of this program

In accordance with MCoA B30a, this program has been prepared by suitably qualified and experienced biodiversity experts of RPS AAP Consulting Pty Ltd:

- Polina Zadorojnaya (BSc; BAM Accredited Assessor BAAS 23014).
- Joe Baird (BSc).
- Chelsea Tiller (BSc).

2.4. Consultation

Consultation undertaken in preparation of this program is summarised in Section 4 and Annexure J: Consultation Report of the HLW BMP. If consultation with relevant stakeholders or regulators is required to assess the efficacy of mitigation strategies detailed in this program, these will be undertaken in accordance with Section 8.3 of the HLW BMP.

2.5. Minister's Conditions of Approval

The MCoA relevant to this program are listed in Table 2-1. A cross reference is also included to indicate where and how the conditions are addressed in this program or other HLW management documents.

Table 2-1 MCoA relevant to this program

MCoA No.	Condition Requirements	Document Reference
Restrictions of Clearing and Habitat		
B25	Unless otherwise agreed with the Planning Secretary, the Proponent must: (a) ensure that the vegetation and habitat clearing limits specified in Table 2-1, Table 2-2 and Table 2-3 of Appendix 2 are not exceeded; and	This program includes monitoring of partial clearing zones (Section 4.2) and PCT 637 (Section 4.6) to ensure clearing limits are not exceeded. Refer to the HLW BMP, including Annexure B: Clearing Protocol for additional measures to address this condition.
	(b) minimise: (i) The impacts of the development on hollow-bearing trees. (ii) The impacts of the development on threatened flora and fauna populations. (iii) The clearing of native vegetation and key habitat.	This plan includes provisions for monitoring impacts in partial clearing zones (i.e., native vegetation; Section 4.2), flora (Section 4.3), fauna (Section 4.4 through 4.5) and Threatened Ecological Communities (Section 4.6) to ensure impacts are minimised per this condition.
	(c) not undertake any works that result in ground disturbance within a minimum setback distance of 50 metres from PCT 637 – Alpine and sub-alpine peatlands, damp herbfields and fens, South Eastern Highlands Bioregion and Australian Alps Bioregion and 30 metres from known locations of *Prasophyllum bagoense, Prasophyllum*	This program includes monitoring of threatened orchids (Section 4.3) and PCT 637 no-go zones

MCoA No.	Condition Requirements	Document Reference
	keltonii and *Pterostylis oreophila* as mapped in the BDAR.	(Section 4.6) to ensure impacts are avoided to these entities. Refer to the HLW BMP, including Annexure B: Clearing Protocol for additional measures to address this condition.
Supplementary Biodiversity Strategy		
B28	Prior to carrying out any development that would impact on the relevant biodiversity values (excluding Enabling Works, if the relevant requirements of this condition are adequately addressed in the Enabling Works Management Plan of condition B64), the Proponent must prepare a Supplementary Biodiversity Strategy as committed to in the EIS, in consultation with CPHR and to the satisfaction of the Planning Secretary. Unless otherwise agreed by the Planning Secretary, the Strategy must:	Results of Supplementary Biodiversity Strategy will be incorporated into this program as relevant (Section 2.1).
	(a) be peer reviewed by a suitably qualified, experienced and independent biodiversity consultant with *Biodiversity Assessment Method* (2020) (BAM) Accreditation whose appointment has been endorsed by the Planning Secretary;	
	(b) detail survey methods for all entities to be targeted by the Strategy, in accordance with the *Biodiversity Assessment Method* (2020) and any other guidance document that is relevant and applicable at the time surveys were undertaken or the BDAR was prepared, including but not limited to: (i) surveys within unsurveyed areas of the development area identified in the EIS where a reduction in credit liability for the relevant biodiversity value assumed present is being sought;	

MCoA No.	Condition Requirements	Document Reference
	(ii) surveys for the following serious and irreversible impact (SAII) entities: ▪ *Prasophyllum bagoense* ▪ *Pterostylis oreophila* ▪ *Caladenia concolor* ▪ *Genoplesium superburn* ▪ *Pomaderris delicatat* ▪ *Litoria castanea* ▪ *Prasophyllum innubum* ▪ *Solanum armourense* ▪ *Calotis glandulosa* ▪ *Grevillea iaspicula* ▪ *Pomaderris pallida* ▪ *Mixophyes balbus* ▪ *Prasophyllum keltonii* ▪ *Bossiae fragrans* ▪ *Eucalyptus robertsonii* subsp*, hemisphaerica* ▪ *Grevillea wilkinsonii* ▪ *Chalinolobus dwyeri* ▪ *Pseudomy fumeus* ▪ *Pimelea bracteata* ▪ *Tyto tenebricosa*	
Biodiversity Assessment Verification Report		
B29	Unless otherwise agreed by the Planning Secretary, prior to carrying out any development that would impact on the relevant biodiversity values subject to survey in the Supplementary Biodiversity Strategy in condition B28 (excluding Enabling Works, if the relevant requirements of this condition are adequately addressed in the Enabling Works Management Plan of condition B64), the Proponent must prepare a Biodiversity Assessment Verification Report in consultation with CPHR and to the satisfaction of the Planning Secretary. The Report must:	Results of Biodiversity Assessment Verification Report will be incorporated into this program as relevant (Section 2.1).

MCoA No.	Condition Requirements	Document Reference
	(a) be prepared by a suitably qualified, experienced and independent biodiversity consultant with *Biodiversity Assessment Method* (2020) (BAM) Accreditation whose appointment has been endorsed by the Planning Secretary;	
	(b) be prepared in accordance with the *Biodiversity Assessment Method* (2020) and any other guidance document that is relevant and applicable at the time surveys were undertaken or the BDAR was prepared;	
	(c) be prepared with regard to the final layout plans for the development required under condition C8, including the location of final access routes within each clearing zone and stockpile locations;	
	(d) include: (i) detail of the outcomes of surveys undertaken in accordance with condition B28;	
	(ii) where species are found to be present following the surveys undertaken under condition B28 or that are assumed to be present, identify measures to avoid and / or mitigate the impact to those entities for inclusion in a revised version of the Biodiversity Management Plan required under condition B30;	
	(e) provide findings and recommendations relating to the matters in (d), including, but not limited to, reducing the relevant credit obligations and calculating credit obligations for unexpected finds.	
	Any required changes to biodiversity offset or mitigation measures arising from the Biodiversity Assessment Verification Report must be incorporated into an updated version of	

MCoA No.	Condition Requirements	Document Reference
	the Biodiversity Offset Package under condition B26 in consultation with CPHR and BCT and addressed in a revised version of the Biodiversity Management Plan required under condition B30, in consultation with CPHR and FCNSW, to the satisfaction of the Planning Secretary.	
Biodiversity Management Plan		
B30	Prior to carrying out any development (excluding Enabling Works, if the relevant requirements of this condition are adequately addressed in the Enabling Works Management Plan of condition B64) that could impact biodiversity values that require offsetting, the Proponent must prepare a Biodiversity Management Plan for the development to the satisfaction of the Planning Secretary. This plan must:	This program forms part of the BMP.
	(a) be prepared by a suitably qualified and experienced biodiversity expert/s;	Section 2.3
	(b) be prepared in consultation with CPHR and FCNSW;	Section 2.4
	(c) be prepared generally in accordance with the *Revised Biodiversity Development Assessment Report* (Revision 0, dated 21 June 2024);	Section 2.1 and Table 2-3
	(d) include a description of the measures that would be implemented for: (i) meeting the biodiversity mitigation requirements in condition B25 and as required by condition B29;	Results of Supplementary Biodiversity Strategy and Biodiversity Assessment Verification Report will be incorporated into this program as relevant (Section 2.1).
	(ii) minimising: ▪ the amount of vegetation clearing on site; ▪ the loss of key fauna habitat (including tree hollows);	This plan includes provisions for monitoring impacts in partial clearing zones (i.e., native vegetation; Section

MCoA No.	Condition Requirements	Document Reference
	▪ the impacts of fauna on site, including undertaking pre-clearance surveys; and ▪ potential indirect impacts on threatened flora and fauna species;	4.2), flora (Section 4.3), fauna (Section 4.4 through 4.5) and Threatened Ecological Communities (Section 4.6) to ensure impacts are minimised per this condition.
	(iii) ensuring the development does not adversely affect the native vegetation and habitat outside the disturbance footprint;	This plan includes provisions for monitoring impacts Threatened Ecological Communities in no-go zones (outside of the disturbance footprint; Section 4.6). Refer to the HLW BMP, including Annexure B: Clearing Protocol for additional measures to address this condition.
	(iv) protocols for unexpected finds of threatened species and threatened ecological communities within the disturbance footprint including the requirements for: ▪ all work in the associated location to stop to prevent further impact, and ▪ notification to the Planning Secretary and CPHR (and AG DCCEEW where relevant) in writing on any additional mitigation measures to be implemented; and ▪ relevant agencies to be consulted and the Planning Secretary to endorse recommencement of work;	Not addressed in this program – refer Annexure D: Unexpected Finds Procedure of the HLW BMP
	(v) connectivity strategy for the potentially impacted species identified in the *Revised Biodiversity Development Assessment Report* (Revision 0, dated 21 June 2024)	Not addressed in this program – refer Annexure C:

MCoA No.	Condition Requirements	Document Reference
	and a Supplementary Hollow and Nest Strategy;	Hollow and Nest Strategy & Annexure F: Connectivity Strategy of the HLW BMP
	(vi) protecting the conservation values of McPhersons Plain and avoiding impacts to *Prasophyllum bagoensis, Prasophyllum keltonni* and *Pterostylis oreophila*;	This program includes provisions for monitoring threatened orchids (Section 4.3) to ensure impacts to these species are avoided.
	(vii) rehabilitating temporary disturbance areas to facilitate natural regeneration of suitable native species;	Not addressed in this program – refer Annexure G: Rehabilitation Plan of the HLW BMP
	(viii) progressively monitoring the areas of partial clearance following the commencement of construction and provision of a verification report every three months during construction to confirm the assumptions made in the BDAR regarding partial clearance within the Easement Clearing Zone and whether any changes are required to this plan;	Section 4.2.
	(ix) maximising the salvage of resources within the approved disturbance area – including vegetative and soil resources – for beneficial reuse (such as fauna habitat enhancement) during the rehabilitation and revegetation of the site;	This program includes provisions for monitoring the reuse of resources in partial clearing zones (Section 4.2). Refer Annexure F: Connectivity Strategy & Annexure G: Rehabilitation Plan of the HLW BMP for additional measures to address this condition.

MCoA No.	Condition Requirements	Document Reference
	(x) collecting and propagating seed (where relevant);	Not addressed in this program – refer Annexure G: Rehabilitation Plan of the HLW BMP
	(xi) controlling erosion, weeds and feral pests;	Not addressed in this program – refer Annexure E: Biosecurity Management Plan of the HLW BMP
	(xii) bushfire management;	Not addressed in this program – refer Section 7.6 of the HLW BMP
	(xiii) minimising impacts on entities at risk of a serious and irreversible impact (SAII), including for Box Gum Woodland, Rice Flower (*Pimelea bracteata*) and Sooty Owl (*Tyto tenebricosa*) and other entities that are identified as requiring mitigation measures in the Biodiversity Assessment Verification Report required by condition B29 and the additional mitigation measures outlined in the additional information (Transgrid proposal dated 2 September 2024) within three years of the date of the Project Approval (over and above the relevant credit obligations); and	This program includes provision for monitoring indirect impacts to *Pimelea bracteata* (Section 4.3) and Sooty Owl (Section 4.4).
	(e) include a program to monitor, evaluate and publicly report on the effectiveness of these measures.	Section 3.1.
	Following the Planning Secretary's approval, the Proponent must implement the Biodiversity Management Plan. *Note: The Biodiversity Management Plan must incorporate all relevant aspects of the development, including Enabling Works consistent with the requirements of condition B67.*	Section 2.3.

2.6. Federal Minister for Water and Environment Condition of Ministerial Approval

The CoMA relevant to this program are listed in Table 2-2. A cross reference is also included to indicate where and how the conditions are addressed in this program or other HLW management documents.

Table 2-2 CoMA relevant to this program

CoMA No.	Condition Requirements	Document Reference
Field Verification Efforts		
6	The approval holder must provide to the department the Supplementary Biodiversity Strategy and Biodiversity Assessment Verification Report required under conditions B28 and B29 of the NSW approval.	Results of Supplementary Biodiversity Strategy and Biodiversity Assessment Verification Report will be incorporated into this program as relevant (Section 2.1).
Biodiversity Management Plan		
7	The approval holder must comply with condition B30 of the NSW Approval. The Biodiversity Management Plan must be prepared in accordance with the Environmental Management Plan Guidelines and condition B30 of the NSW Approval.	Refer Table 2-1.

2.7. Updated Management Measures

UMMs relevant to this program are listed in Table 2-3 below. A cross reference is also included to indicate where and how the conditions are addressed in this program or other HLW management documents.

Table 2-3 UMMs relevant to this program

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
Biodiversity				
B3	A Biodiversity Management Plan (BMP) will be prepared in consultation with NSW DCCEEW Environment and Heritage and approved by DPHI prior to construction. The BMP will be prepared by a qualified ecologist and include a plan for implementing, evaluating and reporting on the effectiveness of all mitigation measures outlined in *Technical Report 1 – Revised Biodiversity Development Assessment Report*, including:	Detailed design and construction	All locations	This program forms part of the BMP to evaluate and report on the effectiveness of all mitigation measures (Section 4.1).
	• Measures to minimise impacts to biodiversity, including measures to reduce disturbance to sensitive flora and fauna procedures for clearing of vegetation, including pre-clearing inspections and procedures for the relocation of flora and fauna.			Not addressed in this program – refer Annexure B: Clearing Protocol of the HLW BMP. Monitoring relevant to this condition is summarised in Section 4.1.
	• Preparation of a fauna handling and rescue procedure to be implemented during construction and operation for the ethical handling of injured or displaced fauna. Further, the fauna handling and rescue procedure would include an incident reporting protocol for fauna relocations, rescue and rehabilitation, euthanasia and/or fatality.			

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
	• Procedures for the demarcation and protection of retained vegetation, including vegetation adjacent to construction areas and during weed management.			
	• Vegetation clearing procedures for a two staged habitat removal process required for removal of key habitat features (hollow-bearing trees, habitat trees, and bushrock) identified in *Technical Report 1 – Revised Biodiversity Development Assessment Report* and/or pre-clearing inspection. Including procedures to record the effort and outcomes of the habitat removal process.			
	• Retention of habitat features such as rocky outcrops, surface rock, dead wood, logs, wherever practicable.			Not addressed in this program – refer Annexure F: Connectivity Strategy & Annexure G: Rehabilitation Plan of the HLW BMP. Monitoring relevant to this condition is summarised in Section 4.1.
	• Proposed rehabilitation of temporary disturbance areas including management and maintenance measures.			Not addressed in this program – refer Annexure G Rehabilitation Plan of the HLW BMP. Monitoring relevant to this condition is summarised in Section 4.1.
	• Unexpected species finds protocol to be implemented if threatened ecological communities, flora and fauna species, not assessed in *Technical Report 1 –*			Not addressed in this program – refer Annexure D:

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
	Revised Biodiversity Development Assessment Report, are encountered during pre-clearing inspections.			Unexpected Finds Procedure of the HLW BMP
	• A description of biosecurity protocols for plant and equipment movement between sites, including species specific measures.			Not addressed in this program – refer Annexure E Biosecurity Plan of the HLW BMP. Monitoring relevant to this condition is summarised in Section 4.1.
	• Education of construction teams regarding the presence of native fauna and risks of vehicle collision, particularly early in the morning and late in the afternoon/at night; implementation of speed limits on sealed and unsealed tracks and roads.			Not addressed in this program – refer Section 7.4 of the HLW BMP.
	• Outline monitoring and compliance management requirements.			This program includes provision for monitoring of all management requirements (Section 3.1), as well as monitoring and compliance management for partial clearing zones (Section 4.2), and indirect impacts to threatened entities (Section 4.3 through Section 4.6).
	• Approach to relocation of nests by suitably qualified ecologist where found within construction work sites (i.e. nests found in hazardous areas will be translocated to nearby safe areas, direct handling of			Not addressed in this program – refer Annexure C: Hollow & Nest Strategy of the HLW BMP. Monitoring

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
	eggs and chicks will be avoided where possible). This could include potentially new poles/nest platforms.			relevant to this condition is summarised in Section 4.1.
	• Details on the pre-clearing and clearing supervision process.			Not addressed in this program – refer Annexure B: Clearing Protocol of the HLW BMP.
	• Procedures for consultation with DPI Fisheries and pre-construction survey (where required) for threatened aquatic species should be established (and Commonwealth DCCEEW for Riek's Crayfish, as required), along with processes for reporting and consideration of recommendations into design and construction methods, as relevant.			Not addressed in this program – refer Section 7.7 of the HLW BMP
	• Procedures for reporting the outcomes of pre-construction aquatic biodiversity surveys (where required under mitigation measure B33) at CLASS 1 crossing locations (new and upgraded tracks) potentially supporting threatened aquatic species and any management measures to be implemented (e.g. timing construction outside of breeding seasons, crossing type, micro siting).			
	• Procedures for the stockpiling and supply of felled trees for KFH rehabilitation or improvement works, including procedures for consultation with DPI Fisheries.			Not addressed in this program – refer Annexure G: Rehabilitation Plan of the HLW BMP. Monitoring relevant to this condition is summarised in Section 4.1.

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
	The BMP will include adaptive management measures for uncertain/ indirect/ prescribed impacts and a biodiversity monitoring program. The adaptive management measures would detail procedures for uncertain impacts, risk associated with potential failure of mitigation, circumstances where avoidance may not be achievable and prescribed impacts. The adaptive management measures would be underpinned by monitoring programs, to provide early warning of ineffective measures and/or uncertain impacts occurring. The adaptive management measures would include: • performance criteria to guide monitoring			This program includes provisions for all components of this condition.
	• measurable thresholds to identify when remedial action is triggered			
	• adaptive management response/actions			
	• a trigger for additional credit obligations and/or conservation measures for uncertain, indirect or prescribed impacts, where these impacts cannot be adaptively managed			
	• reporting requirements.			
	The adaptive management measures and monitoring program will be developed to target specific species considered to be most at risk of significant impacts, as determined during the detailed design phase. The BMP will stipulate objectives for monitoring, reporting and evaluation, and how baseline data will be captured and represented.			

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
B8	Where threatened frog (including Booroolong Frog) habitats have been identified the following avoidance measures will be implemented, where practicable: • avoid installing waterway crossings • avoid disturbance within 50 m of the top of bank of the waterway (including riparian vegetation).	Detailed design and construction	Threatened frog habitats within 250 m downstream of the project footprint. Potential construction monitoring site locations have been identified at Adjungbilly Creek, Brungle Creek, Yaven Creek and Adelong Creek (Figure 13-2 of Technical Report 1 – Revised Biodiversity Development Assessment Report).	Not addressed in this program – refer Section 7.1 of the HLW BMP.
	Where avoidance is not possible: • Waterway crossing designs should avoid instream structures to minimize the potential for hydrological change, erosion and sedimentation impacts of downstream environments.			
	• Location of waterway crossings will be determined in consultation with a suitably qualified Ecologist to avoid or minimize impacts to potential habitats or ecological features.			
	• Develop site specific erosion and sedimentation control plans to ensure the potential for erosion and sedimentation impacts are minimized as far as practicable, including monitoring the success of erosion and sediment control measures.			
	• Develop and implement site-specific hygiene protocols (e.g. cleaning of plant machinery), to minimize the spread of pathogens and exotic weeds during and post-construction (in line with Hygiene protocols for the control of diseases in Australian frogs [Cth DCCEEW, 2011]).			Not addressed in this program – refer Annexure E: Biosecurity Management Plan of the HLW BMP. Monitoring relevant to this

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
				condition is summarised in Section 4.1.
	A suitably qualified ecologist will be engaged to undertake site specific monitoring surveys for the species at the proposed creek crossing sites within and adjacent to the species habitat as well as downstream receiving environments that may be subject to potential indirect impacts. The BMP (refer to mitigation measure B3) will incorporate a monitoring program for threatened frogs to be implemented during construction.			Section 4.5
B12	Develop and implement a Supplementary Hollow and Nest Strategy to provide alternative roosting and/or nesting habitat for threatened fauna displaced during clearing. The strategy should address measures such as nest boxes, hollow re-use / creation, re-use of timber/logs as habitat within the transmission line easement where practicable.	Construction	All locations where hollow bearing trees are being removed	Not addressed in this program – refer Annexure C: Hollow & Nest Strategy of the HLW BMP. Monitoring relevant to this condition is summarised in Section 4.1.
	The strategy would be captured in the BMP (as per mitigation measure B3) and will address the following requirements: • nest boxes and other supplementary measures (such as hollow hogs) to be installed as close to the cleared area as possible (subject to landowner agreement and suitable trees being present)			
	survey of tree hollows and nests within the proposed clearing extents			

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
	• identify the target species, size, type, number and suitable location of nest boxes/hollows required based on the results of the ecological surveys and active hollow resources in adjacent areas			
	• the installation of appropriate nest boxes or hollow replacements will be undertaken as early as practicable prior to clearing activities to prevent the use of the nest boxes or hollow replacements by invasive or non-targeted species			
	• nest boxes can also include the re-use of existing hollows salvaged prior to or during clearing where practicable			
	• record the type, height, orientation and location of nest boxes installed and provide as spatial data to Transgrid			
	• an annual monitoring program to assess the efficacy of supplementary habitat measures throughout the construction phase.			
	Post construction monitoring and replacement of damaged nest boxes will form part of discussions with individual landowners.			
B22	A Biosecurity Management Plan will be developed as a part of the BMP, to be implemented during construction. The plan will include: • Protocols for the identification of priority weed species, relevant pests and diseases of concern, mandatory reporting obligations and management of Emergency,	Detailed design and construction	All locations	Not addressed in this program – refer Annexure E: Biosecurity Management Plan of the HLW BMP. Monitoring relevant to this

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
	Control and Biosecurity zones as per the NSW Biosecurity Act 2015.			condition is summarised in Section 4.1.
	• Weed and pest animal management and monitoring requirements would also be outlined within the plan where relevant.			
	• Inclusion of a Trigger Action Response Plan (TARP) for key biosecurity threats including known biosecurity threats to threatened species and populations.			
	• Locations, timing and methods for removing soil and plant matter from vehicles and machinery and sourcing clean soil and materials free of contaminants for construction work.			
	• Clean down stations (water or air, dependent on the identified biosecurity risk) will be constructed at suitable locations to clean down vehicles and employee shoes to stop the spread of weeds, pathogens (e.g. amphibian chytrid fungus, Phytophthora cinnamomi, exotic rust fungi and Epizootic Haematopoietic Necrosis Virus (EHNV) and the introduction of new species. The biosecurity plan would address any Property Management Plan requirements where relevant.			
	• Phytophthora has been detected in locations associated with the adjoining Snowy 2.0 project and in Lob's Hole (as identified in Appendix C (NSW DCCEEW Environment and Heritage detailed response) of the Submissions Report). If construction vehicles are required to move through areas of known or likely infestation, the risk of spread will be managed through			

UMM No.	Condition Requirements	HLW Stage	Applicable location(s)	Document Reference
	the implementation of suitable hygiene protocols detailed in the Biosecurity Management Plan. Transgrid would consult with relevant agencies and groups involved with pest management in order to contribute to existing or future monitoring and management programs. Consideration of potential contributions would be targeted towards areas where greatest impacts occur, particularly through relatively intact landscapes where easement introduction increases the risk of native fauna predation.			
B36	Regular monitoring/inspections of waterway crossing and access track conditions will be undertaken during operation. Consideration of the maintenance and inspection recommendations detailed in *Fish passage in streams: Fisheries guidelines for design of stream crossings* (Cotterell, 1998) to inform the monitoring/inspection details are recommended. This may include monitoring/inspections following random events, e.g. flooding. This will review: • the crossing structures, access tracks and associated erosion and sediment control measures to determine if they are continuing to operate satisfactorily • any maintenance requirements in order to prevent impacts to aquatic environments • any issues that require intervention or rehabilitation e.g. bank erosion as a result of, or in proximity to, crossing locations.	Operation	Transmission line corridor -access track waterway crossing	Not included in this program as it is limited to construction – to be detailed in Transgrid Operational Environmental Management Plan.

3. Monitoring scope

As detailed in Section 6 of the BMP, HLW may have indirect impacts (including prescribed and uncertain impacts) on threatened flora and fauna, native Plant Community Types (PCTs) within and adjacent to the HLW Area and aquatic species and their habitats.

While direct impacts are easily quantified and controlled by managing the extent of clearing within the disturbance area, indirect impacts are subject to the efficacy of the implemented environmental controls. As such, direct impacts are defined during project design, whereas indirect impacts are mitigated through the effective environmental management of construction. As a result, this program is focused on monitoring those entities which have been identified within the HLW Area with potential to experience indirect impacts during construction.

3.1. BMP monitoring

The HLW BMP includes the following annexures to ensure HLW minimises and mitigates impacts to biodiversity during construction:

- **Annexure B: Clearing Protocol** – described the clearing protocol for vegetation clearing and aquatic works during construction of HLW, in order to mitigate potential impacts caused to flora, fauna and aquatic entities.
- **Annexure C: Hollow and Nest Strategy** – mitigates the impacts of clearing required for HLW by identifying target species and prescribing the necessary processes to manage nests and install/manage fauna habitats (artificial hollows) for impacted fauna species.
- **Annexure D: Unexpected Finds Procedure** – implemented following the sighting of any known or suspected threatened entities within the HLW Area.
- **Annexure E: Biosecurity Management Plan** – describes the management of weeds, pests and pathogens throughout the construction phase of HLW.
- **Annexure F: Connectivity Strategy** – maintains connectivity in areas identified as facilitating fauna movement, particularly for target species which may be impacted by HLW.
- **Annexure G: Rehabilitation Plan** – guides the rehabilitation of temporarily disturbed areas during the construction of HLW.
- **Annexure H: Biodiversity Monitoring Program** (this document).

Monitoring and reporting requirements detailed in the HLW BMP and above listed annexures are detailed in Section 4.1. For details specific to each monitoring or reporting event, please refer to each individual document/annexure.

3.2. Justification for threatened entity monitoring

Threatened entities to be monitored through construction of HLW are derived from those detailed in Section 5 of the HLW BMP.

3.2.1. Threatened flora

Monitoring of threatened flora aims to detect and manage indirect construction-related impacts such as dust deposition, altered hydrology, edge effects, weed incursion, trampling or erosion. Monitoring activities would be targeted at threatened flora that are not subject to direct clearing or habitat disturbance, however remain ecologically sensitive to nearby construction activities within a 30 m buffer.

Flora species located within approved disturbance zones, including the Easement Clearing Zone (ECZ) and Hazard Tree Zone (HTZ), are not included in monitoring as indirect impacts have been accounted for through biodiversity offsetting. The focus of threatened flora monitoring is therefore within retained vegetation, where early detection of indirect impacts is essential in maintaining ecological function and regulatory compliance.

Thirty threatened flora species are known or are assumed to be present within the HLW Area, based on data obtained in the Revised BDAR. Monitoring of threatened flora will occur for all known species where individual have been identified within 30 m of disturbance zones. Currently, five flora species will be subject to monitoring as summarised in Table 3-1. Although no monitoring sites have been prescribed for the remaining 25 assumed present threatened flora species, monitoring sites will be added as necessary for threatened individuals identified within 30 m of disturbance zones through Biodiversity Assessment Verification Reporting or pre-clearing surveys. Monitoring methods will be consistent with that detailed in this program.

Table 3-1 Justification for threatened flora to be monitored

Scientific Name	Common Name	BC Act Status	EPBC Act Status	SAII?	Known or assumed habitat	Included in program?
Acacia ausfeldii	Ausfeld's Wattle	V	-	False	Assumed habitat	No
Ammobium craspedioides	Yass Daisy	V	V	False	Known	Yes
Bossiaea fragrans	-	CE	CE	TRUE	Assumed habitat	No
Caesia parviflora var. *minor*	Small Pale Grass-lily	E	-	False	Assumed habitat	No

Scientific Name	Common Name	BC Act Status	EPBC Act Status	SAII?	Known or assumed habitat	Included in program?
Caladenia concolor	Crimson Spider Orchid	E	V	TRUE	Assumed habitat	No
Caladenia montana	-	V	-	False	Assumed habitat	No
Calotis glandulosa	Mauve Burr-daisy	V	V	TRUE	Assumed habitat	No
Calotis pubescens	Max Mueller's Burr-daisy	E	-	False	Assumed habitat	No
Cullen parvum	Small Scurf-pea	E	-	False	Assumed habitat	No
Diuris tricolor	Pine Donkey Orchid	E	-	False	Assumed habitat	No
Glycine latrobeana	Clover Glycine	CE	V	TRUE	Assumed habitat	No
Grevillea wilkinsonii	Tumut Grevillea	CE	CE	TRUE	Assumed habitat	No
Leucochrysum albicans subsp. *tricolor*	Hoary Sunray	E	E	False	Assumed habitat	No
Persoonia marginata	Clandulla Geebung	V	V	False	Assumed habitat	No
Pimelea bracteata	-	CE	CE	TRUE	Known	Yes
Pomaderris cotoneaster	Cotoneaster Pomaderris	E	E	False	Assumed habitat	No
Prasophyllum bagoense	Bago Leek Orchid	CE	CE	TRUE	Known	Yes

Scientific Name	Common Name	BC Act Status	EPBC Act Status	SAII?	Known or assumed habitat	Included in program?
Prasophyllum innubum	Brandy Marys Leek-orchid	CE	CE	TRUE	Assumed habitat	No
Prasophyllum keltonii	Kelton's Leek Orchid	CE	CE	TRUE	Known	Yes
Prasophyllum petilum	Tarengo Leek Orchid	E	E	False	Assumed habitat	No
Pterostylis alpina	Alpine Greenhood	V	-	False	Assumed habitat	No
Pterostylis foliata	Slender Greenhood	V	-	False	Assumed habitat	No
Pterostylis oreophila	Blue-tongued Greenhood	CE	CE	TRUE	Assumed habitat	No
Pultenaea humilis	Dwarf Bush-pea	V	-	False	Assumed habitat	No
Senecio garlandii	Woolly Ragwort	V	-	False	Assumed habitat	No
Swainsona recta	Small Purple-pea	E	E	False	Assumed habitat	No
Swainsona sericea	Silky Swainson-pea	V	-	False	Assumed habitat	No
Thelymitra alpicola	Alpine Sun-orchid	V	-	False	Assumed habitat	No
Thesium australe	Austral Toadflax	V	V	False	Assumed habitat	No
Xerochrysum palustre	Swamp Everlasting	-	V	False	Known	Yes

V = Vulnerable; E = Endangered; CE = Critically Endangered; - = not listed