Ecological and Rehabilitation Monitoring Report 2024

Lynwood Quarry, NSW

Holcim Australia Pty Ltd

Lynwood Quarry - South Marulan Road
Marulan NSW 2579

Prepared by:

SLR Consulting Australia

SLR Project No.: 630.031740.00001

27 March 2025

Revision: 1.0

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
1.0	27 March 2025	Fiona Iolini	Jeremy Pepper	Jeremy Pepper

Basis of Report

This report has been prepared by SLR Consulting Australia (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Holcim Australia Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

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SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

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1.0 Introduction

1.1 Background

The Lynwood Quarry (the 'site') is a hard rock quarry approximately two kilometres west of Marulan, in the Southern Highland IBRA Region and Bungonia Sub-region of New South Wales (NSW) (see Figure 1). Initial planning consent for the Lynwood Quarry was granted to Cemex (now Holcim) on 21 December 2005 for an approved five million tonnes per annum output. Since the original development approval, five modifications have been approved, with quarrying operations approved until 1 January 2038. Ecological monitoring is a requirement of the project approval and associated ecology reports and management plans.

SLR Consulting Australia Pty Ltd (SLR) was commissioned by Holcim (Australia) Pty Ltd ('Holcim') to undertake ecological and rehabilitation monitoring at the Lynwood Quarry in 2024. SLR has undertaken ecological and rehabilitation monitoring at the quarry since 2020. In 2020, SLR established four retained vegetation monitoring plots (R1-R4) within areas of retained vegetation and baseline flora (BAM plot) and fauna (diurnal and nocturnal fauna census) data was collected at each of these locations. In 2020, SLR also established eleven Hoary Sunray monitoring plots.

In 2021, five rehabilitation monitoring plots (RM1-RM5) were established within areas of rehabilitation and two additional Box-Gum Woodland vegetation monitoring plots (BG1-BG2) were established. In 2022, an additional two core riparian zone monitoring plots (CR1-CR2) were established within riparian corridors of Jaorimin and Marulan Creeks.

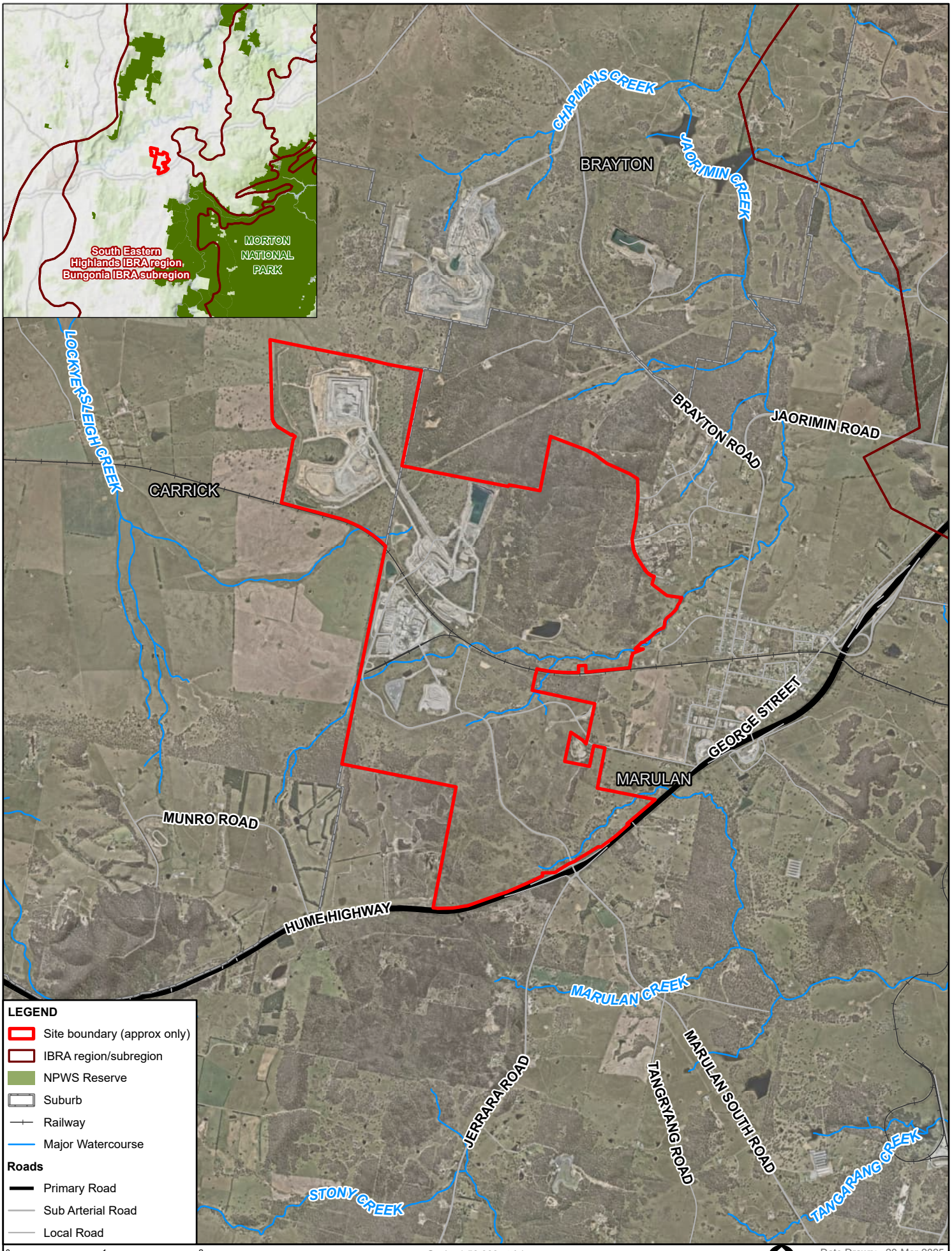
1.2 Previous Ecological Reports

Various documents were prepared during the approval phase of the quarry (Umwelt 2005, 2011, 2013, 2018a, 2018b) and these have been relied upon for background information in relation to the ecology and management of the site. A summary of previous ecological reports is provided below.

1.2.1 Ecological Assessment

Key findings of the Ecological Assessment (Umwelt 2005) are as follows:

- Four broad vegetation types occur across the site: Tableland Low Woodland, Western Tablelands Dry Forest, Tableland Grassy Box-Gum Woodland, Riparian Gum Box-Apple Woodland and Camden Woollybutt Low Open Forest.
- No threatened flora species were recorded; however, potential habitat exists for several threatened plant species listed under the NSW *Biodiversity Conservation Act 2016* (BC Act), namely: Buttercup Doubletail *Diuris aequalis*, Pine Donkey Orchid *Diuris tricolor*, Cotoneaster Pomaderris *Pomaderris cotoneaster*, Tallong Midge Orchid *Genoplesium plumosum* and Cambage Kunzea *Kunzea cambagei*.
- Areas of retained vegetation across the site provide habitat for a suite of local fauna species including the following threatened species listed as 'vulnerable' under the BC Act: Speckled Warbler, Squirrel Gilder, Eastern Coastal Free-tailed Bat (previously Eastern Freetail-bat), Eastern False Pipistrelle and Large Bent-winged Bat (previously known as Eastern Bentwing-bat), as well as several other species.



Data Source: NSW SS, 2020
Aerial imagery supplied by Nearmap (March, 2025)

SLR

SITE LOCATION

FIGURE 1

Path: \\au.slr.local\corporate\Projects-SLR\630-SrvNTL\630-NTL\630.031740.00001 Lynwood Ecology and Rehab Monito\06 SLR Data\01 GIS\GIS\630031740_LynwoodEcologicalMonitoring\630031740_LynwoodEcologicalMonitoring.aprx\630031740_F01_SiteLocation

- To mitigate the impacts of the development the Ecological Assessment proposed monitoring in retained vegetation on a three-yearly basis involving four monitoring locations to be established within a Habitat Management Area (HMA), Jaorimin Creek Management Area and Cultural Management Area (CMA). The proposed approach was a standard 20m by 20m flora quadrat to record species diversity and structural composition, as well as photo monitoring and fauna monitoring targeting threatened species. Nest boxes were also proposed to be installed and monitored on an annual basis for five years.

1.2.2 Box-Gum Woodland Management Plan

Key aspects of the Box-Gum Woodland Management Plan (Umwelt 2013) are as follows:

- During construction, the site was found to contain a large population of the threatened plant Hoary Sunray *Leucochrysum albicans* var. *tricolor*, which at the time was listed as 'vulnerable', under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), as well as areas of White Box – Yellow Box - Blakely's Red Gum Woodland, which at the time was listed as a 'critically endangered ecological community' (CEEC) under the BC Act[1].
- To mitigate and offset the loss of these threatened entities, the plan details management actions, regeneration, and revegetation strategies.
- A Biodiversity Offset Area (BOA) was set aside, which incorporates a 185ha area in the southwest portion of the site and includes the Cultural Management Area. As such, three-yearly plot monitoring in the CMA (as previously proposed under the Rehabilitation Plan mentioned below) was deemed suitable to capture the 'retained vegetation' monitoring requirements of the biodiversity offset area.
- The plan also commits to annual monitoring and reporting to determine success of rehabilitation and general condition including weed and pest animal presence, presence of Hoary Sunray and other matters of national environmental significance (MNES).

1.2.3 Rehabilitation and Landscape Management Plan

The relevant ecological and rehabilitation components of the Rehabilitation and Landscape Management Plan ('RLMP', Umwelt 2018a) can be summarised as follows:

- The rehabilitation efforts are to be focused on three areas over the first five years of operations: the haul road construction area, the western amenity bund and the southern edge of the overburden emplacement area.
- The key elements of the rehabilitation strategy include:
  - The early, timely and progressive rehabilitation of disturbed areas.
  - The surface of the southern overburden emplacement area and the Lynwood overburden emplacement area will be shaped in a generally irregular landform to resemble a natural surrounding landform wherever possible.

[1] The Hoary Sunray *Leucochrysum albicans* var. *tricolor*, is currently listed as 'endangered', under the EPBC Act, but is not listed under the BC Act. White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland is currently listed as a 'critically endangered ecological community' (CEEC) under both the BC Act and the EPBC Act.

  - Stripped topsoil will be placed in stockpiles no greater in depth than 3m and seeded with a cover crop if they are to remain in place for longer than six months.
  - Shaped areas will be covered with topsoil, seeded with a native species and cover crop mix with intent of achieving mixed grassland and woodland native vegetation communities.
  - Selected surface habitat features consisting of large rocks, logs and trees from clearing undertaken will also be placed across the rehabilitated area. These features will provide potential fauna habitat and will aid in achieving a stable landform.
- Weed control measures consist of a comprehensive weed survey of all areas of the quarry every four years, which will advise weed removal. Weed removal is to prioritise noxious[2] species.
- Feral animal control programs are to be implemented as required and include inspections for the presence of significant populations of feral animals.
- The granite pit benches are to be seeded with a native tree species mix and a grass species mix also used on the safety bund.
- Overburden and emplacement areas south of the Main Southern Railway are expected to be seeded with species from the Tableland Low Woodland vegetation community while the overburden emplacement areas to the north of the Main Southern Railway are expected to be seeded with a mixture of Tableland Grassy Box-Gum Woodland and Western Tablelands Dry Forest vegetation communities.
- Rehabilitation of the southern overburden emplacement area and western amenity bund aim to establish PCT1330 Yellow Box - Blakely's Red gum grassy woodland on the tablelands, Southeastern Bioregion.
- Holcim is to establish and maintain the HMA and Jaorimin Creek corridor for the conservation of ecological values. Management includes fencing and signposting the boundary of the management areas and removal of dilapidated fences throughout. The HMA is approximately 130ha of which 105ha is presently vegetated, and an area of 25ha is proposed to be rehabilitated via assisted regeneration and plantings.
- Species established will represent the existing vegetation communities within the HMA, being Western Tablelands Dry Forest, Tableland Grassy Box-Gum Woodland and Tableland Low Woodland. The riparian species to be established along the creek line will also include *Acacia mearnsii* and *A. dealbata*.
- The remaining remnant woodland occurring within the project area that is outside the quarry footprint and specific management areas, will also be managed during the life of the project to maintain its ecological values. Strategies will include management of grazing impacts, weed and feral animal control, sediment and erosion control and encouragement of natural regeneration.
- Maintenance and replacement of arboreal habitat is to occur through the relocation of salvaged tree hollows or installation of nest boxes. Nest boxes are to be monitored annually for a period of five years, followed by condition inspections every four years.
- Ecological monitoring is to include:

[2] Now known as 'priority weed' species under the *Biosecurity Act 2015*

- Annual monitoring of vegetation screens for four years;
- three-yearly monitoring of retained vegetation, moving to 10-yearly if positive for three consecutive years;
- three-yearly fauna monitoring, moving to 10-yearly where positive for three consecutive years; and
- Annual nest box monitoring for five years, then four-yearly condition inspections.

- Preliminary completion criteria are provided for the key rehabilitation works and HMA (see assessment at Section 4.0).

1.2.4 Riparian Area Management Plan Marulan Creek Catchment Area

The Riparian Area Management Plan for Marulan Creek (Umwelt 2011) provides details in relation to management of impacts to riparian areas of Marulan Creek during construction and operation of Lynwood Quarry. The main impacts in the vicinity of Marulan Creek relate to the construction of the access road including the construction compound and the culvert at the location of creek crossing.

In relation to rehabilitation the plan states:

- Holcim propose to implement a program of rehabilitation works along existing drainage lines to reduce the current extent of bank and bed erosion and associated sediment transport, where possible.
- Rehabilitation works will initially include fencing of the third order section of Marulan Creek to prevent cattle access and allow for natural regeneration. This fenced area will be inspected annually for the first three years to assess the level of natural regeneration. If natural regeneration is not proceeding to an acceptable level by the third year of annual monitoring, then alternative regeneration measures including supplementary planting in accordance with measure in the RLMP will be considered.
- Lynwood Quarry's Environmental Officer will inspect Marulan Creek within the project area on a quarterly basis (and after severe storm events) to identify the condition of the vegetation and any significant erosion or creek stability issues.
- During the operational phase of the project monitoring of the management measures implemented will be undertaken in accordance with the RLMP.

1.2.5 Riparian Area Management Plan Jaorimin Creek Catchment

The Riparian Area Management Plan for Jaorimin Creek (Umwelt 2018b) provides details in relation to management of impacts to riparian areas of Jaorimin Creek during construction and operation of Lynwood Quarry. The active quarry area and several dams are within the creek catchment and a raft of controls (such as use of sediment devices, seeding and revegetation of disturbed areas, monitoring, limiting work areas) are suggested to limit impacts caused during construction and operation of these features.

The plan includes the objectives in relation to rehabilitation:

- The riparian corridor has been fenced to exclude cattle where required.
- Revegetation works have occurred along Jaorimin Creek south of the Main Southern Railway.
- Nest boxes along Jaorimin Creek have been established, monitored and are being maintained.

- The site is managing significant weed or feral animal infestations with a demonstrable reduction pre-construction.
- Monitoring has indicated that natural regeneration is occurring.

1.3 Ecological and Rehabilitation Monitoring Requirements

Based on the review of previously approved documentation (Umwelt 2005, 2013 and 2018), SLR devised the ecological and rehabilitation monitoring schedule from 2020-2030, as provided Table 1. The monitoring program will require updating as rehabilitation progresses, to add areas of active quarry that become available for rehabilitation (overburden emplacement areas and pits, etc.).

Table 1: Overview of Monitoring Program to 2030

Monitoring Method	Year 2020-2030 (✓ =survey required, ☑ =survey completed, ☒ survey not completed, additional surveys in red)										
	20	21	22	23	24	25	26	27	28	29	30
1. Nest Box survey	☑	☑	☑	☑	☑	✓	✓	✓	✓	✓	
2. Retained vegetation monitoring*	☑			☑			✓			✓	
3. Hoary Sunray Monitoring	☑			☑	☑	✓	✓			✓	
4. Rehabilitation Monitoring Amenity Bund#		☑	☑	☑	☑	✓					
5. Rehabilitation Monitoring of HMA+		☑	☑	☑	☑	✓					
6. Rehabilitation Monitoring of BOA		☑	☑	☑							
7. Rehabilitation Monitoring of BOA (revegetated)		☑	☑	☑	☑	✓	✓	✓	✓	✓	✓
8. Box-gum Woodland Monitoring (retained)		☑	☑	☑	☑	✓	✓	✓	✓	✓	✓
9. Rehabilitation monitoring of creek corridors^			☑	☑	☑	✓	✓	✓	✓	✓	✓

* After 2029 an assessment is required to determine whether the monitoring can move to 10-yearly intervals

\# Monitoring may cease after three years if vegetation meets completion criteria

\+ After 2025 an assessment is required to determine whether additional planting is required, if it is monitoring of HMA rehab should be extended

^ Monitor annually for 10 years from planting unless completion criteria are met sooner

The surveys of each monitoring method involve:

1 Usage and maintenance survey of 50 nest boxes was required to be undertaken annually for 5 years and has been completed in 2024. Lynwood personnel are required to review the total nest box numbers on site and commence 5-year usage and maintenance monitoring of any additional boxes.

2 Vegetation and Fauna Monitoring of at four locations within areas of retained vegetation, including BAM plots and a fauna survey (involving diurnal reptile, amphibian and bird surveys, spotlighting, and use of ultrasonic bat-call detection and infrared camera devices) at three-yearly intervals until at least 2029.

3 Hoary Sunray population estimates including counting the number of Hoary Sunray plants within ten 4m^2 plots at locations at three-yearly intervals in perpetuity. Additional surveys have been recommended in 2024/2025.

4 Collection of BAM plot data at one location on the amenity bund annually for 3-years or until rehabilitation completion criteria are met. Additional surveys have been recommended in 2024/2025 as completion criteria have not been met.

5 Collection of BAM plot data at two locations within the northern Habitat Management Area, annually for 5 years.

6 Collection of BAM plot data at one location within the Biodiversity Offset Area annually for 3 years.

7 Collection of BAM plot data at one location within the regeneration portion of the Biodiversity Offset Area annually in perpetuity.

8 Collection of BAM plot data at two locations within the retained portion of the Box-Gum Woodland annually in perpetuity.

9 Collection of BAM plot at two locations within core riparian corridors, annually for 10 years.

1.4 Objectives

The purpose of the Lynwood ecological monitoring program is to monitor ecological values within rehabilitation and areas of retained vegetation within the site and demonstrate the achievement of objectives in accordance with the Ecological Assessment (Umwelt 2005), Box-Gum Woodland Management Plan (Umwelt 2013) and RLMP (Umwelt 2018).

The objectives of the 2024 ecological monitoring are to:

- Determine the current condition of rehabilitation and retained vegetation areas through comparison with benchmarks.
- Detect any problems with management of natural areas through general opportunistic observations and make recommendations to address these issues, especially at the Biodiversity Offset Area.
- Determine whether nest boxes are being utilised by native fauna and determine whether any nest box maintenance actions are required.
- Detect changes in Hoary Sunray population size and try to determine any potential impacts on the population.

1.5 Climate Data

Temperature and rainfall data for the locality (sourced from Goulburn Airport AWS station 070330, BOM 2025a) are presented in Figure 2 and Figure 3, respectively. The data indicates that in the months leading up to the survey (July to December 2024), in comparison to the monthly averages since 1994 and since monitoring began in 2020 the locality experienced average to above-average monthly maximum temperatures and average to below-average monthly rainfall.

The temperature and rainfall patterns observed within the locality are generally consistent with those reported by BOM (2025b) for NSW in 2024, as summarised below:

- New South Wales's area-average mean maximum temperature was 25.6°C, 1.71°C above the 1961-1990 average, the seventh-warmest on record for all years since 1910.
- Rainfall totals in 2024 were above average to very much above average for the northern and western areas of the state, as well as central parts of the coast.

- Totals were below average for large parts of the south-east, as well as small parts of the state's northeast and southwest.
- New South Wales's area-averaged rainfall total in 2024 was 581mm, 4.5% above the 1961-1990 average.

Figure 2: Average Monthly Maximum Temperature (°C) for Goulburn (BOM 2025a)

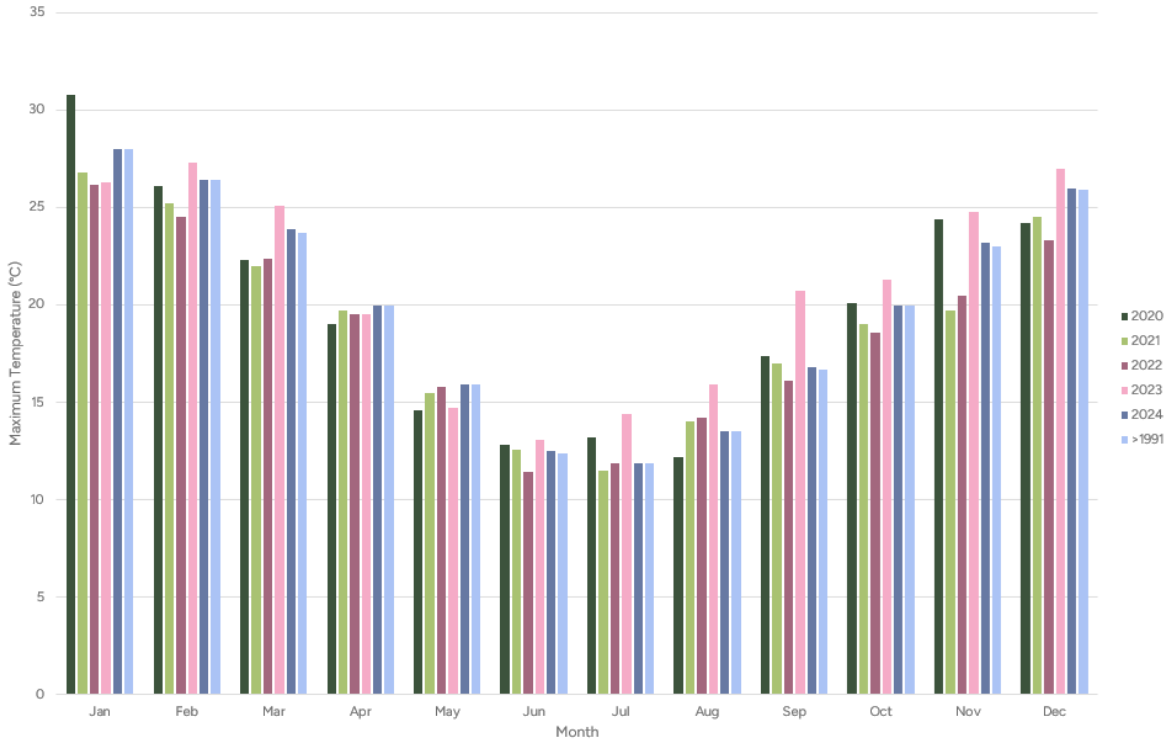
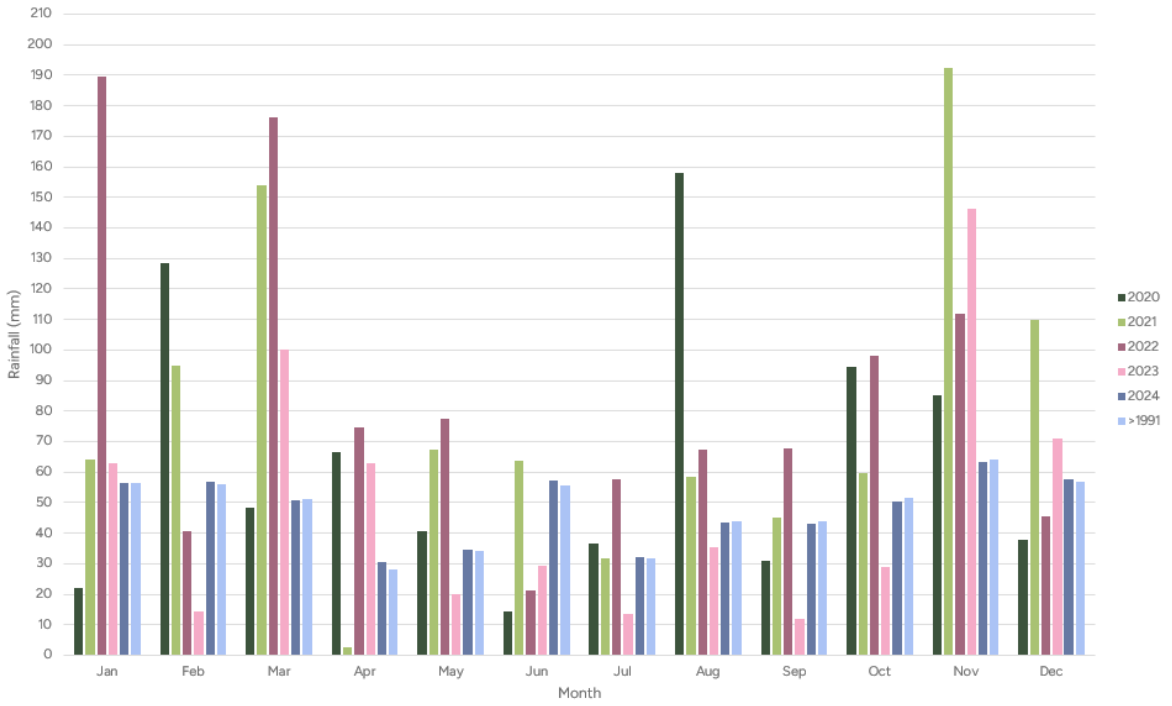


Figure 3: Average Monthly Rainfall (mm) for Goulburn (BOM 2025a)



2.0 Methods

2.1 Vegetation Monitoring Methods

2.1.1 Vegetation Monitoring Plot Selection

Monitoring plots have been pegged using metal star-pickets fitted with a yellow cap and marked with the plot reference. Two star-pickets were positioned at each plot, one at the start and one at the end of the midline (or 50m transect) of each BAM plot. The plots were selected randomly whilst in the field, aiming to monitor each of the following areas:

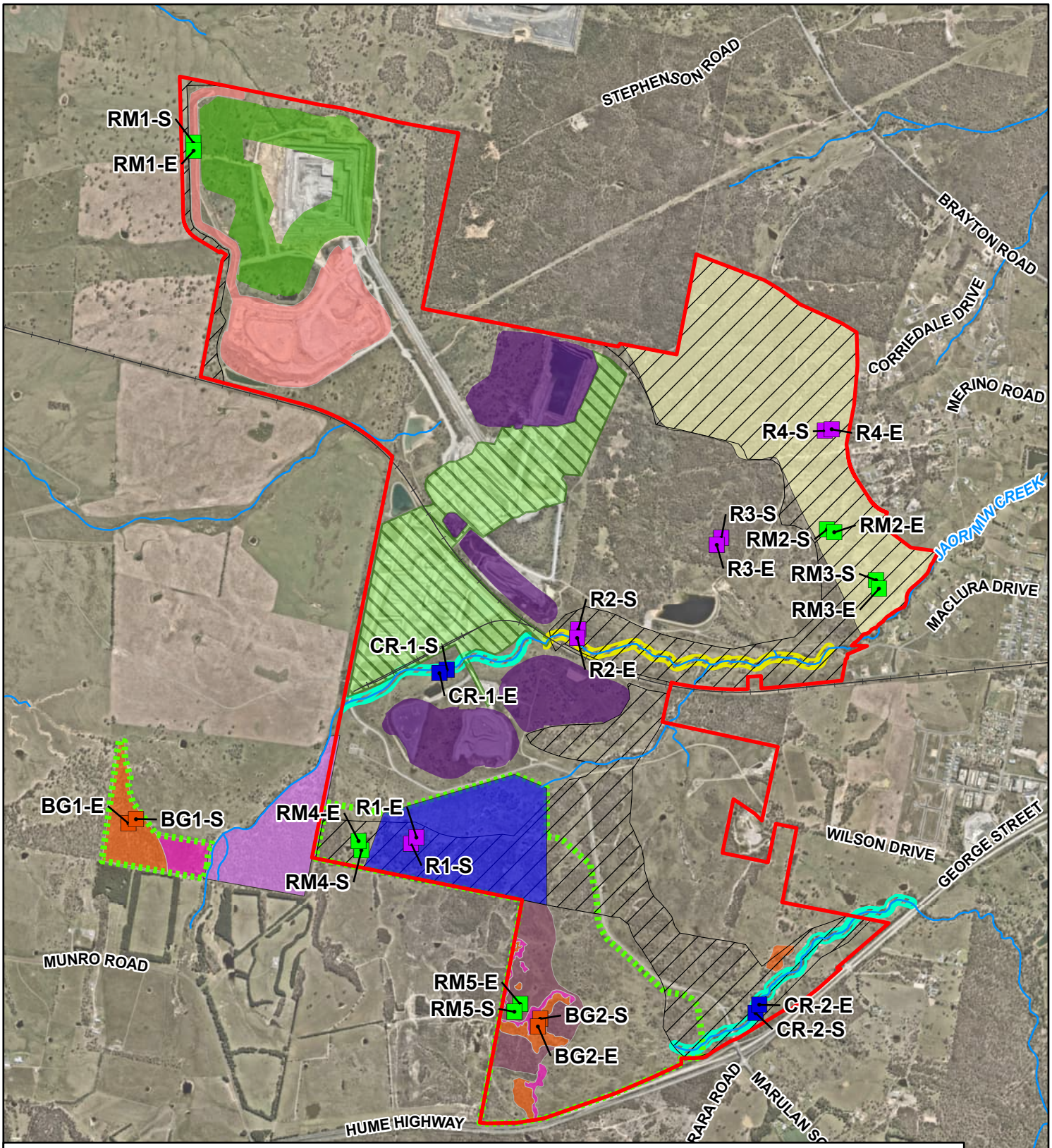
- Amenity bund rehabilitation area - this is an approximate 8ha revegetation area in the northwest of the site which is one of the areas directly impacted by the proposed quarry operations and which requires prioritised rehabilitation efforts according to the RLMP. One permanent rehabilitation monitoring plot (RM1) was established in this area in 2021 and has been monitored in 2024. Plot orientation has been adjusted to ensure that it is positioned within the planting area.
- Habitat Management Area - this is 130ha in the northeast of the site, of which 25ha requires rehabilitation via assisted regeneration and planting according to the RLMP. Two retained vegetation plots were established in this area in 2020 (R3 and R4), and these plots are monitored every three years, therefore have not been monitored in 2024. In 2021 two rehabilitation monitoring plots (RM2 and RM3) were established within previously cleared and managed parts of the HMA. These plots were monitored in 2024 and are monitored annual for five years to determine whether planting is required.
- Cultural Heritage Management Area – the cultural heritage management area is directly south of the western emplacement area and is to be managed as retained native vegetation. One retained vegetation monitoring plot (R1) was established within this area in 2020 and did not require monitoring in 2024.
- Jaorimin Creek Management Area – occurs north of the Main Southern Railway and is to be managed as retained native vegetation. One retained vegetation monitoring plot (R2) was established within this area in 2020 and did not require monitoring in 2024.
- Biodiversity Offset Area - this is a 185ha in the south of the site, of which 5.5ha is to be regenerated (via direct seeding and tube-stock planting) according to the RLMP. One permanent rehabilitation monitoring plot (RM4) was established in this area in 2021. Monitoring of RM4 ceased in 2023.
- Box-Gum Woodland CEEC Regeneration - in relation to the 185ha Biodiversity Offset Area in the south of the site, an additional 22ha of this area is to be regenerated according to the Box-Gum Woodland Management Plan (Umwelt 2013). One permanent rehabilitation monitoring plot (RM5) was established in this area in 2021 and was monitored in 2024.
- Retained Box-Gum Woodland (non-revegetated area) - three additional areas in the south of the Lynwood Quarry site are to be monitored in accordance with the Box-Gum Woodland Management Plan (Umwelt 2013). Two permanent rehabilitation monitoring plots (BG1 and BG2) were established in this area in 2021, and these were monitored in 2024.
- Core Riparian Corridors - the core riparian corridors of Jaorimin and Marulan Creeks extend as a narrow band through the north and south of the site respectively. These

areas are to be rehabilitated including cattle exclusion and passive and active regeneration as required. Two permanent rehabilitation monitoring plots (CR1 and CR2) were established within these areas in 2022 and have been monitored in 2024.

Location and details of the monitoring plots, vegetation communities (DPE 2022) and management areas are included in Table 2, Figure 4 and Figure 5.

Table 2: Monitoring Plot Location and Details

Management/ Rehabilitation Area	Plot	Transect Start Easting	Transect Start Northing	Transect End Easting	Transect End Northing	State Vegetation Map (DPE 2022)
Cultural Heritage Management Area	R1	771155.1	6154011	771125.2	6153975	PCT 3643 Bungonia Tableland Silvertop Ash -Stringybark Forest
Jaorimin Creek Management Area	R2	772059.7	6155132	772065.7	6155178	PCT 3373 Goulburn Tableland Box-Gum Grassy Forest
Habitat Management Area	R3	772844.6	6155654	772870.5	6155695	PCT 3486 Wollondilly-Shoalhaven Slopes Grassy Open Forest
	R4	773491.9	6156306	773453.6	6156296	PCT 3373 Goulburn Tableland Box-Gum Grassy Forest
Amenity Bund Rehabilitation Area	RM1	769899.6	6157918	769900.8	6157871	PCT 3376 Southern Tableland Grassy Box Woodland (prior to recent quarry development)
Habitat Management Area (Rehabilitation portion)	RM2	773464.8	6155743	773506.3	6155726	n/a
	RM3	773741.8	6155457	773757.6	6155409	n/a
Biodiversity Offset Area - Regeneration Area portion	RM4	770845.1	6153936	770830.3	6153989	n/a
Biodiversity Offset Area - Box-Gum Woodland CEEC Regeneration Area	RM5	771706.9	6153029	771739.9	6153072	n/a
Retained Box-Gum Woodland (non-revegetated area)	BG1	769577.1	6154113	769535.1	6154090	PCT 3373 Goulburn Tableland Box-Gum Grassy Forest
	BG2	771851.8	6152990	771838.8	6152946	PCT 3643 Bungonia Tableland Silvertop Ash -Stringybark Forest
Riparian	CR1	771326.2	6154954	771285.1	6154935	n/a
	CR2	773062.9	6153023	773084.5	6153068	PCT 3373 Goulburn Tableland Box-Gum Grassy Forest



LEGEND

- Site boundary (approx only)
- Box Gum Woodland Monitoring
- Rehabilitation Monitoring
- Vegetation Monitoring Plot
- Riparian Monitoring
- Railway
- Major Watercourse
- Assisted Natural Regeneration
- Biodiversity Offset Area
- Box Gum Woodland (CEEC)
- Box Gum Woodland (CEEC) Regeneration
- Box Gum Woodland Derived Native Grassland (CEEC)
- Existing Approved Core Riparian Corridor
- Existing Approved Cultural Heritage Management Zone
- Existing Approved Habitat Management Area
- Habitat Management Area
- Joarmin Creek Management Area
- Rehabilitated Area – Biodiversity Values or Grazing
- Rehabilitated Area – Grazing
- Rehabilitated Areas – Biodiversity Values
- Rehabilitation Area – Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion (PCT 1330)

0 0.5 1 km

Scale: 1:30,000 at A4
Coordinate System: GDA 1994 MGA Zone 55

Date Drawn: 27-Mar-2025
Project Number: 630.031740

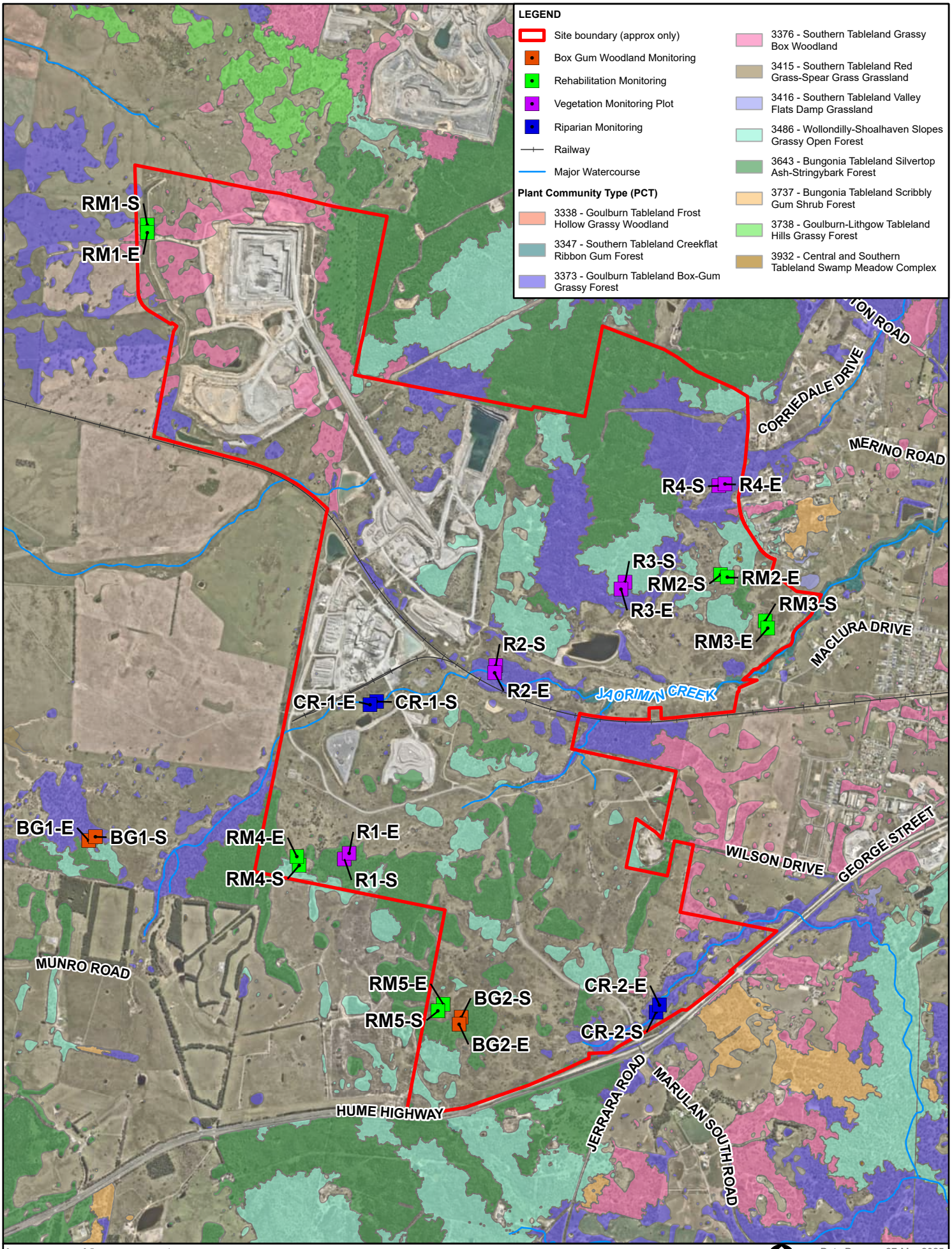
Data Source: NSW SS, 2020
Aerial imagery supplied by Nearmap (March, 2025)
Conservation and Management Areas digitised from (Umwelt, 2018)

SLR

MONITORING SITES

FIGURE 4

Path: \\au.slr.local\corporate\Projects-SLR\630-SrvNTL\630-NTL\630.031740.00001 Lynwood Ecology and Rehab Monito\06 SLR Data\01 GIS\GIS\630031740_LynwoodEcologicalMonitoring\630031740_LynwoodEcologicalMonitoring.aprx\630031740_F04_MonitoringSites



Scale: 1:30,000 at A4
Coordinate System: GDA 1994 MGA Zone 55

Date Drawn: 27-Mar-2025
Project Number: 630.031740

Data Source: NSW SS, 2020
Aerial imagery supplied by Nearmap (March, 2025)
State Vegetation Type Map (Version C2.0.M2.0, NSW DPE 2023)

SLR

PLANT COMMUNITY TYPES

FIGURE 5

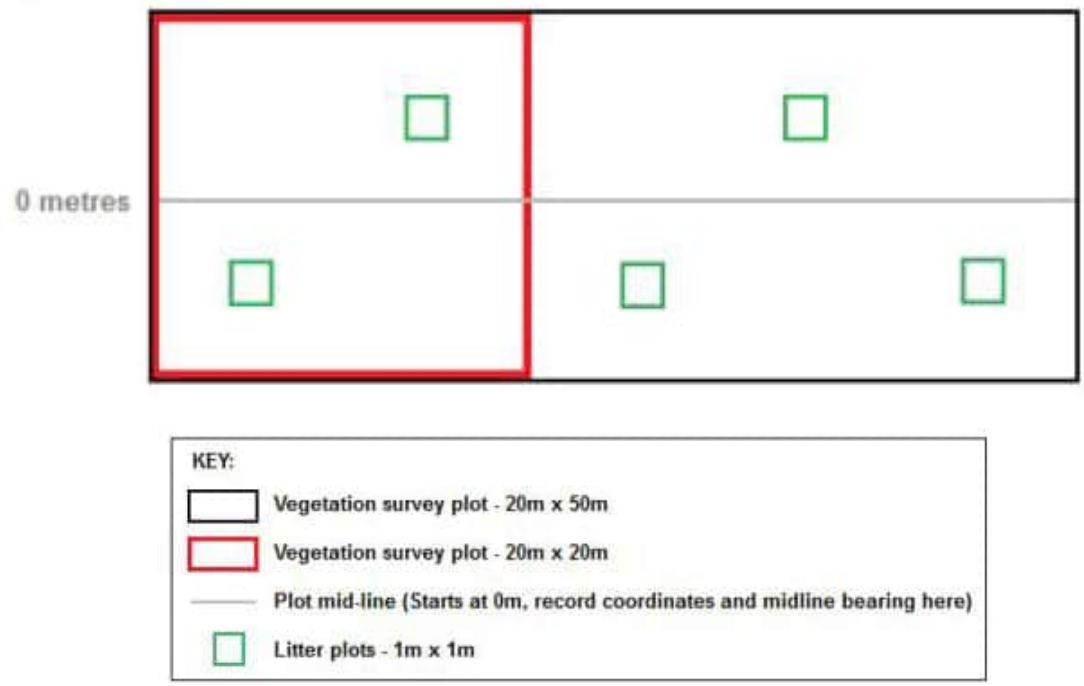
Path: \\au.slr.local\corporate\Projects-SLR\630-SrvNTL\630-NTL\630.031740.00001 Lynwood Ecology and Rehab Monito\06 SLR Data\01 GIS\GIS\630031740_LynwoodEcologicalMonitoring\630031740_LynwoodEcologicalMonitoring.aprx\630031740_F05_Vegetation

2.1.2 Vegetation Survey Technique

Flora monitoring was completed during the spring survey period at eight of the permanent monitoring plots described above, following survey methods prescribed in the NSW Biodiversity Assessment Method (BAM) (DPIE 2020).

This involved a 20m by 20m floristic plot to assess species composition and structure, and a 20m by 50m plot to assess vegetation function. The function attributes collected under the BAM include tree stem size, hollow-bearing tree counts, and ground cover (litter, bare ground, cryptogram, and rock). The ground cover attributes are collected via five 1m by 1m plots along the midline, see Figure 6.

Figure 6: BAM Plot Layout



The BAM provides a repeatable assessment tool to compare vegetation and structural changes over time and to provide comparison for the areas of retained vegetation. All PCTs listed in the NSW BioNet Vegetation Classification database provide 'benchmark' scores for these attributes to which comparison with the relevant plot data can be made. Due to the widespread use of this method in NSW, this method was chosen to provide a consistent and replicable method of assessing the health of the retained vegetation.

To categorise the vegetation at each BAM plot into a PCT (where relevant), previous vegetation mapping and floristic data (Umwelt 2005), as well as current floristic composition data was compared to PCT's within the BioNet Vegetation Classification database. The PCT database was filtered using the Southern Highland IBRA Region and Bungonia Sub-region, followed by a close examination of floristics to match the vegetation at each plot.

2.2 Nest Box Monitoring Methods

A total of 60 nest boxes were inspected as part of the winter monitoring event, with the locations of nest boxes shown in Figure 7. Of these 60 nest boxes, 50 have been monitored by SLR since 2020, an additional nine were located and monitored in 2023-2024 and one additional box was located and monitored 2024. The nest box monitoring was completed by two qualified SLR ecologists, using a non-invasive remote camera inspection method to record the following details:

- Native fauna occupancy
- Presence of nests, eggs, or young
- Indirect signs of usage (e.g. scats, fur, feathers, egg fragments, nest material)
- Evidence of pest species (e.g. bees, exotic birds, such as Indian Miners)
- Nest box condition and maintenance requirements

2.3 Hoary Sunray Monitoring Methods

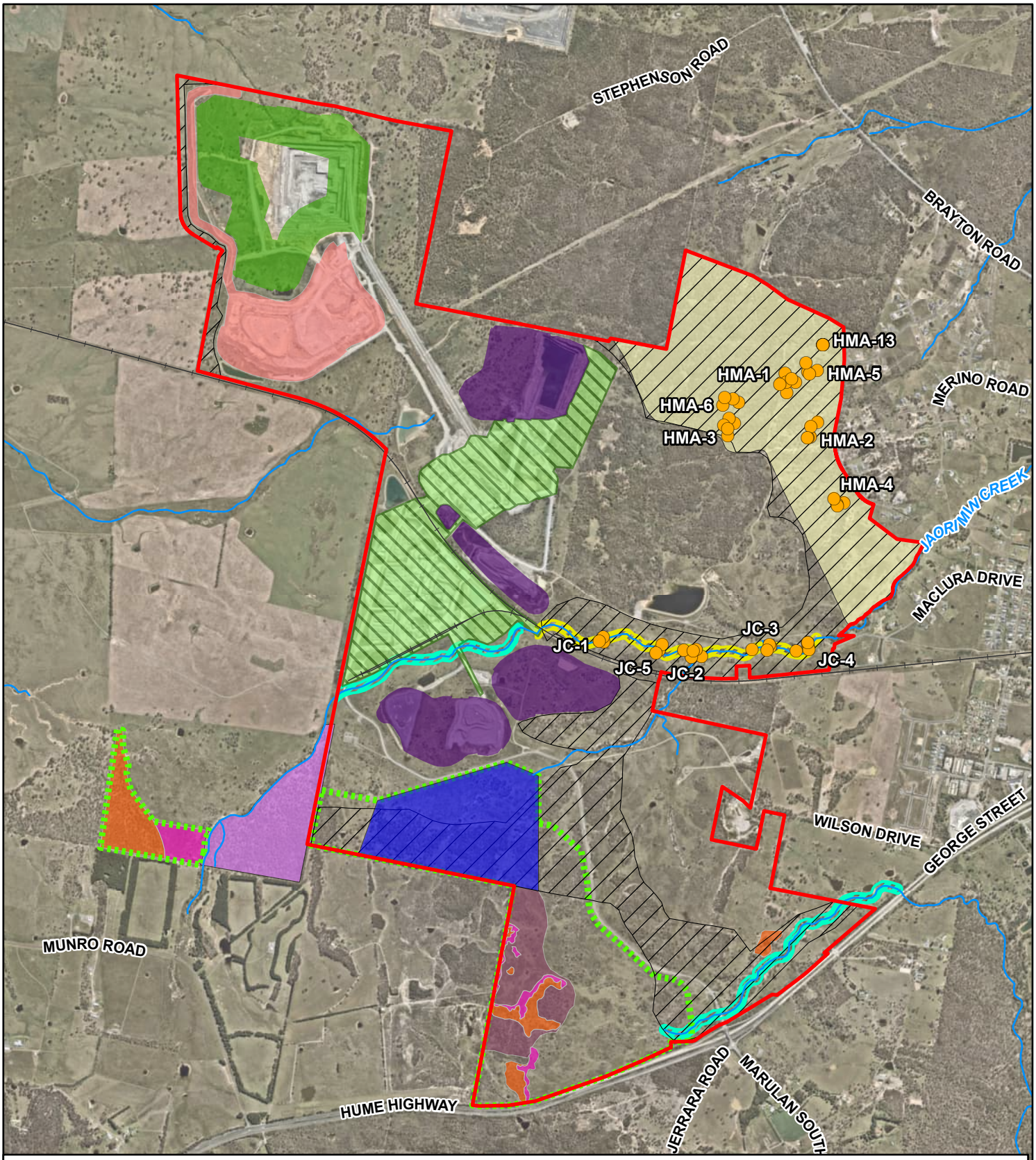
Eleven Hoary Sunray monitoring plots have been established as detailed in Table 3 and Figure 8. Plot locations were selected randomly whilst in the field but aiming to include one plot within each of the patches of Hoary Sunray which had been previously mapped on the site (Umwelt 2013). Monitoring plots have been pegged using a metal star-picket at the centre of the plot, fitted with a yellow cap marked with the plot reference.

Table 3: Hoary Sunray Monitoring Plots

Monitoring Plot	Easting (MGA)	Northing (MGA)
Hoary Sunray 1 (HS1)	772565.1	6152919
Hoary Sunray 2 (HS2)	772620	6152739
Hoary Sunray 3 (HS)3	772245.9	6152606
Hoary Sunray 4 (HS4)	771609.9	6152464
Hoary Sunray 5 (HS5)	772046	6152762
Hoary Sunray 6 (HS6)	772158.6	6153676
Hoary Sunray 7 (HS7)	773014.4	6154255
Hoary Sunray 8 (HS8)	773071.2	6153755
Hoary Sunray 9 (HS9)	772905.5	6153843
Hoary Sunray 10 (HS10)	772401.6	6154880
Hoary Sunray 11 (HS11)	773440	6154894

At each monitoring plot accurate counts of individuals of the Hoary Sunray were recorded within a $4m^2$ plot using a series of $1m^2$ quadrats laid out around the centre marker. Notes on disturbance and condition of the population at each plot were made and a reference photo was taken of each $1m^2$ quadrat.

In 2024 smaller patches (HS1, HS2, HS3, HS6, HS7, HS8, HS10, HS11) were also subjected to parallel traverse searches, and mapping of individuals and small patches, including patch size estimations. Larger patches (HS4, HS5 and HS9) were subject to driven traverses to generally confirm the patch extent.



LEGEND

- Site boundary (approx only)
- Location of Nest Box
- Railway
- Major Watercourse
- Assisted Natural Regeneration
- Biodiversity Offset Area
- Box Gum Woodland (CEEC)
- Box Gum Woodland (CEEC) Regeneration
- Box Gum Woodland Derived Native Grassland (CEEC)
- Existing Approved Core Riparian Corridor
- Existing Approved Cultural Heritage Management Zone
- Existing Approved Habitat Management Area
- Habitat Management Area
- Joarmin Creek Management Area
- Rehabilitated Area – Biodiversity Values or Grazing
- Rehabilitated Area – Grazing
- Rehabilitated Areas – Biodiversity Values
- Rehabilitation Area – Yellow Box - Blakely's Red Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion (PCT 1330)

0 0.5 1 km

Scale: 1:30,000 at A4
Coordinate System: GDA 1994 MGA Zone 55

Date Drawn: 27-Mar-2025
Project Number: 630.031740

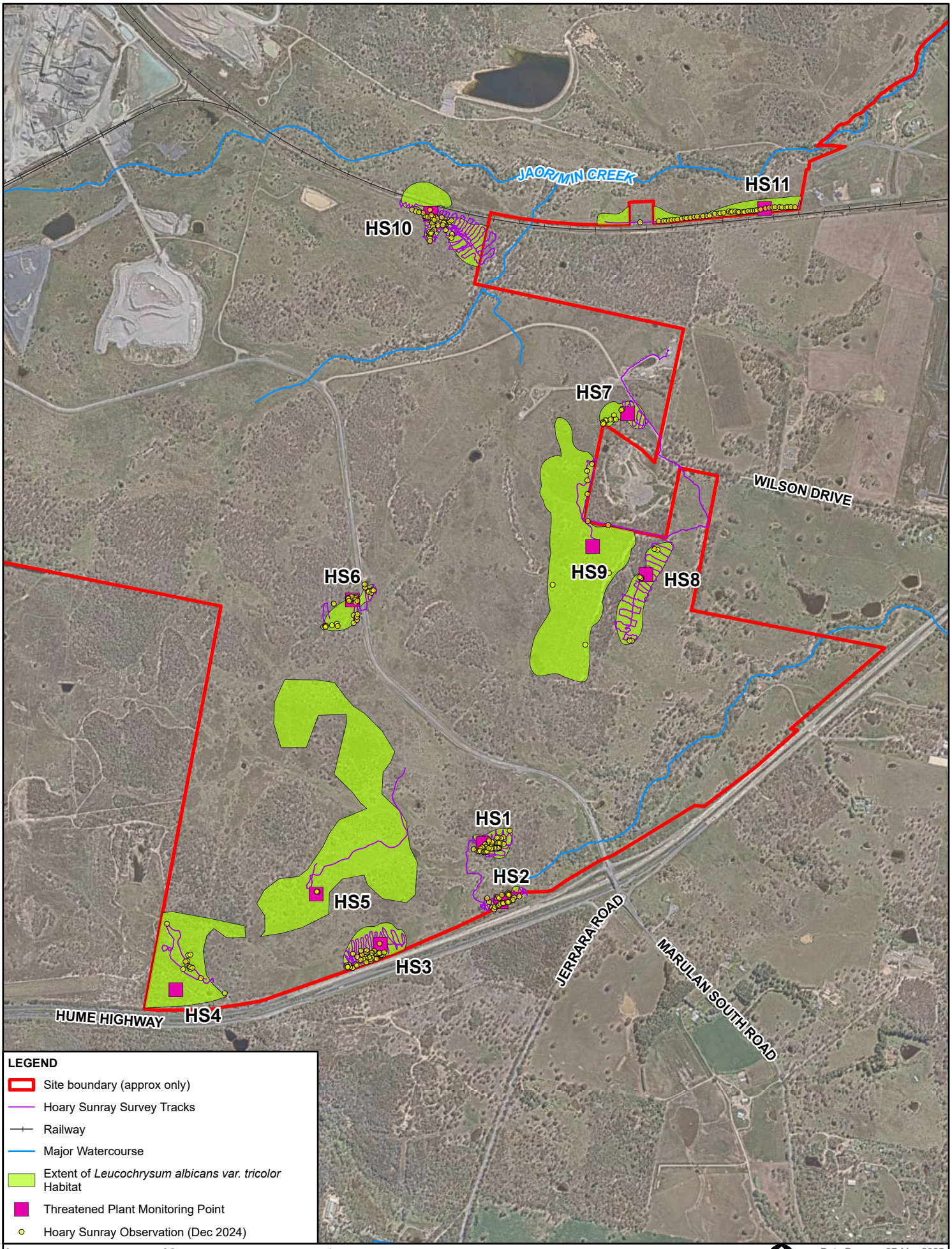
Data Source: NSW SS, 2020
Aerial imagery supplied by Nearmap (March, 2025)
Conservation and Management Areas digitised from (Umwelt, 2018)

SLR

NEST BOX LOCATIONS

FIGURE 7

Path: \\au.slr.local\corporate\Projects-SLR\630-SrvNTL\630-NTL\630.031740.00001 Lynwood Ecology and Rehab Monito\06 SLR Data\01 GIS\GIS\630031740_LynwoodEcologicalMonitoring\630031740_LynwoodEcologicalMonitoring.aprx\630031740_F07_NestBoxLocations



HOARY SUNRAY MONITORING SITES

SLR

FIGURE 8

Path: \\au.slr.local\corporate\Projects-SLR\630-SrvNTL\630-NTL\630.031740.00001 Lynwood Ecology and Rehab Monito\06 SLR Data\01 GIS\GIS\630031740_LynwoodEcologicalMonitoring\630031740_LynwoodEcologicalMonitoring.aprx\630031740_F08_HoarySunrayMonitoring

2.4 Rehabilitation Inspection

2.4.1 General Survey

The following notes were recorded within each BAM plot, as required by the RLMP:

- Evidence of natural regeneration.
- The extent of the vegetative cover and species diversity and any requirement for additional revegetation works to be undertaken.
- The general health of the vegetation.
- Any occurrences of weed species in the revegetation area and any requirements for weed control activities.
- Presence of threatened or other significant species.
- Feral animals and the need for control.
- Erosion and the need for repair of eroded areas.
- Fire management.
- Any signs of disturbance, either by animals or humans.
- Evidence of site management (e.g. fencing and weed control actions).
- The success of any management programs implemented following previous monitoring inspections.
- Opportunistic fauna observations.

2.4.2 Biodiversity Offset Area Survey

A general inspection of the biodiversity offset area was also undertaken opportunistically whilst traversing across the site between monitoring plot locations. The survey involved searches for evidence of erosion, collecting notes on weeds and pests, evidence of planting, natural regeneration, and general management.

2.5 Survey Details

The current 2024 ecological and rehabilitation monitoring involved winter and spring surveys as detailed in Table 4.

Table 4: Details of the 2024 Ecological and Rehabilitation Monitoring

Date (2024)	Survey Technique	Weather Conditions*
17 July	Nest box inspections	Temp -3.9°C (min) 13.2°C (max). Rain 0.6 mm (no rain while onsite). Wind: Light. Moon phase: Third quarter to new moon. Sunrise 7:05am. Sunset 5:09pm.
17 December	Vegetation survey (BAM plots)	Temp 15.3°C (min) 33.5°C (max). Rain 0 mm. Wind: Moderate. Moon phase: Full moon to third quarter. Sunrise 5:39am. Sunset 8:03pm.
18 December	Vegetation survey (BAM plots)	Temp 12.8°C (min) 22.4°C (max). Rain 0 mm. Wind: Light to Moderate. Moon phase: Full moon to third quarter. Sunrise 5:39am. Sunset 8:04pm.

Date (2024)	Survey Technique	Weather Conditions*
19 December	Hoary Sunray survey	Temp 7.4°C (min) 22.3°C (max). Rain 0 mm. Wind: Light to moderate. Moon phase: Full moon to third quarter. Sunrise 5:39am. Sunset 8:04pm.
* Weather data sourced from BOM (2024) weather station Goulburn Airport (20 km SW of site) and www.timeanddate.com (Sydney 2024).		

2.5.1 Survey Limitations

Survey efficacy is influenced by a range of factors. For this type of survey, such limitations are generally due to a single, short duration survey that does not account for seasonal variation. Given the short period of time spent on site, the detection of certain species may be affected by:

- Seasonal migration (particularly migratory birds).
- Seasonal flowering periods (e.g. cryptic species unlikely to be detected outside of the known flowering period).
- Seasonal availability of food, such as blossoms for some fauna.
- Weather conditions during the survey period (cycles of activity related to specific weather conditions, e.g. reptiles and frogs inactive during cold weather).
- Species lifecycle (cycles of activity related to breeding).

2.5.2 SLR Permits and Licenses

The SLR ecology team operates under a Scientific Licence (licence number SL 00176, issued under the BC Act), which authorises field staff to trap, capture, harm, hold and release plants and animals protected under the BC Act and *National Parks and Wildlife Act 1974*, as well as an Animal Research Authority (issued by the Secretary of the NSW Animal Care and Ethics Committee of DPIE), which allows trapping of animals in NSW for the purposes of animal research.

2.6 Staff Roles and Qualifications

The roles and qualifications of all staff responsible for preparation of this report are listed in Table 5.

Table 5: Staff Roles and Qualifications

Staff Name/Title	Qualifications and Training	Role
Jeremy Pepper Technical Director	Bachelor of Science (Hons Class 1), University of NSW 1996 Cert II Bushland Regeneration, TAFE NSW Cert III Horticulture (Arboriculture), TAFE NSW BAM accredited assessor (#BAAS17104)	Project Director, report review
Fiona Iolini Associate Ecologist	Bachelor of Environmental Science and Management, University of Newcastle 2007 Certificate of Native Plant Identification, Sydney University 2008 Cert III Conservation and Land Management, TAFE NSW 2015 BAM accredited assessor (#BAAS19042)	Project Manager, Spring field survey, report preparation

Staff Name/Title	Qualifications and Training	Role
Joshua Drane Project Ecologist	Bachelor of Environmental Science, Australian Catholic University	Winter field survey
Elise Newberry Project Ecologist	Bachelor of Environmental Biotechnology, University of Technology Sydney	Field surveys, data entry
James Hugo GIS technician	Master of Environmental Management and Sustainability, University of Newcastle (2020) Bachelor of Science (Hons), University of Newcastle (2016)	GIS data management and figure preparation

3.0 Results

3.1 Vegetation Monitoring

3.1.1 PCT Floristic Assessment

An assessment of the total number of matching floristic species at each of the monitoring plots (Table 6) indicates that overall, most plots reflect the PCTs as mapped by the SVT mapping. However, the floristic composition recorded at BG1 and BG2 is more closely aligned with PCT 3376 Southern Tableland Grassy Box Woodland. The vegetation recorded at plots where no SVT mapping occurs align with PCT 3376 (RM2, RM3, CR1) or PCT 3373 (RM5).

Table 6: PCT Floristic Assessment

Plot	Mapped PCT (SVT)	PCT code with most matching flora species per year and the total number of matching species					Final matching PCT
		2020	2021	2022	2023	2024	
RM1	3376	n/a	3376 (3)	3373, 3376 (1)	3376 (11)	3376 (11)	3376
RM2	n/a	n/a	3376 (12)	3376 (13)	3373, 3376 (14)	3373, 3376 (16)	3376
RM3	n/a	n/a	3376 (10)	3373, 3376 (9)	3376 (5)	3373, 3376 (6)	3376
RM5	n/a	n/a	3373, 3376 (12)	3373 (11)	3373 (8)	3373 (10)	3373
BG1	3373	n/a	3376 (20)	3376 (20)	3376 (24)	3376 (20)	3376
BG2	3643	n/a	3373, 3376 (19)	3376 (17)	3373, 3376 (13)	3373, 3376, 3643 (15)	3376
CR1	n/a	n/a	n/a	3373, 3376 (6)	3376 (5)	3376 (6)	3376
CR2	3373	n/a	n/a	3373 (13)	3373 (14)	3376 (9)	3376

According to the species profiles (Appendix A) the PCTs at the monitoring plots in 2024 typically contain the following key species:

- PCT 3373 'Goulburn Tableland Box-Gum Grassy Forest' *Eucalyptus melliodora*, *E. macrorhyncha*, *Eucalyptus blakelyi*, *Eucalyptus dives*, *L. strigosa*, *Pimelea curviflora*, *Melichrus urceolatus*, *H. obtusifolia*, *Themeda triandra*, *M. stipoides*, *Poa sieberiana*, *Elymus scaber*, *Aristida ramosa, Lomandra filiformis*, *Lomandra multiflora*, *Goodenia hederacea*, *Hydrocotyle laxiflor*a, *Oxalis perennans*, *Chrysocephalum apiculatum*, *Tricoryne elatior*, *Gonocarpus tetragynus*, *Hypericum gramineum*.
- PCT 3376 'Southern Tableland Grassy Box Woodland' *E. melliodora* or *E. bridgesiana*, *E. blakelyi*, *M. urceolatus*, *L. strigosa*, *Acacia* spp., *H. laxiflora*, *Austrostipa scabra*, *Lomandra filiformis*, *M. stipoides* and *E. scaber*).

PCT 3373 and PCT 3376, correspond to the national and state listed CEEC known as White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland (TSC 2025, DCCEEW 2025b).

A full list of species common to each PCT is included in Appendix A. Dominant species at each of the monitoring plots is indicated in Table 7. The dominant species have been defined as being the top three species in each structural layer with the highest cover scores in 2024.

Table 7: Dominant Native Plant Species at Monitoring Plots in 2024

Plot (PCT)	Tree	Shrub	Grass & Grass-like	Forb	Fern	Other
RM1 (3376)	*E. blakelyi*, *A. melanoxylon*, *E. bridgesiana*	*A. mearnsii*	*C. dactylon*, *C. ventricosa*, *C. refractus*, *E. pseudoacrotrich a*, *R. tenuius*	*E. crinitum*, *G. solanderi*, *W. gracilis*	Nil	Nil
RM2 (3376)	Nil	*C. sifton*, *A. humifusum*, *C. aculeata*, *K. parvifolia*	*A. vagans*, *A. densiflora*, *E. leptostachya*	*G. tetragynus*, *G. hederacea*, *E. involucratus*, *H. gramineum*	*C. sieberi*	Nil
RM3 (3376)	Nil	*C. sifton*	*J. usitatus*, *M. stipoides*, *E. benthamii*	*W. gracilis*, *E. sphaericus*	Nil	Nil
RM5 (3373)	Nil	*C. sifton*, *K. parvifolia*	*J. usitatus*, *M. stipoides*, *E. benthamii*	*H. sibthorpioides*, *G. tetragynus*, *I. fluviatilis*	*C. sieberi*	Nil
BG1 (3376)	*E. blakelyi*	*C. sifton*, *L. strigosa*	*M. stipoides*, *A. scabra*, *A. densiflora*	*H. sibthorpioides*, *W. gracilis*, *H gramineum*, *C. australis*, *E. trigonos*, *L. gracilis*, *O. diphylla.* *P. gaudichaudii*, *T. elatior*, *V. plebeian*, *W. communis*	*C. sieberi*	Nil
BG2 (3376)	*E. agglomerata*, *E. blakelyi*, *A. littoralis*, *E. cinerea*, *E. macrorhyncha*	*C. sifton*, *C. aculeata*	*L. confertifolia*, *M. stipoides*, *J. usitatus*, *R. fulvum*	*G. tetragynus*, *G. hederacea*, *V. plebeia*, *S. glauca*	Nil	Nil
CR1 (3376)	*A. parramattensis*	*C. sifton*, *L. strigosa*	*J. usitatus*, *L. filiformis*	*G. solanderi*, *Haloragis hetrophylla*	Nil	Nil
CR2 (3376)	*E. blakelyi*, *A. parramattensis*, *A. decurrens*	*C. sifton*, *O. viscidula*, *C. aculeata*	*M. stipoides*, *R. racemosum*, *J. usitatus*	*H. sibthorpioides*, *G. solanderi*, *V. plebeia*, *E. trigonos*, *E. japonicus*, *O. radicosa*	Nil	*A. miquelii*

3.1.2 Rehabilitation Monitoring Plots

3.1.2.1 Composition & Structure

The rehabilitation monitoring plots are assessed against benchmark values for species richness and species cover in Figure 9 and Figure 10, respectively. Tables of analysed data used to create the figures are included in Appendix B. The species richness of trees ranges from 0-5 and is below the benchmark at all plots but has not declined over the monitoring period. The cover of trees ranges from 0-8% and is below benchmark for all plots, having

remained nil or decreased slightly at most plots except RM1 which increased slightly due to planting efforts.

The species richness of shrubs ranges from 0-3 and is below benchmark but has increased or remained stable over the monitoring period. The species cover of shrubs ranges from 0-45.2% and has noticeably increased over the monitoring period such that most rehabilitation monitoring plots are now within or well above benchmark.

The species richness of grass and grass-like ranges from 0-6 and is below the benchmark at all plots. There has been a slight increase in species richness for grass and grass-like species at most plots across the monitoring period, except for RM3 and RM5, which decreased slightly. Grass and grass-like cover scores range from 0-55%, with most plots remaining consistently below or declining to below benchmark in 2024.

Forb species richness ranges from 1-8 and is below benchmark for all plots. Forb species richness has remained largely stable across the monitoring program. The cover of forbs ranges from 0.1-30%, with most plots being consistently below benchmark. Fern species richness ranges from 0-1 and is at or just below benchmark for all plots, having only changed slightly across the monitoring period (increase or decrease by one value at two plots). Fern covers have ranged from 0-0.5 %, which is at or above the benchmark of zero. 'Other' growth form species richness and cover has been consistently nil across the monitoring period and is below benchmark for all plots

Overall, the native species richness and cover has increased at RM1 due to plot repositioning (the plot now runs along the outer face of the amenity bund which has been planted with native species). The remaining plots have only seen slight changes to species richness, but cover has increased, particularly in the shrub layers which is likely due to increased rainfall and cessation of slashing practises. Sifton Bush *Cassinia sifton* has become prolific within the passive rehabilitation areas.

Figure 9: Native Species Richness for Rehabilitation Monitoring Plots

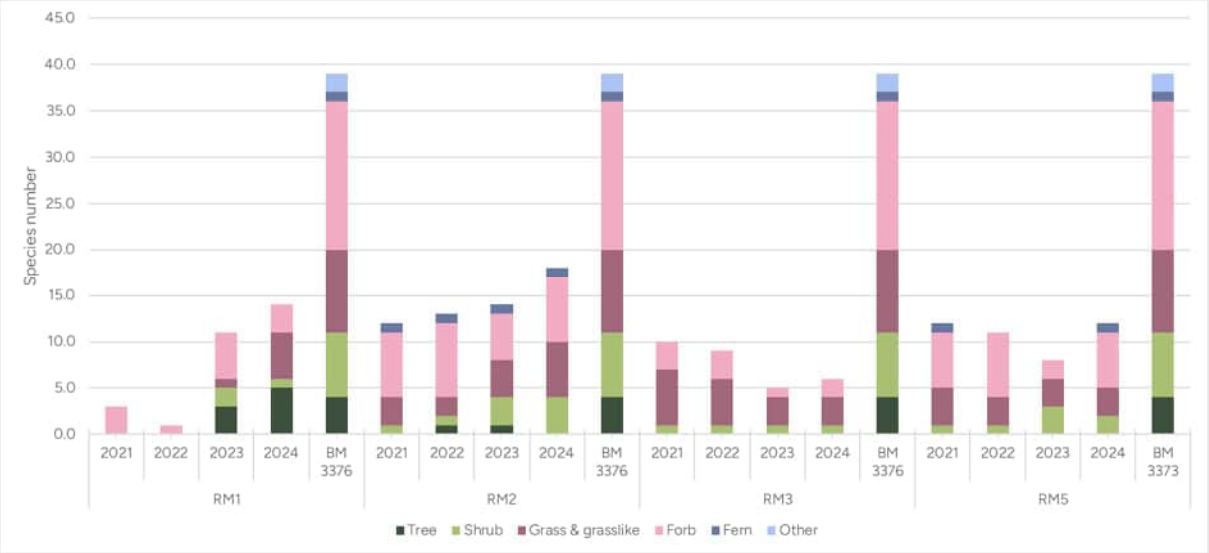
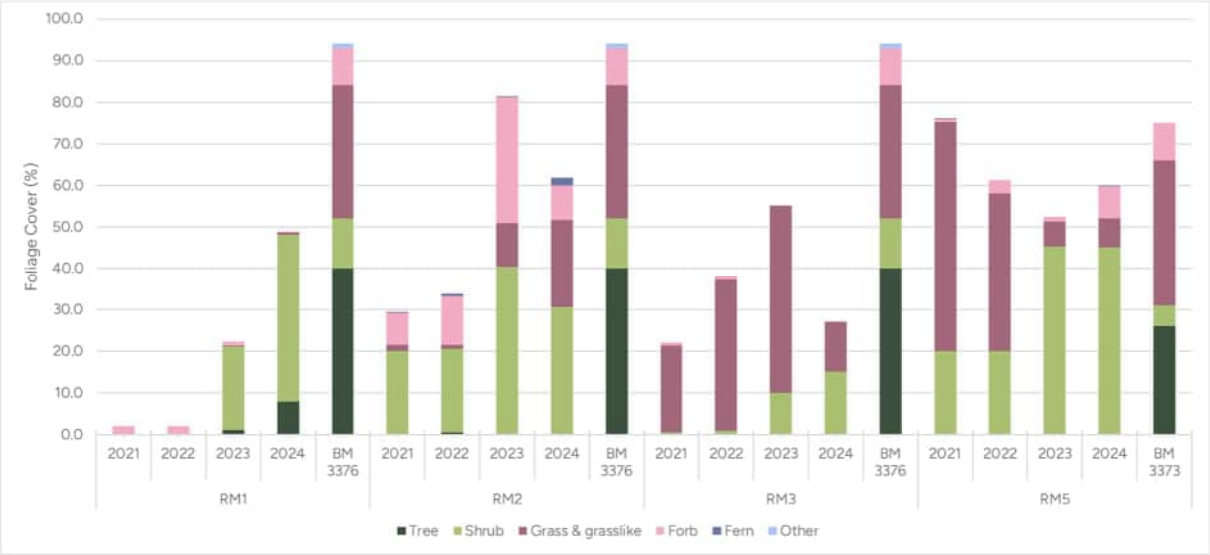


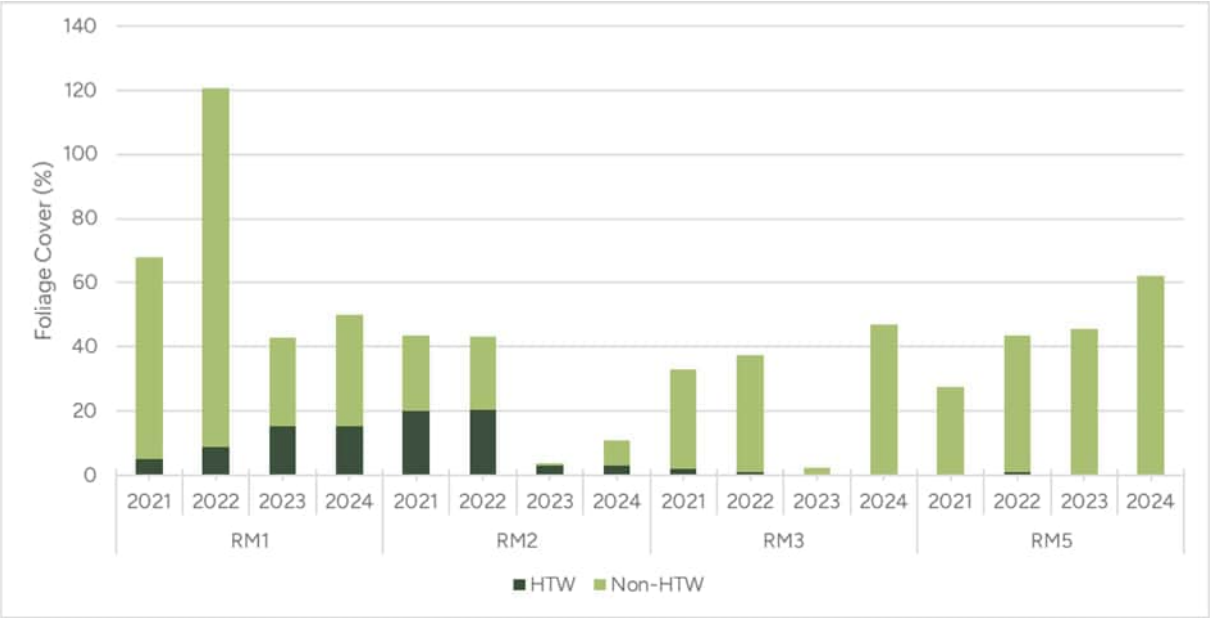
Figure 10: Native Species Cover for Rehabilitation Monitoring Plots



3.1.2.2 Function

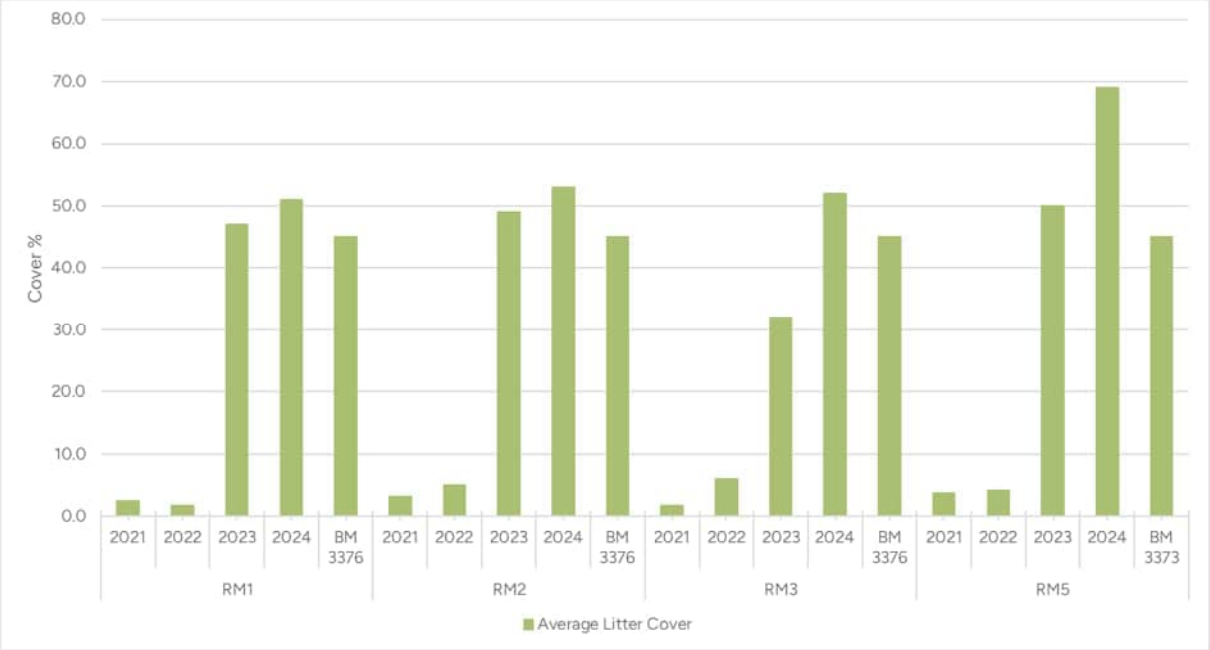
Exotic species covers for rehabilitation monitoring plots are represented in Figure 11, indicating cover of HTW and Non-HTW species. Across the monitoring period the HTW covers have ranged from 0.1-20.3% and the non-HTW covers have ranged from 0.7-111.17%. Weed covers were highest at RM1 in 2022 but have significantly decreased in 2023 (mostly due to plot relocation). Weed covers have increased at most plots in 2024.

Figure 11: Exotic Species Cover for Rehabilitation Monitoring Plots



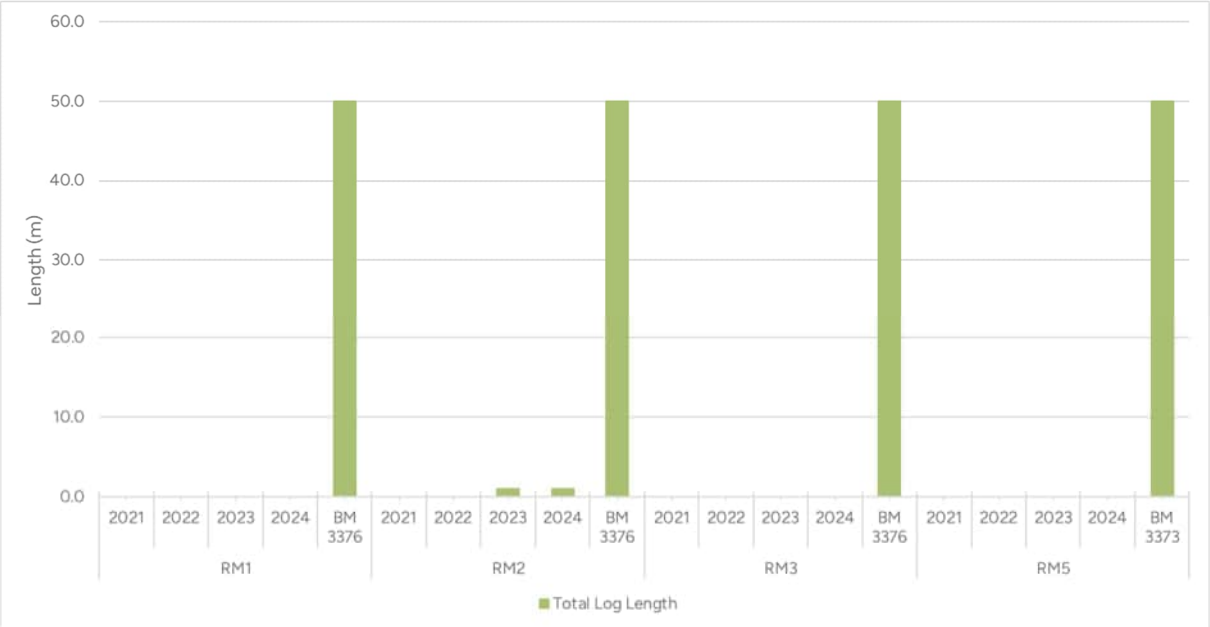
The rehabilitation monitoring plots are assessed against benchmark values for litter cover in Figure 12. Litter scores have ranged from 1.8-69% across the monitoring period. The data shows that litter scores have increased at all plots between 2020 and 2024. All plots are now above benchmarks for litter.

Figure 12: Litter Cover for Rehabilitation Monitoring Plots



The rehabilitation monitoring plots are assessed against benchmark values for total log length in Figure 13. The data shows that total log lengths have ranged from 0-1m across the monitoring period and are consistently below benchmark values.

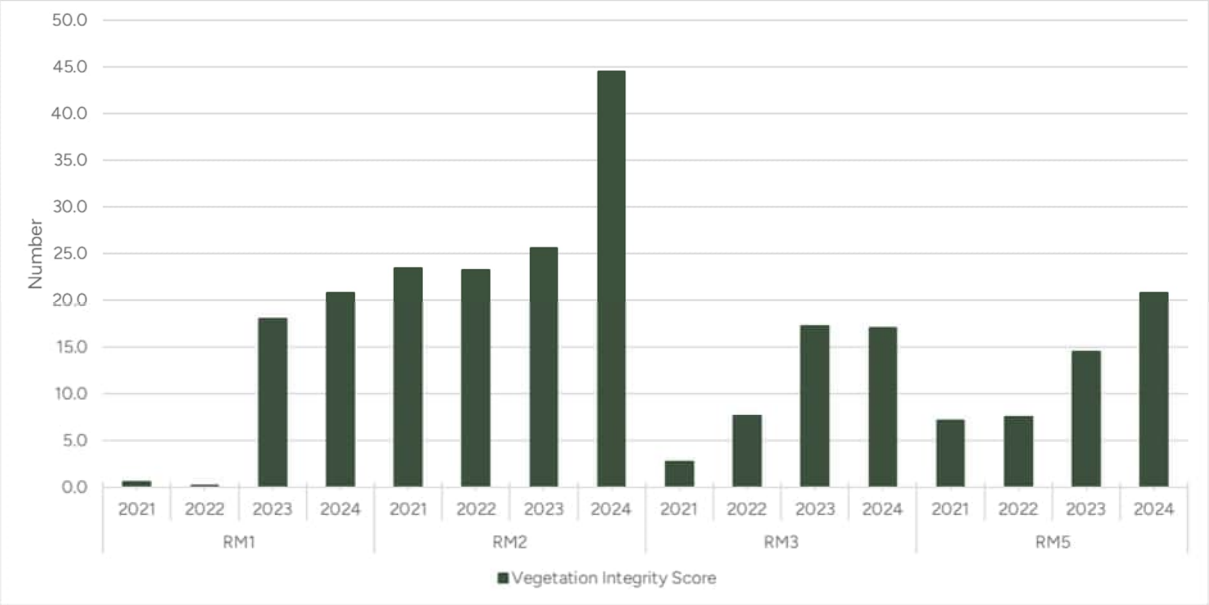
Figure 13: Total Log Length for Rehabilitation Monitoring Plots



3.1.2.3 Vegetation Integrity (VI)

An assessment of vegetation integrity for rehabilitation monitoring plots is provided in Figure 14. The graph shows that the vegetation integrity, which is an indicator of overall vegetation condition, improved at all plots.

Figure 14: Vegetation Integrity Assessment for Rehabilitation Monitoring Plots



3.1.3 Box-Gum Monitoring Plots

3.1.3.1 Composition & Structure

Species richness and percentage cover results (by growth form) for Box-Gum monitoring plots are presented in Figure 15 and Figure 16, respectively. Tables of analysed data used to create the Figures are included in Appendix B. Tree species diversity is stable and ranges from 1-5 and is below the benchmark at all plots. Similarly, tree cover is stable, ranging from 6-15.2% and is below benchmark for all plots. Storm damage may have contributed to the decline in tree diversity and cover at these plots.

The species richness of shrubs ranges from 1-2, which is below benchmark. Conversely, shrub cover ranges from 17-60%, which has been consistently above benchmark.

Species richness for grass growth form ranges from 5-9 and is typically below the benchmark, except for BG1, which was within benchmark in 2023. Grass cover ranges between 1.3 and 55.6%, with BG1 within benchmark and BG2 below benchmark.

Forb species richness ranges from 2-11 and is below benchmark for all plots. There has been a slight increase in species richness for forb species at BG1 across the monitoring period, but BG2 has decreased. The cover of forbs ranges from 0.3-25.2% and has increased to exceeding benchmark at BG2 in 2024.

Fern species richness ranges from 0-1 and has typically been below benchmark for all plots. Fern covers have ranged from 0-0.1% which is at or above the benchmark of nil.

‘Other’ growth form species richness and cover has been consistently nil across the monitoring period and is below benchmark.

Overall, the native species richness and cover at the Box-Gum monitoring plots has varied slightly throughout the survey period and overall cover is currently within benchmark at BG2. An increase in the shrub layer may be affecting ground cover species diversity and covers at the Box-Gum monitoring plots.

Figure 15: Native Species Richness for Box-Gum Monitoring Plots

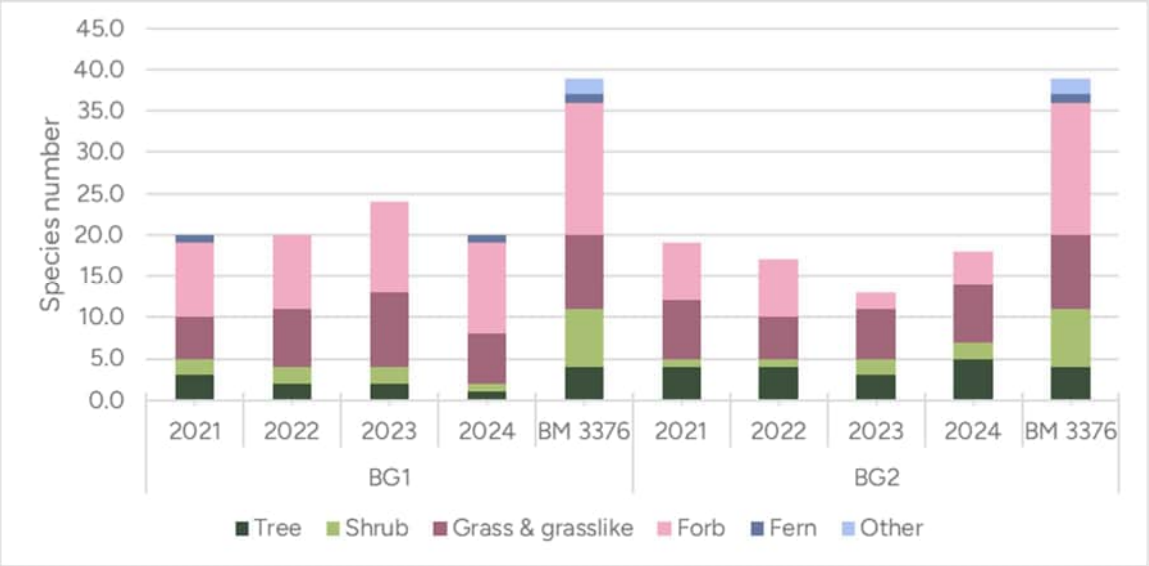
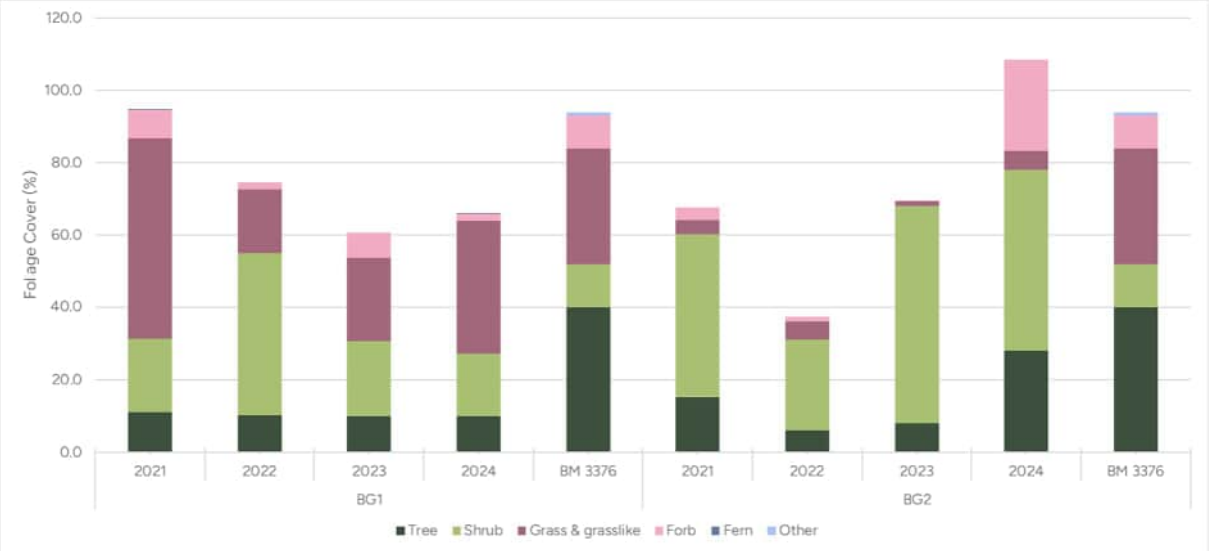


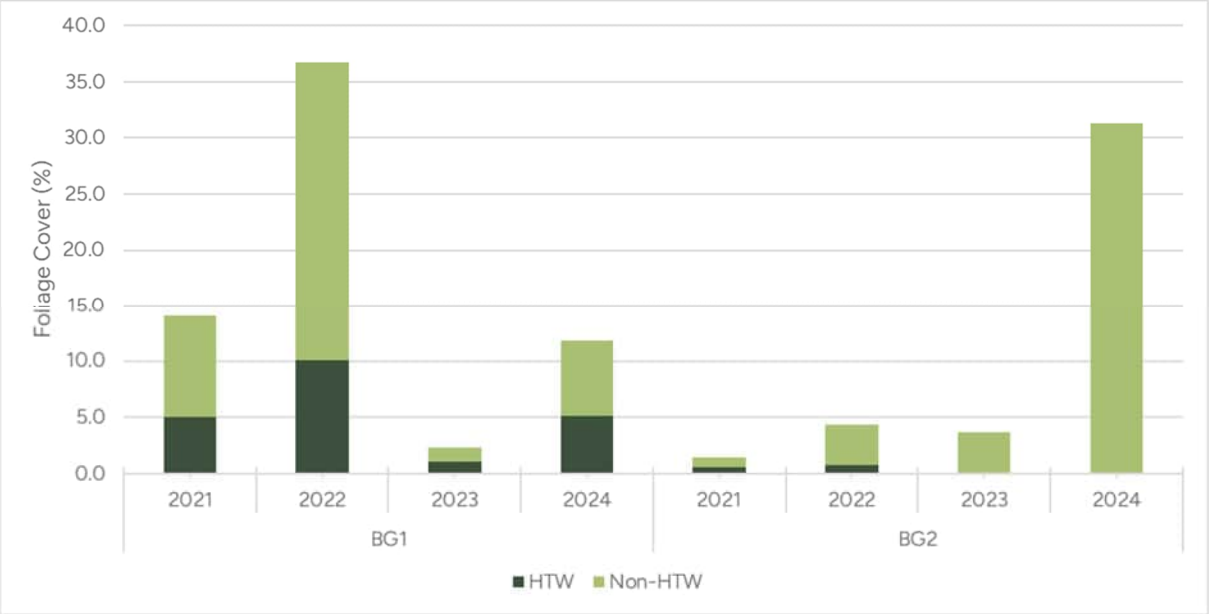
Figure 16: Native Species Cover for Box-Gum Monitoring Plots



3.1.3.2 Function

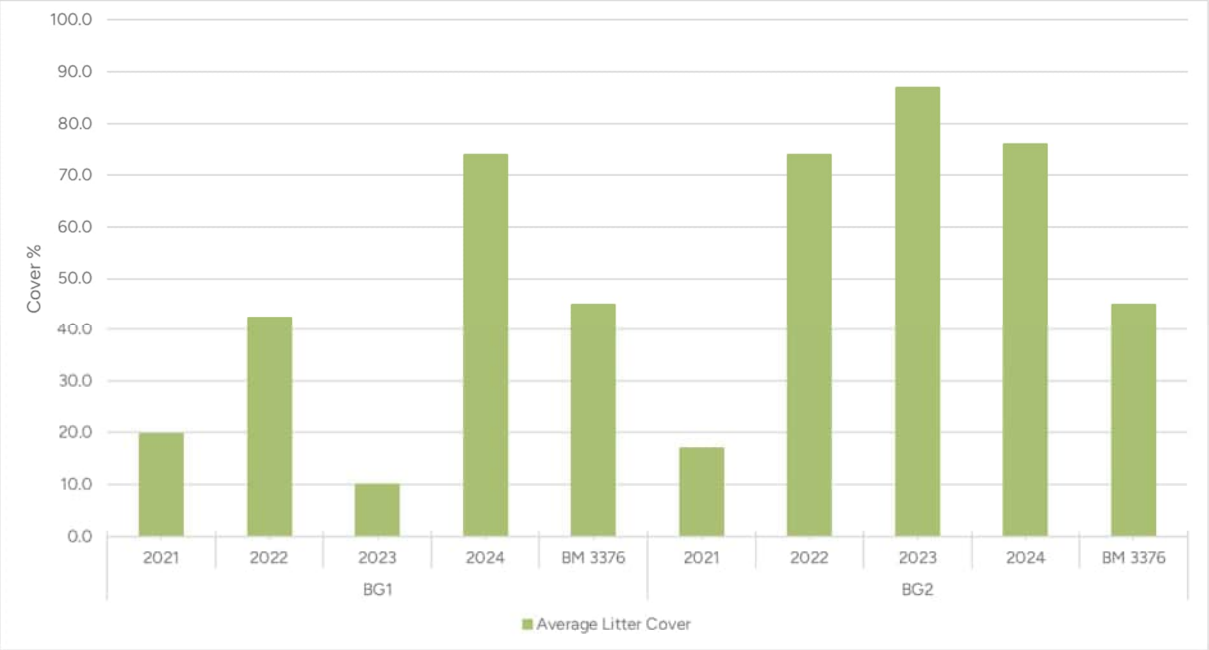
Exotic species covers for Box-Gum monitoring plots are represented in Figure 17, indicating cover of HTW and Non-HTW species. Across the monitoring period the HTW covers have ranged from 0.1-10.1% and the non-HTW covers have ranged from 0.8-31.3%. Weed covers were highest at BG1 in 2022, but have recently decreased, whilst weed covers have been low at BG2, but have increased in 2024 due to increased cover of *Anthoxanthum odoratum*.

Figure 17: Exotic Species Cover for Box-Gum Monitoring Plots



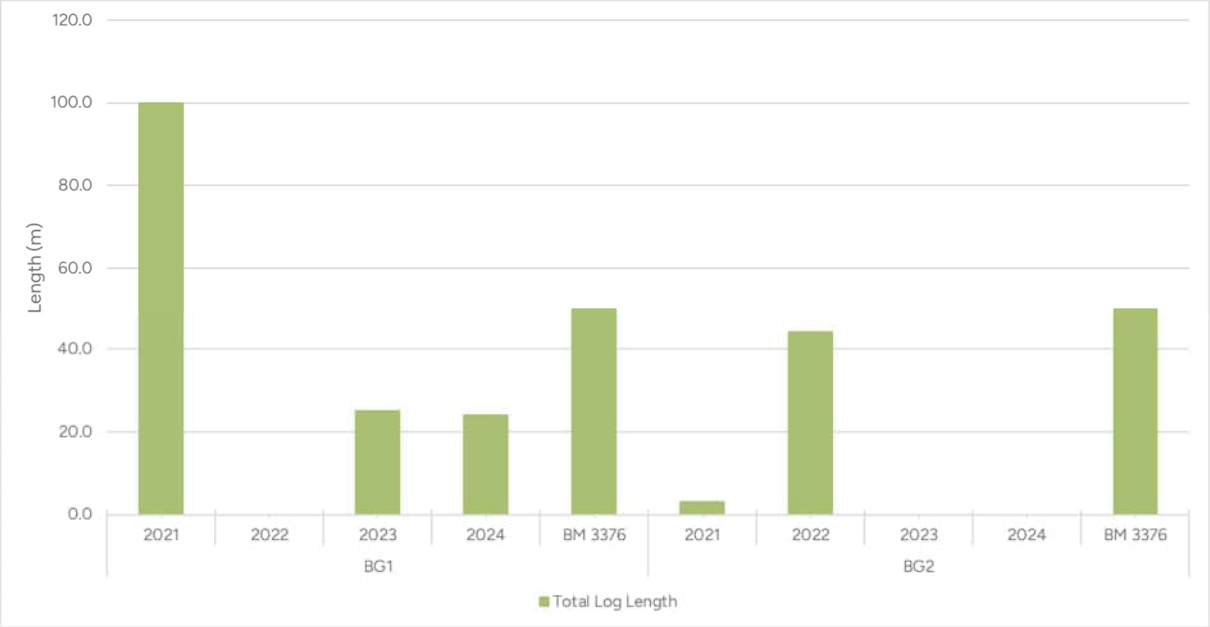
The Box-Gum monitoring plots are assessed against benchmark values for litter cover in Figure 18. Litter scores have ranged from 10-87% across the monitoring period and have shown an increase. The ground litter may be affected by surface water flows at BG1 as there is a nearby drainage channel and evidence of sheet erosion.

Figure 18: Litter Cover for Box-Gum Monitoring Plots



The Box-Gum monitoring plots are assessed against benchmark values for total log length in Figure 19. The data shows that total log lengths have fluctuated substantially, ranging from 0-100m across the monitoring period and more recently scores are below benchmark values.

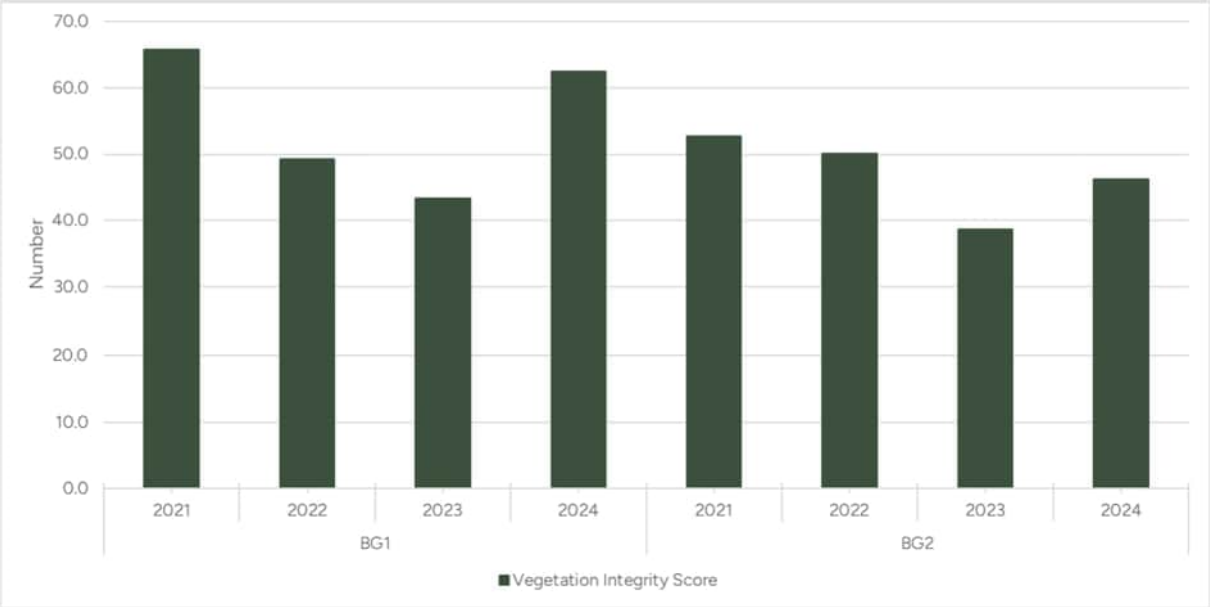
Figure 19: Total Log Length for Box-Gum Monitoring Plots



3.1.3.3 Vegetation Integrity (VI)

An assessment of vegetation integrity for Box-Gum monitoring plots is provided in Figure 20. The graph shows that vegetation integrity, which is an indicator of vegetation condition showed a decline over the past couple of years but has improved to near original vales in this round of surveys.

Figure 20: Vegetation Integrity Assessment for Box-Gum Monitoring Plots



3.1.4 Core Riparian Plots

3.1.4.1 Composition & Structure

Species richness and species cover results for the core riparian monitoring plots are presented in Figure 21 and Figure 22, respectively. Tables of analysed data used to create the Figures are included in Appendix B. The species richness of trees has ranged from 1-4 and is now at the benchmark at CR2. The species cover of trees is below benchmark, ranging from 2-33%. Whilst tree covers have steadily risen at CR2, a decline was recorded in the tree cover of wattles (*Acacia* spp.) at CR1 in 2024, possibly from storm damage or senescing.

The species richness of shrubs has ranged from 1-4 and is below the benchmark of seven. The species cover of shrubs ranges from 0.1-39.5% and after a steep rise in 2023, covers have now decreased such CR1 is now once again below benchmark.

The species richness of grass and grass-like ranges from 2-7 and has remained below the benchmark of nine. There has been a slight increase in species richness for grass and grass-like at CR2 across the monitoring period, but CR1 remains unchanged. Grass and grass-like covers range from 3.5-53.4%, with a substantial increase noted across the monitoring period, such that CR2 is now within benchmark.

Forb species richness ranges from 1-6 and is below benchmark for both core riparian plots. There has been a slight increase in species richness for forb species at both core riparian plots across the monitoring period. The cover of forbs ranges from 0.1-1.7%, being consistently below benchmark and experiencing and slight increase in cover over the monitoring period.

The ‘fern’ and ‘other’ growth form species richness and cover has been consistently nil at both core riparian plots across the monitoring period and is below benchmark. The exception is a record of one mistletoe plant in 2024 which resulted in a very low score of ‘other’ at CR2.

Overall, the native species richness and cover at CR2 has improved over the monitoring period, such that some structural layers are now within benchmark, whilst the native species richness and cover at CR1 has shown a recent decline.

Figure 21: Native Species Richness for Core Riparian Plots

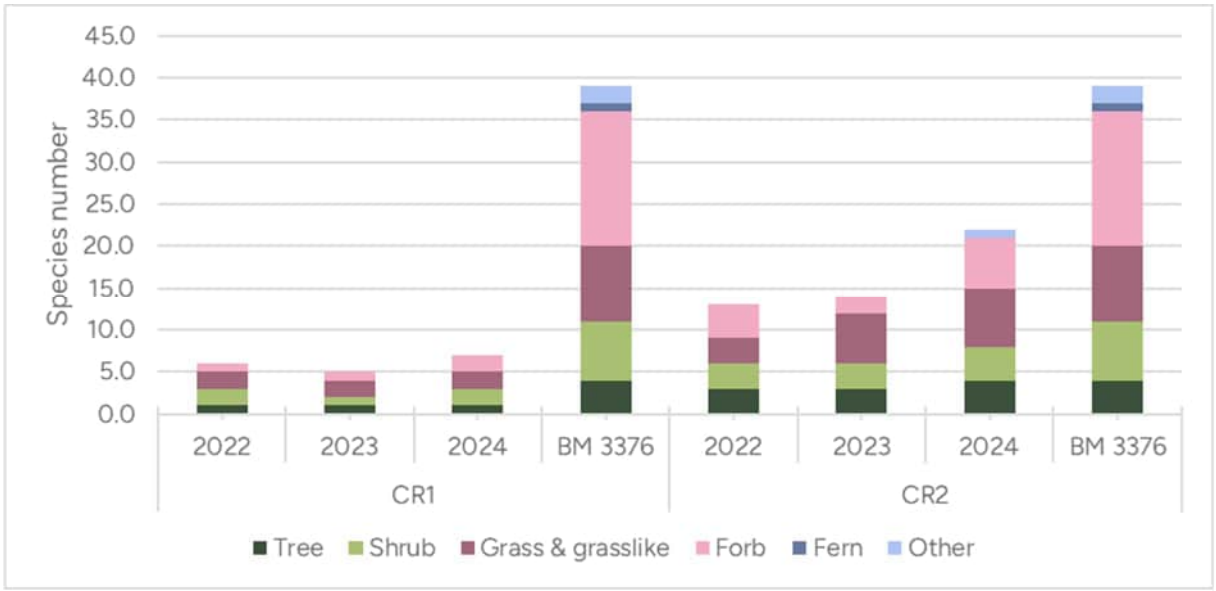
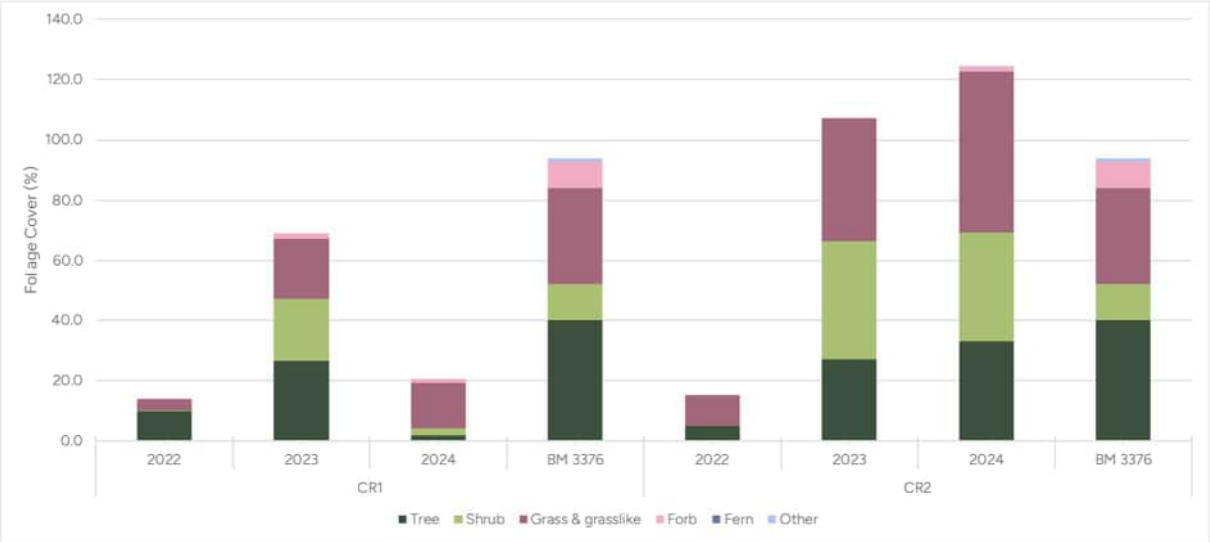


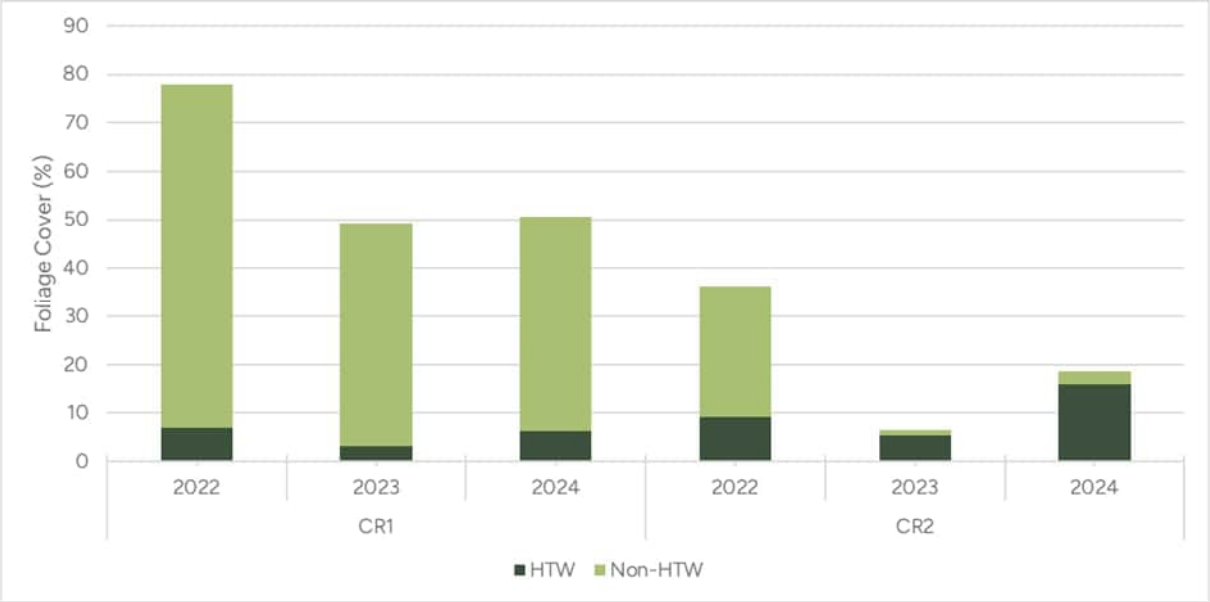
Figure 22: Native Species Cover for Core Riparian Plots



3.1.4.2 Function

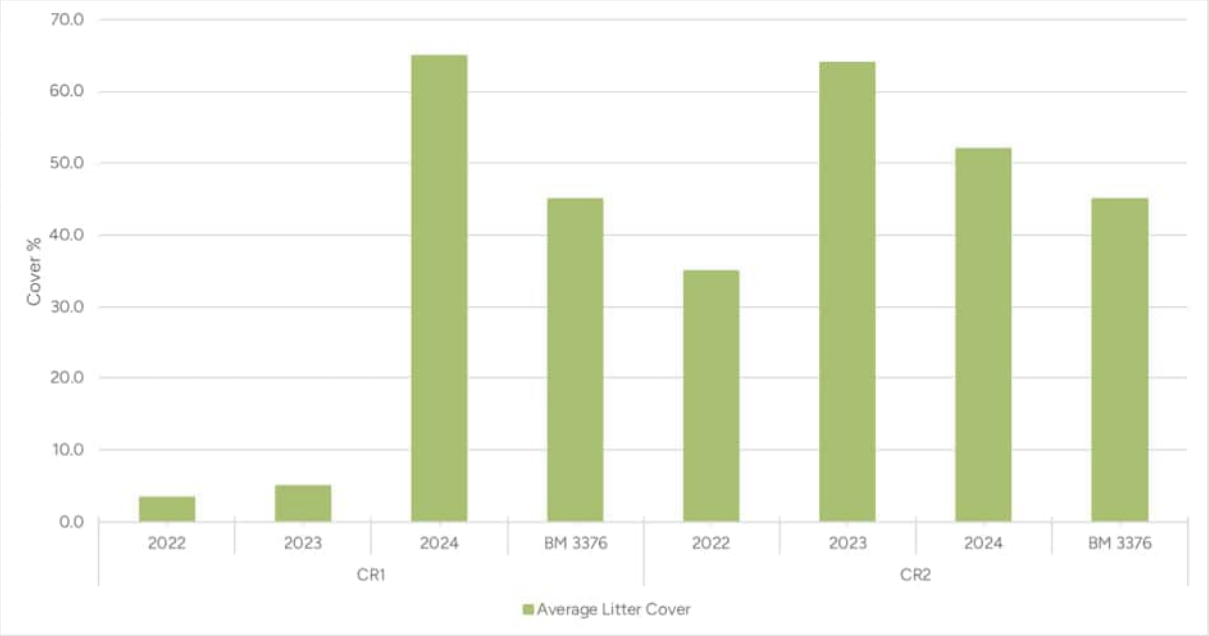
Exotic species covers for core riparian plots are represented in Figure 23, indicating cover of HTW and Non-HTW species. Across the monitoring period the HTW covers have ranged from 3.2-16% and the non-HTW covers have ranged from 1.1-70.8%. Weed covers were highest at CR1 in 2022 but decreased at both core riparian plots in 2023 and increased slightly in 2024.

Figure 23: Exotic Species Cover for Core Riparian Plots



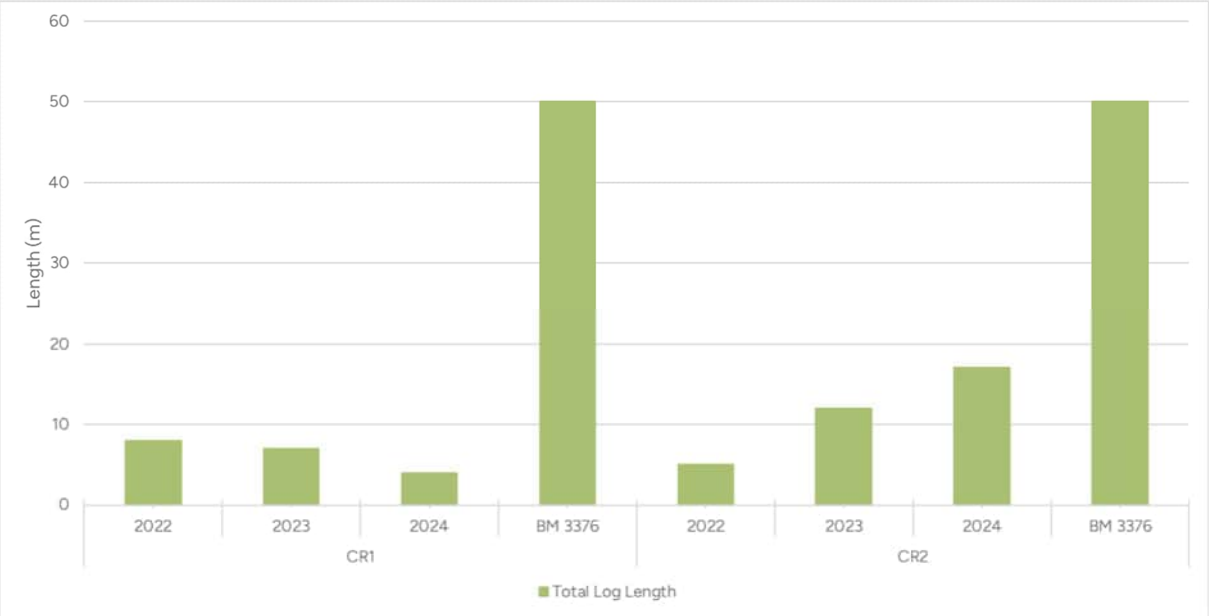
The core riparian monitoring plots are assessed against benchmark values for litter cover in Figure 24. Litter scores have ranged from 3.4-65% across the monitoring period. The data shows that overall litter scores have increased, such that both sites are now within benchmark.

Figure 24: Litter Cover for Core Riparian Plots



Length of fallen logs results are presented in Figure 25. The data shows that total log lengths remain below benchmark ranging from 5-17m across the monitoring period. There has been a stead decline at CR1 and a steady incline at CR2 across the monitoring period.

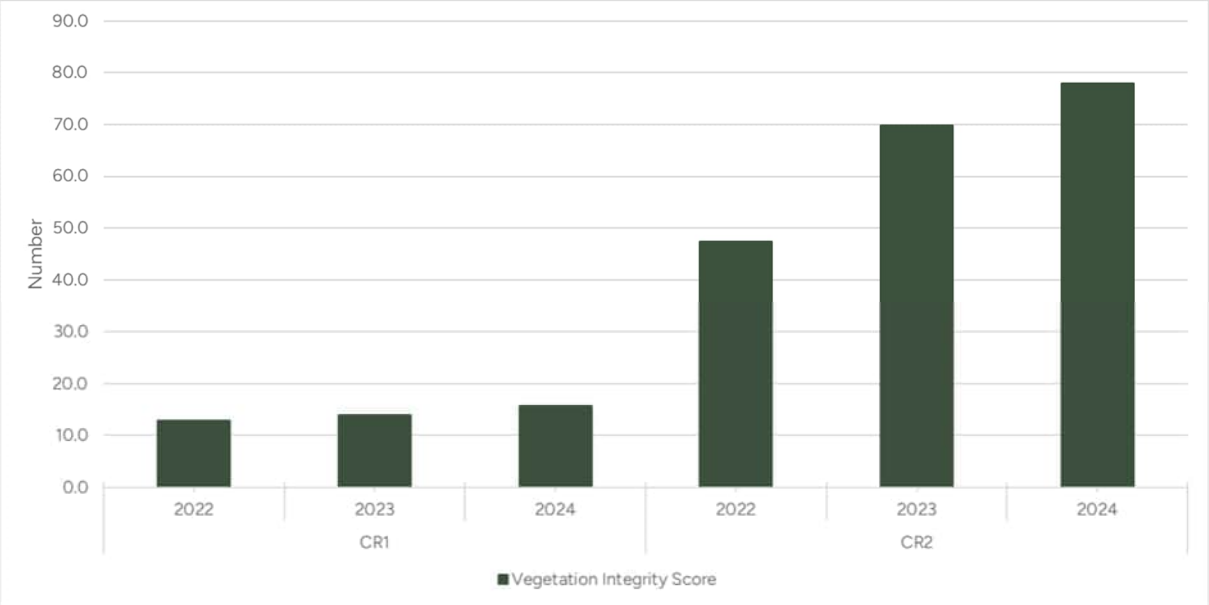
Figure 25: Total Log Length for Core Riparian Plots



3.1.4.3 Vegetation Integrity (VI)

An assessment of vegetation integrity for core riparian monitoring plots is provided in Figure 26. The results show that vegetation integrity, which is an indicator of vegetation condition, increased at the core riparian monitoring plots.

Figure 26: Vegetation Integrity Assessment for Core Riparian Plots



3.2 Nest Box Monitoring

A total of 60 nest boxes were inspected during the winter monitoring event (see Appendix C for complete nest box inventory). Key results are summarised as follows:

- 12 nest boxes are occupied by native fauna, including: nine boxes occupied by either Sugar Gliders or Squirrel Gliders *Petaurus* spp. and three boxes occupied by Brushtail Possum *Trichosurus vulpecula*.
- Two nest boxes contain what appears to be nesting material and an egg.
- 45 of the 60 nest boxes contain nesting material, identified as being a mix of glider nests (leaf material), wood duck nest (bark and leaves with fragments of eggs) and bird nests (sticks and feathers).
- 34 nest boxes were recorded as having chew marks on the entrance, ranging from severe to slight chew marks.
- One nest box was recorded as having pests (inactive European bee nest).
- Two nest boxes require maintenance including:
    - o One requiring the removal of an inactive bee nest.
    - o One box requires repair of the roof hinge.

3.3 Hoary Sunray Monitoring

All populations previously mapped by Umwelt (2013) were identified as still present and within roughly the same bounds of the previous mapping. Results of the population count, patch size and population estimates are included in Table 8 and Table 9.

An extrapolation of the plot results estimates the population size at 914,755 plants, representing an increase from the 2023 estimate of 213,078 and a decrease from the 2020 estimate of 15,490,172 plants. Parallel traverse counts are hugely different to the plot population estimates. For the eight sites that were surveyed in detail the population count is

at 3,186 plants. It is recommended that the large patches undergo parallel traverse searches as part of the 2025 monitoring.

All Hoary Sunray monitoring data, including notes on disturbance and general health, is included in Appendix D. Generally, ground conditions at most Hoary Sunray monitoring plots have improved and no longer indicate very dry conditions that were seen in 2023. Light grazing and weediness were recorded at some sites. Sifton Bush cover had increased at some plots, which could potentially compete with Hoary Sunray (for space and light access). The overall health of the vegetation is mostly 'moderate'.

Table 8: Hoary Sunray Extrapolated Population Estimates

Plot ID	Number per 1m^2	Original Patch area (m^2)	Population estimate
HS1	2.8	7566.5	20807.7
HS2	0.3	2440.1	610.0
HS3	0.0	18454.0	0.0
HS4	1.0	53811.8	53811.8
HS5	0.0	169143.2	0.0
HS6	4.0	9664.0	38655.9
HS7	11.3	8764.4	98599.7
HS8	0.3	21942.2	5485.6
HS9	5.3	130011.2	682558.8
HS10	0.5	28452.8	14226.4
HS11	0.0	18803.7	0.0
Av/Total	**2.3**	**469053.9**	**914755.9**

Table 9: Hoary Sunray 2024 Population Estimates

Plot ID	Number per 1m^2	2024 Patch area (m2)	Population estimate	Parallel traverse count
HS1	2.8	317.8	889.8	180
HS2	0.3	252.3	75.7	135
HS3	0.0	345.1	0.0	269
HS4	1.0	0	0.0	0
HS5	0.0	0	0.0	0
HS6	4.0	516.6	2066.4	1,222
HS7	11.3	191.2	2160.6	208
HS8	0.3	742.7	222.8	77
HS9	5.3	0	0.0	0
HS10	0.5	490.1	245.1	388
HS11	0.0	945.3	0.0	707
Av/Total	**2.3**	**3801.1**	**5660.4**	**3,186**

3.4 Rehabilitation Inspection

3.4.1 General Observations

General observations were made at all monitoring plots in 2024 and are included in Appendix B. Natural regeneration was observed at most plots, but for some areas only a very low level of regeneration was occurring. Most of the open paddock areas (e.g. RM2, RM3, RM5) which are being monitored for natural regeneration are regenerating with very high abundance and cover of Sifton Bush *Cassinia sifton*, which appears to be resulting in suppression of other native species, including the Hoary Sunray, as well as forming a potential bushfire hazard and limiting access to the monitoring plots. Due to earthworks at RM1 natural regeneration was not occurring, but tree and shrub planting was evident. Tree planting was more advanced at the plot location than along the bund (Photo 1).

Native species cover and diversity varied across the plots but was generally lower at the rehabilitation monitoring plots, particularly in the canopy layer. General vegetation health was overall moderate to good, but generally lower at the rehabilitation monitoring plots. Weeds occur at most plots and have shown a slight increase in 2024. Plots with higher weeds include RM1, RM5 and CR1. Main problematic weeds were Serrated Tussock (see Photo 2), St John's Wort, African Lovegrass, Blackberry and Sweet Vernal Grass. The core riparian plot CR2 did not have a high cover of weeds within the plot but Serrated Tussock and Blackberry have been noted as highly abundant along the adjacent creek line.

No threatened or significant species were noted at the vegetation monitoring plots. Whilst estimates indicate that the Hoary Sunray was less abundant across the Holcim land than previous years, more detailed survey work confirmed the species remains present in good numbers. There were minimal signs of feral animals recorded at the site in 2024 including Rabbit/Hare (recorded at RM2), sheep and deer (at RM1).

Minor sheet erosion was noted at RM1, and minor bank erosion was recorded at CR1. Erosion was noted further along the amenity bund (Photo 3). There was no evidence of recent fire at any of the plots and fuel loads were moderate at BG1, BG2 and CR2. Sifton Bush may also present a fire hazard at RM2, RM3 and RM5.

Signs of human disturbance were minimal and included historic clearing and clearing for vehicle tracks. Signs of animal disturbance include wildlife grazing at most plots. No burrows or warrens were seen in the 2024 surveys.

Other site management noted include:

- St John's wort requires control around Jaorimin Creek areas.
- Erosion controls requiring ongoing maintenance at RM1 and CR2.
- Successfully established planting on western side of amenity bund at RM1, with recommendation for planting efforts to focus on other parts of the bund that have been less successful.

Photo 1: Less Advanced Amenity Bund Planting to the Southeast of the Plot

Photo 2: Serrated Tussock grass occurring around the active quarry at RM1

Photo 3: Erosion at Amenity Bund

3.4.2 Biodiversity Offset Area Observations

The areas of retained Box-Gum woodland vegetation within the BOA (i.e. 'Box-Gum Woodland (CEEC)' and 'Box-Gum Woodland derived Native Grassland (CEEC)' – see Figure 4) are generally in moderate to good condition and no immediate actions are necessary, other than spot control of high threat weeds, such as Serrated Tussock *Nassella trichotoma* and St John's Wort *Hypericum perforatum*. Due to a sharp increase in cover in 2024 the Sweet Vernal Grass *Anthoxanthum odoratum* should continue to be monitored carefully at BG2. Open areas in the west of the BOA that appear to have been historically cleared (previously identified as derived native grassland) are naturally

regenerating with *Eucalyptus* spp. and *Cassinia sifton* (see Photo 4). Evidence of planting was seen in the southeast of the BOA (Photo 5).

Other parts of the BOA were also generally in moderate to good condition, although control of high threat and priority weeds Serrated Tussock *Nassella trichotoma*, St John's Wort *Hypericum perforatum* and Blackberry *Rubus anglocandicans* is required as patches of these species occur particularly in the southeast portion of the BOA.

In 2023 there was a significant increase in the cover and abundance of Sifton Bush *Cassinia sifton*, particularly in disturbed open paddocks. However, a change in climatic conditions in 2024 appear to have eased the growth of this species. Although this species is native, in the Southern Tablelands it has become a weed of disturbed areas and degraded native pasture (DPI 2024). At present the Sifton Bush is outcompeting native species and may be contributing to a reduction in the Hoary Sunray population. Where covers do not show a natural reduction over time, a program of slashing or brush cutting involving minimal disturbance to soils and other native plants, as well as tree planting should be considered to reduce the cover of Sifton Bush.

No erosion was seen within the areas of the BOA that were inspected although erosion was seen along the southern edge of the BOA in previous surveys. Erosion inspections targeting areas of drainage should be undertaken by a qualified expert and erosion control measures implemented where required.

There were no other management issues noted at the BOA.

Photo 4: Regeneration in Box-Gum Woodland derived Native Grassland CEEC

Photo 5: Tree Plantings along eastern edge of southern BOA

4.0 Completion Criteria Assessment

An assessment of completion criteria from the RLMP is provided in Appendix E. The assessment determined the following:

- With respect to the amenity bund:
  - The relevant completion criteria are on track for vegetation establishment, groundcover protection, achievement of a sustainable ecosystem with trees.
- With respect to the HMA:
  - Two completion criteria were unable to be assessed, being the completion criteria in relation to fencing of the HMA and cattle exclusion.
  - Two are on track for completion, being nest box usage, as well as weed and feral pest control.
  - One is not met for natural regeneration.
- With respect to the core riparian corridors:
  - Two completion criteria are not met due to a lack revegetation and natural regeneration at CR1.
  - Two are on track for completion, being nest box usage, weed and feral pest control.
  - One could not be assessed (cattle exclusion).

5.0 Discussion and Recommendations

5.1 Vegetation Monitoring

5.1.1 Floristic Analysis

Floristic analysis against PCT classifications (DPE 2022) has shown that most plots correspond to PCT 3373 or PCT 3376 which are forms of the CEEC White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (TSC 2025, DCCEEW 2025b). It is recommended that comparison to PCTs is repeated at each monitoring event to ensure vegetation is representative of the correct PCT.

5.1.2 Rehabilitation monitoring sites

Rehabilitation monitoring sites have a low cover and diversity of trees, high cover of shrubs which significantly increased in 2023/2024 (due to Sifton Bush), low to moderate cover and diversity in the grass, forb, fern, and other layers. Natural regeneration is low, and weeds are low, but RM1 and RM5 may benefit from minor weed control. These areas are below benchmark for the respective PCT and may benefit from Sifton Bush control, followed by native tree planting. The total length of logs is low at most rehabilitation sites and log emplacement could be considered where feasible.

No threatened or significant species were recorded at the rehabilitation inspections. Feral animals recorded at the rehabilitation monitoring sites include sheep and deer. Erosion control requires ongoing maintenance at RM1. No recent fire was recorded, and fuel loads were thought to be low at all rehabilitation monitoring sites. Dense Sifton Bush was noted as a potential fuel source at RM2, RM3 and RM5.

Signs of human disturbance include past clearing and tracks. Signs of disturbance by animals include wildlife grazing. Weed control is required, particularly at RM1 and RM5. Tree plantings appear to have successfully established at RM1 and fencing is in good condition at the BOA (RM5).

Follow up actions for the rehabilitation sites include feral animal control, weed control, Sifton Bush control, native tree planting, log emplacement and erosion control.

5.1.3 Box-Gum Monitoring sites

There has been a slight decrease in canopy condition at Box-Gum monitoring sites, evidently due to storm damage, but shrub diversity and cover remain high, and grass, forb, fern, and other growth forms are stable. Natural regeneration is occurring, cover and abundance of natives is good, overall health is moderate to good and weed covers are low. Some cover and abundance scores are within benchmark.

No threatened or significant species, feral animals or erosion were recorded at the rehabilitation inspections. No evidence of recent fire was recorded, and fuel loads are moderate. Signs of disturbance are minor and include animal (Kangaroo/Wallaby) activity and light grazing. Fencing is in good condition at these sites. Overall, the vegetation integrity has remainder stable at the Box-Gum monitoring sites.

Follow up actions include minor weed control.

5.1.4 Core riparian sites

Native species richness and cover at the core riparian monitoring sites has remained largely stable over the monitoring period, and some structural layers are within benchmark.

However, tree cover and diversity at CR1 remains low and natural regeneration is minimal. Like the other monitoring locations, there has been a notable increase in the cover of the shrub layer since 2023, but this cover decreased at CR1 in 2024.

No threatened or significant species, or feral animals were recorded. Minor bank erosion was noted at CR1. No evidence of recent fire was recorded, and fuel loads are low to moderate. Signs of disturbance include past clearing and animal (Kangaroo/Wallaby and Wombat) activity and light grazing.

Follow up actions include weed control, native tree planting and erosion control.

5.2 Nest Box monitoring

Most nest boxes currently installed on site show evidence of usage (50 of 60), with 12 boxes occupied by live fauna. In regard to target species usage: the Squirrel Glider boxes were generally occupied by Sugar Gliders or their nesting materials; the Brushtail and Ringtail Possum boxes showed evidence of possum usage as well as birds (mostly Wood Duck); the bat boxes showed no evidence of usage; the Owlet Nightjar boxes all appeared to be used by gliders; and the Rosella boxes also showed evidence of glider usage. In relation to maintenance, one box requires pest removal, and one requires roof hinge repair.

Best practice for nest box installation includes painting the exterior of the box with a protective coat in order to extend the life of the box and durability against the elements. The interior of the box should never be painted and should be left as it is – raw untreated wood (Nest Box Australia, 2024). The boxes can be finished in either, oil (decking oil, linseed oil), varnish or paint. Nest Boxes Australia recommends a good quality exterior water-based paint such as Dulux Weathershield, or a water based decking oil such as Intergrain in a Merbau colour. Two to three coats is recommended to ensure that the box is protected for several years (Nest Box Australia, 2024).

The orientation is also crucial when installing the nest boxes. Microbats prefer a north to north-westerly aspect, while birds and mammals prefer the entrance of the nest box to face in an easterly direction, ranging from northeast to southeast. Furthermore, mammals such as gliders and possums tend to prefer a more closed or sheltered aspect (e.g. dense overhanging foliage), whereas birds prefer a more open aspect (fauNature 2011).

Nest box monitoring indicates a high rate of usage by native fauna and general good condition of most nest boxes. Removal of pests and ongoing monitoring of the boxes, particularly along Jaorimin Creek, is recommended to prevent further impacts on the native fauna using the boxes.

5.3 Hoary Sunray

The Hoary Sunray population across the Lynwood Quarry is in moderate health with a large population estimated; however, estimates are significantly lower than the previous estimate in 2020. This may be due to climatic conditions or competition with native shrubs. Most plots showed recent evidence of light grazing, as well as possible competition with surrounding native shrubs (*Cassinia sifton* and *Kunzea* sp.).

Populations of Hoary Sunray at HS4, HS5 and HS9 should be re-surveyed using parallel traverses next year and a remapping/map-refining exercise should be incorporated so that more accurate population estimates can be made. Additional survey sites could also be incorporated. A careful control program for Sifton Bush will likely also assist maintenance of the population of Hoary Sunray.

6.0 Conclusion and Actions Summary

The 2024 ecological monitoring of Holcim quarry has collected data with respect to:

- Progress of passive and active rehabilitation
- Usage and condition of nest boxes
- Counts and condition of populations of the Hoary Sunray

Overall, the vegetation was in moderate to good condition across the site, with two key management issues being (i) the abundance of high threat weeds and (ii) increased prevalence of the native shrub Sifton Bush. Rehabilitation areas require particular attention regarding Sifton Bush control, and it is recommended that a program of slashing/brush-cutting and/or ecological burn is considered, combined with native tree planting.

Four fauna pests have been identified for targeted management, being rabbit, cat, fox and deer. The Hoary Sunray population has appeared to be in decline over the past two surveys; however, a detailed survey indicates that good numbers remain. Further work is recommended to check status of population at larger patches (HS4, HS5 and HS9) in 2025.

Additional surveys recommended for 2025 include a follow-up Hoary Sunray survey, surveys of any additional nest boxes (on top of the original 50) and ongoing surveys of the amenity bund rehabilitation (RM1). Ecological monitoring should continue in accordance with the summary in Section 1.3. The next monitoring event would therefore be required in 2025 and will include:

- Nest box monitoring
- Rehabilitation monitoring at the:
  - Amenity bund (RM1)
  - HMA (RM2 and RM3)
  - BOA revegetation areas (RM5)
  - Core riparian area (CR1 and R2)
- Box-Gum woodland monitoring (BG1 and BG2)
- Hoary Sunray monitoring (HS4, HS5 and HS9).

In response to the findings of the 2024 ecological monitoring the recommended site management actions for 2025 include:

- Ongoing weed maintenance
- Sifton Bush control program in consultation with a local bush regeneration specialist
- Tree planting
- Targeted pest surveys and ongoing pest control
- Nest box maintenance
- Erosion control, particularly along creeks and drainage lines
- Consider bushfire management of large patches of forest in consultation with bushfire consultant with experience undertaking ecological burns

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Appendix A PCT Profile and Benchmark Data

Ecological and Rehabilitation Monitoring Report 2024

Lynwood Quarry, NSW

Holcim Australia Pty Ltd

SLR Project No.: 630.031740.00001

27 March 2025

Table A-1: PCT 3373 Goulburn Tableland Box-Gum Grassy Forest

Plant Community Type ID (PCT ID)	3373
VCA Type ID	0
PCT Name	Goulburn Tableland Box-Gum Grassy Forest
PCT Scientific Name	
Authority	Eastern NSW PCT Classification
Classification Type	Quantitative
Classification Confidence Level	High
Vegetation Formation	Grassy Woodlands;
Vegetation Class	Southern Tableland Grassy Woodlands;
Vegetation Description	A mid-high to tall dry sclerophyll grassy open forest to woodland of northern parts of the Southern Tablelands, occurring from Canberra and Queanbeyan north to Pejar and east to Durran Durra and Canyonleigh, with a northern outlier at Golspie. It is found in landscape positions with moderately deep soil profiles, particularly footslopes of gently undulating low hills, on a wide range of substrates including sedimentary (sandstone, arenite, greywacke, shale), acid volcanic (ignimbrite, rhyolite) and granitic rocks. This PCT is found at elevations of 600-850 metres asl with mean annual rainfall of 650-800 mm. Remnants of this community often have a long history of disturbance and the tree canopy may be sparse to very sparse, commonly including *Eucalyptus melliodora* and occasionally with *Eucalyptus macrorhyncha*, *Eucalyptus blakelyi* or *Eucalyptus dives*. A very sparse shrub stratum commonly includes scattered *Lissanthe strigosa*, *Pimelea curviflora*, *Melichrus urceolatus* or *Hibbertia obtusifolia*, while the ground layer is predominantly grassy and commonly includes *Themeda triandra*, *Microlaena stipoides*, *Poa sieberiana*, *Elymus scaber* and *Aristida ramosa*, with occasional high cover of *Rytidosperma laeve*. Common forbs include *Lomandra filiformis*, *Lomandra multiflora* subsp. *multiflora*, *Goodenia hederacea*, *Hydrocotyle laxiflora*, *Oxalis perennans*, *Chrysocephalum apiculatum*, *Tricoryne elatior*, *Gonocarpus tetragynus* and *Hypericum gramineum*. In lower landscape positions subject to cold air drainage this community may be replaced by PCT 3338, while on stony dry hills it commonly grades into PCT 3747.
Other Diagnostic Features	
IBRA Bioregion(s)	South Eastern Highlands;
IBRA Comments	
IBRA Sub-region(s)	Bungonia; Crookwell; Monaro; Murrumbateman;
NSW Landscape(s)	
LGA(s)	GOULBURN MULWAREE; QUEANBEYAN-PALERANG REGIONAL; UPPER LACHLAN SHIRE; YASS VALLEY;
Elevation Min(m)	615.2
Elevation Median(m)	698.5
Elevation Max(m)	839.5
Annual Rainfall Min(mm)	648
Annual Rainfall Median(mm)	698
Annual Rainfall Max(mm)	776
Annual Mean Temperature Min (deg.C)	11.28
Annual Mean Temperature Median(deg.C)	12.36

Annual Mean Temperature Max(deg.C)	13.18
Upper Stratum Species	
Mid Stratum Species	
Ground Stratum Species	
Diagnostic Species	
Emergent Species	
Tree Growth Form Group Species	*Eucalyptus melliodora , Eucalyptus macrorhyncha , Eucalyptus blakelyi , Eucalyptus dives , Eucalyptus mannifera , Eucalyptus bridgesiana , Acacia decurrens , Eucalyptus rubida , Eucalyptus rossii , Acacia dealbata , Acacia melanoxylon , Eucalyptus cinerea , Eucalyptus pauciflora , Allocasuarina littoralis , Eucalyptus amplifolia , Acacia parramattensis , Allocasuarina luehmannii , Eucalyptus tereticornis , Eucalyptus eugenioides , Eucalyptus goniocalyx , Eucalyptus polyanthemos , Eucalyptus radiata , Eucalyptus sclerophylla , Eucalyptus viminalis*
Shrub Growth Form Group Species	*Melichrus urceolatus , Lissanthe strigosa , Pimelea curviflora , Hibbertia obtusifolia , Bossiaea buxifolia , Dillwynia sericea , Brachyloma daphnoides , Astroloma humifusum , Cassinia sifton , Acacia genistifolia , Cassinia aculeata , Daviesia latifolia , Daviesia genistifolia , Acacia mearnsii , Acrotriche serrulata , Pultenaea procumbens , Indigofera australis , Pultenaea microphylla , Acacia deanei , Cryptandra amara , Daviesia mimosoides , Dillwynia phylicoides , Pultenaea subspicata , Acacia gunnii , Daviesia leptophylla , Exocarpos cupressiformis , Exocarpos strictus , Gompholobium huegelii , Leucopogon virgatus , Acacia rubida , Acacia ulicifolia , Cassinia longifolia , Daviesia ulicifolia , Hibbertia riparia , Leucopogon fraseri , Persoonia linearis , Rubus parvifolius , Acacia brownii , Acacia cognata , Acacia dawsonii , Acacia falciformis , Acacia implexa , Acacia paradoxa , Acacia terminalis , Calytrix tetragona , Cassinia laevis , Cassinia uncata , Grevillea lanigera , Hibbertia cistoidea , Kunzea parvifolia , Leptospermum continentale , Leptospermum myrtifolium , Leucopogon attenuatus , Leucopogon fletcheri , Leucopogon juniperinus , Olearia viscidula , Pimelea linifolia , Pomaderris andromedifolia , Pultenaea ferruginea , Rhytidosporum procumbens , Styphelia triflora*
Grass & Grass-like Growth Form Group Species	*Lomandra filiformis , Themeda triandra , Microlaena stipoides , Lomandra multiflora subsp. multiflora , Poa sieberiana , Elymus scaber , Aristida ramosa , Rytidosperma laeve , Austrostipa scabra , Dichelachne micrantha , Rytidosperma pallidum , Poa meionectes , Rytidosperma racemosum , Austrostipa densiflora , Echinopogon ovatus , Panicum effusum , Rytidosperma monticola , Luzula densiflora , Luzula flaccida , Rytidosperma tenuius , Schoenus apogon , Carex inversa , Lepidosperma laterale , Aristida jerichoensis , Juncus subsecundus , Rytidosperma pilosum , Austrostipa mollis , Aristida vagans , Echinopogon caespitosus , Juncus filicaulis , Lomandra longifolia , Poa labillardierei var. labillardierei , Rytidosperma auriculatum , Eragrostis benthamii , Lepidosperma gunnii , Rytidosperma caespitosum , Austrostipa rudis , Carex breviculmis , Chloris truncata , Dichelachne inaequiglumis , Dichelachne sieberiana , Eragrostis leptostachya , Juncus usitatus , Panicum simile , Rytidosperma penicillatum , Rytidosperma setaceum , Austrostipa pubinodis , Austrostipa semibarbata , Bothriochloa macra , Cynodon dactylon , Lomandra micrantha subsp. tuberculata , Lomandra obliqua , Rytidosperma carphoides , Rytidosperma erianthum , Rytidosperma nudiflorum*
Forb Growth Form Group Species	*Goodenia hederacea , Gonocarpus tetragynus , Hydrocotyle laxiflora , Hypericum gramineum , Chrysocephalum apiculatum , Oxalis perennans , Tricoryne elatior , Dianella revoluta , Bossiaea prostrata , Cymbonotus lawsonianus , Opercularia aspera , Einadia nutans , Hovea linearis , Wahlenbergia stricta , Solenogyne dominii , Galium gaudichaudii , Acaena echinata , Daucus glochidiatus , Microseris lanceolata , Stylidium graminifolium , Acaena ovina , Coronidium scorpioides , Crassula sieberiana , Leptorhynchos squamatus , Asperula conferta , Geranium solanderi , Laxmannia gracilis , Plantago gaudichaudii , Plantago varia , Ajuga australis , Calocephalus citreus , Opercularia hispida , Scleranthus biflorus , Bulbine bulbosa , Chrysocephalum semipapposum , Dichondra repens , Euchiton sphaericus , Rumex brownii , Veronica plebeia , Wahlenbergia communis , Wahlenbergia luteola , Acaena novae-zelandiae , Leucochrysum albicans , Opercularia diphylla , Plantago debilis , Senecio quadridentatus , Stackhousia monogyna , Wahlenbergia gracilis , Arthropodium fimbriatum , Brachyscome ciliaris , Eryngium ovinum , Hackelia suaveolens , Oxalis exilis , Vittadinia muelleri , Wahlenbergia graniticola , Asperula scoparia , Craspedia variabilis , Dianella longifolia , Drosera peltata , Euchiton involucratus , Euchiton japonicus , Poranthera microphylla , Sebaea ovata , Senecio prenanthoides , Thysanotus tuberosus , Veronica calycina , Viola betonicifolia , Vittadinia cuneata , Brachyscome rigidula , Caladenia carnea , Eriochilus cucullatus , Goodenia pinnatifida , Haloragis heterophylla , Lagenophora stipitata , Microtis unifolia , Oreomyrrhis eriopoda , Podolepis jaceoides , Pterostylis reflexa , Senecio tenuiflorus , Swainsona sericea , Triptilodiscus pygmaeus , Velleia paradoxa , Arthropodium minus , Arthropodium strictum , Asperula ambleia , Burchardia umbellata , Caesia parviflora , Caladenia tentaculata , Calotis anthemoides , Calotis scabiosifolia , Cynoglossum australe , Dianella caerulea , Diuris sulphurea , Dysphania pumilio , Einadia hastata ,*

	Galium ciliare , Geranium retrorsum , Helichrysum rutidolepis , Hydrocotyle sibthorpioides , Isoetopsis graminifolia , Lagenophora gracilis , Mitrasacme serpyllifolia , Oxalis chnoodes , Oxalis radicosa , Plantago hispida , Pterostylis nana , Pterostylis truncata , Ranunculus lappaceus , Scleranthus diander , Senecio diaschides , Solenogyne gunnii , Stypandra glauca , Thelymitra circumsepta , Trachymene incisa subsp. incisa , Wahlenbergia littoricola , Wahlenbergia multicaulis , Xerochrysum bracteatum , Xerochrysum viscosum
Fern Growth Form Group Species	*Cheilanthes sieberi subsp. sieberi , Cheilanthes austrotenuifolia*
Other Growth Form Group Species	*Hardenbergia violacea , Glycine clandestina , Desmodium varians , Thysanotus patersonii , Glycine tabacina , Billardiera scandens , Convolvulus angustissimus , Amyema miquelii , Cassytha pubescens , Convolvulus erubescens , Muellerina eucalyptoides*
Median Native Species Richness per plot	37
Height Class (Walker & Hopkins 1990)	
Variation And Natural Disturbance	
Fire Regime	
Landscape Position	
Lithology	
Landform Pattern	
Landform Element	
Is PCT Derived?	
PCT derived from these communities	
PCT derived community comments	
Pre-European Extent	45446
Pre-European Extent Accuracy	
Pre-European Comments	Calculated from State Vegetation Type Map (SVTM) pre-clearing PCT map C1.1.M1 and Inland Multinomial Modelling. Values rounded to nearest hectare.
Current Extent	3589
Current Extent Accuracy	
Current Extent Comments	Calculated from State Vegetation Type Map (SVTM) extant PCT map C1.1.M1 and Inland Multinomial Modelling. Values rounded to nearest hectare.
PCT Percent Cleared	92.1
% accuracy (of PCT % cleared estimate)	
PCT Percent Cleared Comments	Calculated from State Vegetation Type Map (SVTM) pre-clearing and extant PCT maps C1.1.M1 and Inland Multinomial Modelling. Values are condition weighted SVTM % cleared estimates (see DPE 2022 Eastern NSW PCT % Cleared Calculation Technical notes). There may be a discrepancy between the calculated % cleared values and displayed values due to rounding.
PCT associated with TEC	Has associated TEC
TEC List	Listed BC Act,CE: White Box - Yellow Box - Blakelyâ€™s Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (Part) ; Listed EPBC Act,CE: White Box-Yellow Box-Blakelyâ€™s Red Gum Grassy Woodland and Derived Native Grassland (Part) ;
TEC Comments	(Comment TEC1) Relates to the NSW White Box - Yellow Box - Blakelyâ€™s Red Gum Grassy Woodland TEC. (Comment TEC2) May relate to the Commonwealth White Box-Yellow Box-

	Blakelyâ€™s Red Gum Grassy Woodland TEC where it meets condition criteria as per section 4 of the Listing Advice.
Adequacy of plot sampling	None
Total Number of Replicates	85
Number of Primary Replicates	56
Number of Secondary Replicates	29
Pre-European Mapped Or Modelled	
Current Extent Mapped Or Modelled	
Classification source	
Citations	Connolly, D. et al., in prep.
Full Reference Details	Connolly, D., Binns, D., Turner, K., Hager, T., Lyons, M., Magarey, E. (in prep.) A revised classification of Plant Community Types for eastern New South Wales. NSW DPIE, Parramatta;
Profile Source	R4.145;
PCT Definition Status	Approved

Table A-2: Default Benchmark Data PCT 3373

Plant Community Type ID(PCT ID)	3373
Classification Confidence Level	High
PCT Name	Goulburn Tableland Box-Gum Grassy Forest
PCT Scientific Name	
Vegetation Class	Southern Tableland Grassy Woodlands
Vegetation Formation	Grassy Woodlands
IBRA Bioregion Code	SEH
IBRA Bioregion(s)	South Eastern Highlands
Benchmark Calculation Level	Class/IBRA
PCT Benchmark Variation	monthly average, following AVERAGE RAINFALL year
Rainfall Threshold	560 - 846
Default Benchmark Condition	Yes
Tree richness	4
Shrub richness	7
Grass & grass - like richness	9
Forb richness	16
Fern richness	1
Other richness	2
Tree cover	26
Shrub cover	5
Grass & grass - like cover	35
Forb cover	9
Fern cover	0
Other cover	0
No.of large trees(per 0.1ha)	50
Litter cover	45
Total length of fallen logs	3
Large Tree Threshold Size	50
PCT Benchmarks Comments	Composition-Structure Benchmark : Class/IBRA | Function: Logs-Class; Litter-Class; Large Trees-Formation
PCT Benchmarks Reference Site	
Benchmark source	Multiple methods
Benchmark Confidence	Composition: High | Structure: Moderate | Function: Logs-Moderate; Litter-Moderate; Large Trees-Moderate
PCT Benchmark Status	Approved
PCT Definition Status	Approved

Table A-3: PCT 3376 Southern Tableland Grassy Box Woodland

Plant Community Type ID (PCT ID)	3376
VCA Type ID	0
PCT Name	Southern Tableland Grassy Box Woodland
PCT Scientific Name	
Authority	Eastern NSW PCT Classification
Classification Type	Quantitative
Classification Confidence Level	Medium
Vegetation Formation	Grassy Woodlands;
Vegetation Class	Southern Tableland Grassy Woodlands;
Vegetation Description	A tall sclerophyll woodland with a dry shrub layer that is patchy to absent and a mid-dense, grassy groundcover, widespread in the low hills of the drier parts of the Southern Tablelands between Bredbo and Rylstone. The canopy almost always includes Box eucalypts (*Eucalyptus melliodora* or *Eucalyptus bridgesiana*), occasionally associated with *Eucalyptus blakelyi* which may be locally prominent in lower parts of the landscape. The shrub layer is sparse to absent with occasional, scattered *Melichrus urceolatus*, *Lissanthe strigosa* or various Acacia species. The mid-dense ground layer typically includes grasses, forbs, graminoids and some twiners, very frequently including *Hydrocotyle laxiflora*, *Austrostipa scabra*, *Lomandra filiformis*, *Microlaena stipoides* and *Elymus scaber*. The PCT primarily occurs in the Bredbo, Canberra, Goulburn and Boorowa areas, with more scattered occurrences extending north to Bathurst, Orange and Rylstone. It occurs on granite, volcanic and sedimentary substrates in cold, dry environments with a mean annual rainfall typically below 760 mm. While widespread, this PCT primarily occurs in small, often disturbed patches with a long history of grazing. It is not closely related floristically to nearby PCTs, however it grades into PCT 3373 which has a more diverse shrub layer and some subtle differences in canopy species. *Eucalyptus macrorhyncha*, *Eucalyptus dives*, *Bossiaea buxifolia*, *Dillwynia sericea* and *Brachyloma daphnoides* are only occasional in PCT 3373 however collectively represent a suite of species that are rare in this PCT. In the Boorowa area, PCT 3376 grades into PCT 3400 which are both grassy woodlands featuring *Eucalyptus melliodora* and *Eucalyptus blakelyi*. This represents the transition from the colder environment of the tablelands (PCT 3376) to the woodlands of the lower elevation, warmer climate of the South-west Slopes (PCT 3400).
Other Diagnostic Features	
IBRA Bioregion(s)	NSW South Western Slopes; South East Corner; South Eastern Highlands; Sydney Basin;
IBRA Comments	
IBRA Sub-region(s)	Capertee Valley; Inland Slopes; South East Coastal Ranges; Bathurst; Bondo; Bungonia; Crookwell; Hill End; Monaro; Murrumbateman; Oberon; Orange; Wollemi;
NSW Landscape(s)	
LGA(s)	BATHURST REGIONAL; BLAYNEY; CABONNE; GOULBURN MULWAREE; HILLTOPS; LITHGOW CITY; MID-WESTERN REGIONAL; QUEANBEYAN-PALERANG REGIONAL; SNOWY MONARO REGIONAL; SNOWY VALLEYS; UPPER LACHLAN SHIRE; YASS VALLEY;
Elevation Min(m)	311.9
Elevation Median(m)	684.1
Elevation Max(m)	1028.1
Annual Rainfall Min(mm)	574
Annual Rainfall Median(mm)	687
Annual Rainfall Max(mm)	918
Annual Mean Temperature Min (deg.C)	10.55

Annual Mean Temperature Median(deg.C)	12.44
Annual Mean Temperature Max(deg.C)	14.06
Upper Stratum Species	
Mid Stratum Species	
Ground Stratum Species	
Diagnostic Species	
Emergent Species	
Tree Growth Form Group Species	*Eucalyptus melliodora , Eucalyptus blakelyi , Eucalyptus bridgesiana , Eucalyptus rossii , Acacia dealbata , Eucalyptus macrorhyncha , Eucalyptus mannifera , Eucalyptus rubida , Allocasuarina verticillata , Eucalyptus dives , Eucalyptus polyanthemos , Brachychiton populneus , Eucalyptus nortonii , Eucalyptus pauciflora , Eucalyptus tereticornis , Acacia decurrens , Acacia parramattensis , Allocasuarina littoralis , Eucalyptus amplifolia , Callitris endlicheri , Eucalyptus albens , Eucalyptus camaldulensis , Eucalyptus cinerea , Eucalyptus dalrympleana , Eucalyptus sieberi , Eucalyptus viminalis*
Shrub Growth Form Group Species	*Melichrus urceolatus , Lissanthe strigosa , Pimelea curviflora , Hibbertia obtusifolia , Bossiaea buxifolia , Cassinia sifton , Astroloma humifusum , Cryptandra amara , Dillwynia sericea , Acacia implexa , Acrotriche serrulata , Cassinia longifolia , Pultenaea microphylla , Acacia genistifolia , Cassinia quinquefaria , Acacia mearnsii , Daviesia genistifolia , Daviesia ulicifolia , Dodonaea viscosa , Exocarpos cupressiformis , Kunzea ericoides , Acacia deanei , Acacia rubida , Brachyloma daphnoides , Bursaria spinosa , Cassinia aculeata , Pultenaea procumbens , Rubus parvifolius , Acacia falciformis , Cassinia laevis , Daviesia leptophylla , Hibbertia riparia , Indigofera australis , Leucopogon fletcheri , Styphelia triflora , Acacia cardiophylla , Acacia dawsonii , Acacia paradoxa , Acacia ulicifolia , Acacia vestita , Calytrix tetragona , Cheiranthera linearis , Daviesia acicularis , Daviesia latifolia , Daviesia mimosoides , Dillwynia phylicoides , Hibbertia cistoidea , Hibbertia monogyna , Indigofera adesmiifolia , Leucopogon neoanglicus , Monotoca scoparia , Pultenaea ferruginea , Pultenaea subspicata , Pultenaea villosa , Rhytidosporum procumbens , Solanum linearifolium*
Grass & Grass-like Growth Form Group Species	*Austrostipa scabra , Lomandra filiformis , Microlaena stipoides , Elymus scaber , Themeda triandra , Bothriochloa macra , Panicum effusum , Poa sieberiana , Rytidosperma racemosum , Carex inversa , Aristida ramosa , Lomandra multiflora subsp. multiflora , Rytidosperma carphoides , Schoenus apogon , Juncus filicaulis , Austrostipa bigeniculata , Austrostipa densiflora , Rytidosperma auriculatum , Rytidosperma pilosum , Dichelachne micrantha , Luzula densiflora , Rytidosperma laeve , Chloris truncata , Poa labillardierei var. labillardierei , Rytidosperma erianthum , Rytidosperma pallidum , Carex breviculmis , Rytidosperma caespitosum , Enneapogon nigricans , Eragrostis benthamii , Juncus subsecundus , Aristida jerichoensis , Lepidosperma laterale , Poa meionectes , Rytidosperma monticola , Carex appressa , Cymbopogon refractus , Cynodon dactylon , Lomandra bracteata , Lomandra longifolia , Rytidosperma setaceum , Sorghum leiocladum , Austrostipa rudis , Dichelachne sieberiana , Eragrostis brownii , Eragrostis leptostachya , Rytidosperma penicillatum , Rytidosperma tenuius , Sporobolus creber , Aristida vagans , Austrostipa mollis , Bothriochloa decipiens var. decipiens , Dichanthium sericeum , Dichelachne crinita , Dichelachne rara , Digitaria brownii , Echinopogon ovatus , Eragrostis parviflora , Juncus homalocaulis , Lachnagrostis filiformis , Luzula flaccida , Rytidosperma bipartitum , Rytidosperma fulvum , Aristida behriana , Austrostipa gibbosa , Austrostipa setacea , Carex tereticaulis , Cyperus gracilis , Deyeuxia quadriseta , Dichanthium tenue , Dichelachne hirtella , Dichelachne inaequiglumis , Dichelachne parva , Eragrostis elongata , Eragrostis trachycarpa , Isolepis cernua , Juncus gregiflorus , Juncus usitatus , Luzula meridionalis , Luzula ovata , Sporobolus elongatus , Tricostularia pauciflora , Typha domingensis*
Forb Growth Form Group Species	*Hydrocotyle laxiflora , Oxalis perennans , Chrysocephalum apiculatum , Gonocarpus tetragynus , Acaena ovina , Rumex brownii , Solenogyne dominii , Tricoryne elatior , Cymbonotus lawsonianus , Hypericum gramineum , Crassula sieberiana , Geranium solanderi , Einadia nutans , Asperula conferta , Plantago varia , Triptilodiscus pygmaeus , Goodenia hederacea , Wahlenbergia communis , Vittadinia muelleri , Euchiton involucratus , Dichondra repens , Bulbine bulbosa , Daucus glochidiatus , Leptorhynchos squamatus , Vittadinia cuneata , Plantago gaudichaudii , Senecio quadridentatus , Wahlenbergia stricta , Eryngium ovinum , Acaena echinata , Arthropodium minus , Wahlenbergia gracilis , Euchiton sphaericus , Arthropodium fimbriatum , Bossiaea prostrata , Chrysocephalum semipapposum , Cotula australis , Goodenia pinnatifida , Microtis unifolia , Oxalis radicosa , Calocephalus citreus , Galium gaudichaudii , Scleranthus biflorus , Hackelia suaveolens , Dianella longifolia , Dianella revoluta , Drosera peltata , Euphorbia drummondii , Haloragis heterophylla , Leucochrysum albicans , Stackhousia monogyna ,*

	Xerochrysum viscosum , Veronica calycina , Veronica plebeia , Ajuga australis , Euchiton japonicus , Opercularia aspera , Opercularia diphylla , Oxalis exilis , Wahlenbergia luteola , Laxmannia gracilis , Lythrum hyssopifolia , Microseris lanceolata , Oreomyrrhis eriopoda , Sebaea ovata , Aphanes australiana , Burchardia umbellata , Dysphania pumilio , Epilobium billardierianum , Euphorbia dallachyana , Geranium retrorsum , Scleranthus diander , Thelymitra circumsepta , Wahlenbergia graniticola , Brachyscome rigidula , Calotis lappulacea , Cynoglossum australe , Plantago hispida , Ranunculus lappaceus , Solenogyne gunnii , Stuartina muelleri , Swainsona sericea , Vittadinia gracilis , Acaena novae-zelandiae , Alternanthera nana , Erodium crinitum , Hypoxis hygrometrica , Isoetopsis graminifolia , Oxytes brachypoda , Thysanotus tuberosus , Ammobium craspedioides , Arthropodium milleflorum , Calotis anthemoides , Calotis scabiosifolia , Coronidium scorpioides , Craspedia variabilis , Einadia hastata , Hovea linearis , Lagenophora gracilis , Microtis parviflora , Opercularia hispida , Plantago debilis , Podolepis jaceoides , Pterostylis mutica , Pterostylis nana , Stellaria pungens , Thelymitra pauciflora , Viola betonicifolia , Wahlenbergia multicaulis , Zornia dyctiocarpa var. dyctiocarpa , Alternanthera sp. A , Arthropodium strictum , Brachyscome angustifolia , Brachyscome ciliaris , Brachyscome multifida , Brachyscome ptychocarpa , Caesia parviflora , Caladenia tentaculata , Centipeda cunninghamii , Cymbonotus preissianus , Desmodium rhytidophyllum , Diuris sulphurea , Einadia trigonos , Galium ciliare , Galium leiocarpum , Gnaphalium indutum , Goodenia elongata , Hydrocotyle algida , Hydrocotyle foveolata , Isotoma axillaris , Lepidium pseudohyssopifolium , Mentha diemenica , Myriophyllum crispatum , Polygala japonica , Poranthera microphylla , Portulaca oleracea , Ranunculus pumilio , Rumex dumosus , Rutidosis leptorrhynchoides , Scutellaria humilis , Senecio diaschides , Senecio prenanthoides , Senecio tenuiflorus , Solanum pungetium , Spiranthes australis , Swainsona monticola , Urtica incisa , Velleia paradoxa , Vittadinia triloba , Wahlenbergia gracilenta , Xerochrysum bracteatum
Fern Growth Form Group Species	*Cheilanthes sieberi subsp. sieberi , Cheilanthes austrotenuifolia , Ophioglossum lusitanicum , Asplenium flabellifolium*
Other Growth Form Group Species	*Desmodium varians , Glycine tabacina , Convolvulus erubescens , Glycine clandestina , Convolvulus angustissimus , Clematis microphylla , Kennedia prostrata , Amyema pendula , Amyema miquelii , Thysanotus patersonii , Hardenbergia violacea , Glycine microphylla , Xanthorrhoea concava*
Median Native Species Richness per plot	34
Height Class (Walker & Hopkins 1990)	
Variation And Natural Disturbance	
Fire Regime	
Landscape Position	
Lithology	
Landform Pattern	
Landform Element	
Is PCT Derived?	
PCT derived from these communities	
PCT derived community comments	
Pre-European Extent	452899
Pre-European Extent Accuracy	
Pre-European Comments	Calculated from State Vegetation Type Map (SVTM) pre-clearing PCT map C1.1.M1 and Inland Multinomial Modelling. Values rounded to nearest hectare.
Current Extent	31900
Current Extent Accuracy	
Current Extent Comments	Calculated from State Vegetation Type Map (SVTM) extant PCT map C1.1.M1 and Inland Multinomial Modelling. Values rounded to nearest hectare.

PCT Percent Cleared	92.96
% accuracy (of PCT % cleared estimate)	
PCT Percent Cleared Comments	Calculated from State Vegetation Type Map (SVTM) pre-clearing and extant PCT maps C1.1.M1 and Inland Multinomial Modelling. Values are condition weighted SVTM % cleared estimates (see DPE 2022 Eastern NSW PCT % Cleared Calculation Technical notes). There may be a discrepancy between the calculated % cleared values and displayed values due to rounding.
PCT associated with TEC	Has associated TEC
TEC List	Listed BC Act,CE: White Box - Yellow Box - Blakelyâ€™s Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (Part) ; Listed EPBC Act,CE: White Box-Yellow Box-Blakelyâ€™s Red Gum Grassy Woodland and Derived Native Grassland (Part) ;
TEC Comments	(Comment TEC1) Relates to the NSW White Box - Yellow Box - Blakelyâ€™s Red Gum Grassy Woodland TEC. (Comment TEC2) May relate to the Commonwealth White Box-Yellow Box-Blakelyâ€™s Red Gum Grassy Woodland TEC where it meets condition criteria as per section 4 of the Listing Advice.
Adequacy of plot sampling	None
Total Number of Replicates	187
Number of Primary Replicates	110
Number of Secondary Replicates	77
Pre-European Mapped Or Modelled	
Current Extent Mapped Or Modelled	
Classification source	
Citations	Connolly, D. et al., in prep.
Full Reference Details	Connolly, D., Binns, D., Turner, K., Hager, T., Lyons, M., Magarey, E. (in prep.) A revised classification of Plant Community Types for eastern New South Wales. NSW DPIE, Parramatta;
Profile Source	R6.97;
PCT Definition Status	Approved

Table A-4: Default Benchmark Data PCT 3376

Plant Community Type ID(PCT ID)	3376
Classification Confidence Level	Medium
PCT Name	Southern Tableland Grassy Box Woodland
PCT Scientific Name	
Vegetation Class	Southern Tableland Grassy Woodlands
Vegetation Formation	Grassy Woodlands
IBRA Bioregion Code	SEH
IBRA Bioregion(s)	South Eastern Highlands
Benchmark Calculation Level	Class/IBRA
PCT Benchmark Variation	monthly average, following AVERAGE RAINFALL year
Rainfall Threshold	560 - 846
Default Benchmark Condition	Yes
Tree richness	4
Shrub richness	7
Grass & grass - like richness	9
Forb richness	16
Fern richness	1
Other richness	2
Tree cover	26
Shrub cover	5
Grass & grass - like cover	35
Forb cover	9
Fern cover	0
Other cover	0
No.of large trees(per 0.1ha)	50
Litter cover	45
Total length of fallen logs	3
Large Tree Threshold Size	50
PCT Benchmarks Comments	Composition-Structure Benchmark : Class/IBRA | Function: Logs-Class; Litter-Class; Large Trees-Formation
PCT Benchmarks Reference Site	
Benchmark source	Multiple methods
Benchmark Confidence	Composition: High | Structure: Moderate | Function: Logs-Moderate; Litter-Moderate; Large Trees-Moderate
PCT Benchmark Status	Approved
PCT Definition Status	Approved

Appendix B Monitoring Plot Data

Ecological and Rehabilitation Monitoring Report 2024

Lynwood Quarry, NSW

Holcim Australia Pty Ltd

SLR Project No.: 630.031740.00001

27 March 2025

Table B-1: Photo data for 2024

Site	Start Transect	End Transect
RM1		
RM2		
RM3		

Site	Start Transect	End Transect
RM5		
BG1		
BG2		

Site	Start Transect	End Transect
CR1		
CR2		

Table B-2: Flora cover data for 2024

GF/ HTW	Scientific Name	RM1	RM2	RM3	RM5	BG1	BG2	CR1	CR2
Tree	*Acacia dawsonii*	0.5	0	0	0	0	0	0	0
Tree	*Acacia decurrens*	0	0	0	0	0	0	0	5
Shrub	*Acacia mearnsii*	40	0	0	0	0	0	0	0
Tree	*Acacia melanoxylon*	2	0	0	0	0	0	0	0
Tree	*Acacia parramattensis*	0	0	0	0	0	0	2	5
Non-HTE	*Aira caryophyllea*	0	0	0	0	0	0.1	0	0
Non-HTE	*Aira cupaniana*	0	0.1	0	0.1	0	0	0	0
Tree	*Allocasuarina littoralis*	0	0	0	0	0	1	0	3
Other	*Amyema miquelii*	0	0	0	0	0	0	0	0.1
Non-HTE	*Anthoxanthum odoratum*	20	0	0	60	0	30	0	1
Grass & grasslike	*Aristida vagans*	0	10	0	0	0	0	0	0
Shrub	*Astroloma humifusum*	0	0.3	0	0	0	0	0	0
Grass & grasslike	*Austrostipa densiflora*	0	3	0	0	10	0.1	0	0
Grass & grasslike	*Austrostipa pubescens*	0	1	0	0	0	0	0	0

GF/ HTW	Scientific Name	RM1	RM2	RM3	RM5	BG1	BG2	CR1	CR2
Grass & grasslike	*Austrostipa scabra subsp. falcata*	0	0	0	0	10	0.1	0	0
Non-HTE	*Avena fatua*	0	0	0	0	0	0	1	0
Non-HTE	*Briza minor*	0	5	0	0	0.1	0.1	0	0
HTE	*Bromus diandrus*	0.5	0	0	0	0	0	0	0
Grass & grasslike	*Carex appressa*	0	0	0	0	0	0	0	0.1
Grass & grasslike	*Carex inversa*	0	0	0	0	0	0	0	0.1
Shrub	*Cassinia aculeata*	0	0.1	0	0	0	25	0	0.2
Shrub	*Cassinia sifton*	0	30	15	45	15	25	2	35
Non-HTE	*Centaurium erythraea*	0	0.1	1	0.1	0.2	0.1	0	0
Non-HTE	*Cerastium glomeratum*	0	0	0	0	0	0	0	0.2
Fern	*Cheilanthes sieberi*	0	2	0	0.1	0.1	0	0	0
Grass & grasslike	*Chloris ventricosa*	0.1	0	0	0	0	0	0	0
Forb	*Chrysocephalum apiculatum*	0	0.1	0	0	0	0	0	0
Non-HTE	*Cirsium vulgare*	0.1	0	0	0	0.3	0	0.1	0.2
Non-HTE	*Conyza bonariensis*	0.1	0	0	0	0.1	0	0.1	0.1
Forb	*Cotula australis*	0	0	0	0	0.1	0	0	0
Grass & grasslike	*Cymbopogon refractus*	0.1	0	0	0	0	0	0	0
Grass & grasslike	*Cynodon dactylon*	0.2	0	0	0	0	0	0	0.1
Non-HTE	*Cyperus congestus*	0	0	0	0	0.1	0	5	0.1
Non-HTE	*Echium plantagineum*	0	0	0	0	0	0	0	0.1
Forb	*Einadia trigonos*	0	0	0	0	0.1	0	0	0.1
Non-HTE	*Eleusine tristachya*	0.1	0	0	0	0	0	0	0
Grass & grasslike	*Elymus scaber*	0	0	0	0	5	0	0	0
Grass & grasslike	*Eragrostis benthamii*	0	0	1	1	0	0	0	0
Grass & grasslike	*Eragrostis leptostachya*	0	5	0	0	0	0	0	0
Grass & grasslike	*Eriochloa pseudoacrotricha*	0.1	0	0	0	0	0	0	0
Forb	*Erodium crinitum*	0.1	0	0	0	0	0	0	0
Tree	*Eucalyptus agglomerata*	0	0	0	0	0	15	0	0
Tree	*Eucalyptus blakelyi*	3	0	0	0	10	10	0	20
Tree	*Eucalyptus bridgesiana*	2	0	0	0	0	0	0	0
Tree	*Eucalyptus cinerea*	0	0	0	0	0	1	0	0
Tree	*Eucalyptus macrorhyncha*	0	0	0	0	0	1	0	0
Tree	*Eucalyptus sieberi*	0.5	0	0	0	0	0	0	0
Forb	*Euchiton involucratus*	0	1	0	0	0	0	0	0
Forb	*Euchiton japonicus*	0	0	0	0	0	0	0	0.1
Forb	*Euchiton sphaericus*	0	0	0.1	0	0	0	0	0
Non-HTE	*Gamochaeta coarctata*	0	0	2	0	0	0	0	0
Non-HTE	*Gamochaeta purpurea*	0	0.1	0	0	0	0	0	0
Forb	*Geranium solanderi*	0.1	0	0	0	0	0	1	0.1
Forb	*Gonocarpus tetragynus*	0	5	0	1	0	20	0	0
Forb	*Goodenia hederacea*	0	1	0	0	0	5	0	0

GF/ HTW	Scientific Name	RM1	RM2	RM3	RM5	BG1	BG2	CR1	CR2
Forb	*Haloragis hetrophylla*	0	0	0	0.5	0	0	0.2	0
Non-HTE	*Hirschfeldia incana*	0	0	0	0	0.1	0	0	0
Non-HTE	*Holcus lanatus*	0	0	40	0	2	0	20	0.1
Forb	*Hydrocotyle sibthorpioides*	0	0	0	5	1	0	0	1
Forb	*Hypericum gramineum*	0	1	0	0.1	0.1	0	0	0
HTE	*Hypericum perforatum*	0	0	0.1	0	0	0	0	0
Non-HTE	*Hypochaeris radicata*	0.1	0.5	0.5	2	0	1	0.1	0.1
Forb	*Isotoma fluviatilis*	0	0	0	1	0	0	0	0
Grass & grasslike	*Juncus homalocaulis*	0	0	0	0	0	0	0	0.1
Grass & grasslike	*Juncus usitatus*	0	0	10	1	1	1	15	1
Shrub	*Kunzea parvifolia*	0	0.1	0	0.1	0	0	0	0
Grass & grasslike	*Lachnagrostis filiformis*	0	0	0	0	0	0	0.1	0
Forb	*Laxmannia gracilis*	0	0	0	0	0.1	0	0	0
Shrub	*Lissanthe strigosa*	0	0	0	0	2	0	0.2	0
Non-HTE	*Lolium perenne*	3	0	0	0	0	0	0	0
Grass & grasslike	*Lomandra confertifolia*	0	0	0	0	0	2	0	0
Grass & grasslike	*Lomandra multiflora*	0	0	0	0	1	0.1	0	0
Non-HTE	*Lysimachia arvensis*	0	0	0	0	0	0	0	0.1
Grass & grasslike	*Microlaena stipoides*	0	2	1	5	10	1	0	50
Forb	*Microtis unifolia*	0	0.1	0	0	0	0	0	0
Non-HTE	*Modiola caroliniana*	0.3	0	0	0	0	0	0	0
HTE	*Nassella trichotoma*	10	3	0	0	4	0	0.2	5
Shrub	*Olearia phlogopappa*	0	0	0	0	0	0	0	0.1
Shrub	*Olearia viscidula*	0	0	0	0	0	0	0	1
Forb	*Opercularia diphylla*	0	0	0	0	0.1	0	0	0
Forb	*Oxalis radicosa*	0	0	0	0	0	0	0	0.1
Non-HTE	*Paronychia brasiliana*	0.1	0	0	0	0.1	0	0	0.1
HTE	*Paspalum dilatatum*	0	0	0	0	0	0	1	0
Non-HTE	*Petrorhagia dubia*	0	0	0	0	0	0	0	0.1
Non-HTE	*Petrorhagia nanteuilii*	0	0	0	0	0.2	0	0	0
Non-HTE	*Phalaris aquatica*	0.1	0	0	0	0	0	20	0
Forb	*Plantago gaudichaudii*	0	0	0	0	0.1	0	0	0
Non-HTE	*Plantago lanceolata*	0.2	0	0.1	0	0.5	0	1	0.1
Non-HTE	*Polygonum aviculare*	0.1	0	0	0	0	0	0	0
HTE	*Rubus anglocandicans*	0	0.2	0	0	0.1	0	4	10
HTE	*Rumex acetosella*	5	0	0.2	0.1	1	0	1	1
Non-HTE	*Rumex crispus*	0	0	0	0	0	0	2	0
Grass & grasslike	*Rytidosperma fulvum*	0	0.1	0	0	0	1	0	0
Grass & grasslike	*Rytidosperma racemosum*	0	0	0	0	0	0	0	2
Grass & grasslike	*Rytidosperma tenuius*	0.1	0	0	0	0	0	0	0
Non-HTE	*Solanum chenopodioides*	0	0	0	0	0	0	0	0.1

GF/ HTW	Scientific Name	RM1	RM2	RM3	RM5	BG1	BG2	CR1	CR2
Non-HTE	*Solanum nigrum*	0.1	0	0	0	0	0	0	0
Non-HTE	*Sonchus asper*	0	0	0	0	0	0	0.1	0
Non-HTE	*Sonchus olearceus*	0	0	0	0	0	0	0	0.1
Forb	*Stypandra glauca*	0	0	0	0	0	0.1	0	0
Forb	*Tricoryne elatior*	0	0	0	0	0.1	0	0	0
Non-HTE	*Trifolium arvense*	0	0	0	0	0.1	0	0	0
Non-HTE	*Trifolium subterraneum*	0.1	0	0	0	0	0	0	0
Non-HTE	*Verbena bonariensis*	0	0	0	0	0	0	0	0.1
Forb	*Veronica plebeia*	0	0	0	0	0.1	0.1	0	0.1
Non-HTE	*Vulpia bromoides*	10	0	3	0	3	0	0	0.1
Non-HTE	*Vulpia myuros*	0	2	0	0	0	0	0	0
Forb	*Wahlenbergia communis*	0	0	0	0	0.1	0	0	0
Forb	*Wahlenbergia gracilis*	0.1	0.1	0.1	0.1	0.1	0	0	0
Forb	*Wahlenbergia gracilis*	0.1	0.1	0.1	0.1	0.1	0	0	0

Table B-3: Tree stem data for 2024

DBH (cm)	RM1	RM2	RM3	RM5	BG1	BG2	CR1	CR2
>80	0	0	0	0	0	0	0	1
50 to 79	0	0	0	0	1	0	0	3
30 to 49	0	0	0	0	2	1	0	4
20 to 29	0	0	0	0	2	0	1	8
10 to 19	0	0	0	0	0	14	0	4
5 to 9	0	0	0	0	2	16	0	3
Tree stem <5cm DBH	16	1	1	0	2	43	0	8
No Large Trees (>50cm DBH)	0	0	0	0	1	0	0	4

Table B-4: Litter data for 2024

Transect interval	RM1	RM2	RM3	RM5	BG1	BG2	CR1	CR2
Litter cover (%) at 5m	50	70	50	75	85	85	60	35
Litter cover (%) at 15m	60	70	40	70	80	80	70	45
Litter cover (%) at 25m	50	50	65	70	75	95	70	35
Litter cover (%) at 35m	70	50	60	70	80	50	50	75
Litter cover (%) at 45m	25	75	45	60	50	70	75	70
Average Litter cover (%)	51	53	52	69	74	76	65	52

Table B-5: Log length data for 2024

	RM1	RM2	RM3	RM5	BG1	BG2	CR1	CR2
Log Length (m)	0	1	0	0	24	0	4	17

Table B-6: Fauna and General observation data for 2024

Site	Fauna observations	General observation notes
RM1	Kangaroo scat, Noisy Miner, Sheep, Deer.	• Natural regeneration not occurring but tube stock and seeding evident. • Overall native species cover, and diversity noted as low due to largely exotic groundcover. Native species diversity of Acacia species is high. • General health moderate to good, with steep slope (25 degree) and nearby paddock weeds. • Weed occurrence is high within the ground layer and low-moderate within the shrub layer. • Threatened/significant species not recorded. • Feral animals noted including sheep and deer • Erosion was noted in bund area including minor rills (5-10cm). • Fire evidence not recorded, and fuel levels are low. Fuel management not required at this location. • Disturbance signs include an old disused track within plot and signs of animal grazing • Site management and successes include planting appears successful with eucalypts, acacias, and grasses.
RM2	Kangaroo scat, Crimson Rosella, Magpie Lark.	• Natural regeneration present, including evidence of regenerating Eucalypts. • Native species cover and diversity generally limited in the canopy layer, however there is good diversity within the groundcover. • General health is moderate, but species diversity appears to be low in open areas. • Weed occurrence is moderate. • Threatened/significant species not recorded. • Feral animals not noted. • Erosion was not noted. • Fire evidence not recorded. Fuel loads thought to be low due to limited litter and logs, but dense Sifton Bush can present as a fire hazard. Sifton Bush control should be considered for fire management and to improve ecological diversity. • Disturbance signs including grazing by native and feral animal species (Wallaby, Kangaroo, rabbit/hare) and driving track present through plot. • Site management and successes not recorded
RM3	Kangaroo scat	• Natural regeneration present, including evidence of regenerating Eucalypts. • Native species cover and diversity generally poor-moderate. Groundcover diversity remains moderate and canopy layer diversity is poor. The shrub layer is dominated by Sifton Bush • General health of the vegetation is moderate-good with Sifton Bush overtaking paddocks • Weed occurrence is moderate, weeds noted within groundcover. • ·Threatened/significant species not recorded. • Feral animals not recorded. • Erosion not recorded. • Fire evidence not recorded. Fuel loads thought to be low due to limited litter and logs, but dense Sifton Bush can present as a fire hazard. Sifton Bush control should be considered for fire management and to improve ecological diversity. • Disturbance signs not recorded. • Site management and successes not recorded.
RM5	Kangaroo scat, Wallaby scat	• Natural regeneration present, in understorey and ground layer, but appears absent in canopy. • Native species cover and diversity moderate within shrub layer however low within the canopy layer. • General health is moderate - good. Plot being taken over by Sifton Bush hindering regeneration of other species. • Weed occurrence is high in groundcover particularly with the occurrence of exotic perennial grass. • Threatened/significant species not recorded. • Feral animals not recorded.

Site	Fauna observations	General observation notes
		• Erosion not recorded. • Fire evidence not recorded. Fuel loads thought to be low due to limited litter and logs, but dense Sifton Bush can present as a fire hazard. Sifton Bush control should be considered for fire management and to improve ecological diversity. • Disturbance signs including historic clearing and grazing by kangaroos and wallabies and evidence of vehicles being driven through plot • Site management not recorded.
BG1	Kangaroo scat, Wombat scat	• Natural regeneration present, evidence of Eucalypt regeneration. • Native species cover and diversity noted as good across all layers. • General health is good. • Minor weed infestation specifically within the groundcover. • Threatened/significant species not recorded. • Feral animals not recorded. • Erosion not recorded. • Fire evidence not recorded. Fuel loads are moderate with dry logs, stags, and leaf litter present. • Disturbance signs were minimal with possible native wildlife grazing. • Site management not recorded.
BG2	Kangaroo scat, Black-faced Cuckoo Shrike, Copperhead Skink, Grey Fantail	• Natural regeneration present, evidence of Eucalypt regeneration. • Native species cover and diversity noted as good across all layers. • General health of vegetation is good with high levels of regeneration occurring. • Weed occurrence is minor. • Threatened/significant species not recorded. • Feral animals not recorded. • Erosion not recorded. • Fire evidence not recorded. Moderate fuel loads due to leaf litter, fire management may be required. • Disturbance signs include potential for native animal grazing due to evidence of Kangaroos. • Site management and successes not recorded.
CR1	Kangaroo scat, Black-faced Cuckoo Shrike	• Natural regeneration present within understory and groundcover but not present within canopy layer. • Native species cover and diversity is noted as low across all layers. • General health of the vegetation is moderate-good. • Weed occurrence is noted including exotic perennial grasses, common annual weeds and Blackberry. • Threatened/significant species not recorded. • Feral animals were not recorded. • Erosion was noted including minor bank erosion. • Fire evidence not recorded, fuel loads generally low to moderate and fire management not likely to be required here. • Disturbance signs include native grazing and historic clearing of driving track. • Site management and successes not recorded.
CR2	Kangaroo scat, Wombat scat	• Natural regeneration present, including canopy layer of regenerating Eucalypts and Casuarinas. • Native species cover and diversity generally good across all layers with no immediate need for planting. • General health of vegetation is good with regeneration and some weeds. • Weed occurrence is noted including patches of Pattersons Curse and Blackberry. • Threatened/significant species not recorded. • Feral animals not recorded. • Erosion not recorded.

Site	Fauna observations	General observation notes
		• Fire evidence not recorded. Fuel loads are low to moderate. Fire management may be required. • Disturbance signs recorded include natural grazing by kangaroos and wombats. • Site management not recorded.

Table B-7: Species Richness analysis for 2024

	RM1	RM2	RM3	RM5	BG1	BG2	CR1	CR2
Tree	5.0	0.0	0.0	0.0	1.0	5.0	1.0	4.0
Shrub	1.0	4.0	1.0	2.0	2.0	2.0	2.0	4.0
Grass & grasslike	5.0	6.0	3.0	3.0	6.0	7.0	2.0	7.0
Forb	3.0	7.0	2.0	6.0	11.0	4.0	2.0	6.0
Fern	0.0	1.0	0.0	1.0	1.0	0.0	0.0	0.0
Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0
HTW	3.0	2.0	2.0	1.0	3.0	0.0	4.0	3.0
Non-HTW	14.0	6.0	6.0	4.0	12.0	5.0	10.0	16.0
TOTAL WEED SPECIES	17.0	8.0	8.0	5.0	15.0	5.0	14.0	19.0

Table B-8: Species Cover analysis for 2024

	RM1	RM2	RM3	RM5	BG1	BG2	CR1	CR2
Tree	8.0	0.0	0.0	0.0	10.0	28.0	2.0	33.0
Shrub	40.0	30.5	15.0	45.1	17.0	50.0	2.2	36.3
Grass & grasslike	0.6	21.1	12.0	7.0	37.0	5.3	15.1	53.4
Forb	0.3	8.3	0.2	7.7	2.0	25.2	1.2	1.5
Fern	0.0	2.0	0.0	0.1	0.1	0.0	0.0	0.0
Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
HTW	15.5	3.2	0.3	0.1	5.1	0.0	6.2	16
Non-HTW	34.4	7.8	46.6	62.2	6.8	31.3	49.4	2.7
TOTAL WEED SPECIES	49.9	11	46.9	62.3	11.9	31.3	55.6	18.7

Table B-9: Target Species Richness analysis for 2024

	RM1	RM2	RM3	RM5	BG1	BG2	CR1	CR2
Target PCT	3376	3376	3376	3373	3376	3376	3376	3376
Tree	4.0	0.0	0.0	0.0	1.0	4.0	1.0	4.0
Shrub	1.0	4.0	1.0	2.0	2.0	2.0	2.0	3.0
Grass & grasslike	2.0	4.0	3.0	3.0	6.0	5.0	1.0	5.0
Forb	2.0	7.0	2.0	4.0	9.0	4.0	1.0	5.0
Fern	0.0	1.0	0.0	1.0	1.0	0.0	0.0	0.0
Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0

Table B-10: Target Species Cover analysis for 2024

	RM1	RM2	RM3	RM5	BG1	BG2	CR1	CR2
Target PCT	3376	3376	3376	3373	3376	3376	3376	3376

	RM1	RM2	RM3	RM5	BG1	BG2	CR1	CR2
Tree	7.5	0	0	0	10	13	2	33
Shrub	40	30.5	15	45.1	17	50	2.2	36.2
Grass & grasslike	0.3	20	12	7	37	2.3	15	53.2
Forb	0.2	8.3	0.2	6.2	1.8	25.2	1	1.4
Fern	0	2	0	0.1	0.1	0	0	0
Other	0	0	0	0	0	0	0	0.1

Table B-11: Proportion of Target Species Richness analysis for 2024

	RM1	RM2	RM3	RM5	BG1	BG2	CR1	CR2
Target PCT	3376	3376	3376	3373	3376	3376	3376	3376
Tree	80.0	0	0	0	100.0	80.0	100.0	100.0
Shrub	100.0	100.0	100.0	100.0	100.0	100.0	100.0	75.0
Grass & grasslike	40.0	66.7	100.0	100.0	100.0	71.4	50.0	71.4
Forb	66.7	100.0	100.0	66.7	81.8	100.0	50.0	83.3
Fern	0	100.0	0	100.0	100.0	0	0	0
Other	0	0	0	0	0	0	0	100.0

Table B-12: Proportion of Target Species Cover analysis for 2024

	RM1	RM2	RM3	RM5	BG1	BG2	CR1	CR2
Target PCT	3376	3376	3376	3373	3376	3376	3376	3376
Tree	93.8	0	0	0	100.0	46.4	100.0	100.0
Shrub	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.7
Grass & grasslike	50.0	94.8	100.0	100.0	100.0	43.4	99.3	99.6
Forb	66.7	100.0	100.0	80.5	90.0	100.0	83.3	93.3
Fern	0	100.0	0	100.0	100.0	0	0	0
Other	0	0	0	0	0	0	0	100.0

Table B-13: VI score data for 2024

	RM1	RM2	RM3	RM5	BG1	BG2	CR1	CR2
pct	3376	3376	3376	3373	3376	3376	3376	3376
area	5	5	5	5	5	5	5	5
patchsize	100	100	100	100	100	100	100	100
conditionclass	RM1_23	RM2_23	RM3_23	RM5_23	BG1_23	BG2_23	CR1_23	CR2_23
zone	56	56	56	56	56	56	56	56
easting	769915.4	773464.8	773741.8	771706.9	769577.1	771851.8	771326.2	773062.9
northing	6157908	6155743	6155457	6153029	6154113	6152990	6154954	6153023
bearing	0	0	0	0	0	0	0	0
compTree	5	0	0	0	1	5	1	4
compShrub	1	4	1	2	2	2	2	4
compGrass	5	6	3	3	6	7	2	7
compForbs	3	7	2	6	11	4	2	6

	RM1	RM2	RM3	RM5	BG1	BG2	CR1	CR2
compFerns	0	1	0	1	1	0	0	0
compOther	0	0	0	0	0	0	0	1
strucTree	5.5	0	0	0	10	28	2	33
strucShrub	42.5	30.5	15	45.1	17	50	2.2	36.1
strucGrass	0.6	21.1	12	7	37	4.3	15.1	53.4
strucForbs	0.3	8.3	0.2	7.7	2	25.2	1.2	1.5
strucFerns	0	2	0	0.1	0.1	0	0	0
strucOther	0	0	0	0	0	0	0	0.1
funLargeTrees	0	0	0	0	1	0	0	4
funHollowtrees	0	0	0	0	6	0	0	2
funLitterCover	51	53	52	69	74	76	65	52
funLenFallenLogs	0	1	0	0	24	0	4	17
funTreeStem5to9	0	0	0	0	1	1	0	1
funTreeStem10to19	0	0	0	0	0	1	0	1
funTreeStem20to29	0	0	0	0	1	0	1	1
funTreeStem30to49	0	0	0	0	1	1	0	1
funTreeStem50to79	0	0	0	0	1	0	0	1
funTreeRegen	1	1	1	0	1	1	0	1
funHighThreatExotic	15.5	3.2	0.3	0.1	5.1	0	5.2	16.1

Table B-14: BAM-C Outputs

Category	Plot	Year	Composition Score	Structure Score	Function Score	Vegetation Integrity Score
Rehabilitation	RM1	2021	3	1.5	0	0.6
Rehabilitation	RM1	2022	0.2	1.3	0	0.2
Rehabilitation	RM1	2023	27.9	7	30	18
Rehabilitation	RM1	2024	29.8	10.1	30	20.8
Rehabilitation	RM2	2021	38.7	22	15.1	23.4
Rehabilitation	RM2	2022	38.2	21.4	15.3	23.2
Rehabilitation	RM2	2023	37.9	29.4	15	25.6
Rehabilitation	RM2	2024	54.2	54.1	30	44.5
Rehabilitation	RM3	2021	23.2	35.3	0	2.7
Rehabilitation	RM3	2022	19.6	47.3	0.5	7.6
Rehabilitation	RM3	2023	7.3	53.3	13.3	17.3
Rehabilitation	RM3	2024	8.2	20.4	30	17.1
Rehabilitation	RM5	2021	43.4	53.5	0.2	7.1
Rehabilitation	RM5	2022	36.1	58.6	0.2	7.5
Rehabilitation	RM5	2023	20.5	10	15	14.5
Rehabilitation	RM5	2024	26.9	22.4	15	20.8
Box-Gum	BG1	2021	60.1	80.4	58.8	65.8
Box-Gum	BG1	2022	66.7	70.6	25.3	49.2
Box-Gum	BG1	2023	70.4	13.4	86.8	43.4

Category	Plot	Year	Composition Score	Structure Score	Function Score	Vegetation Integrity Score
Box-Gum	BG1	2024	59.7	63.5	64.5	62.5
Box-Gum	BG2	2021	63.7	51.1	44.9	52.7
Box-Gum	BG2	2022	69.1	41.4	43.9	50.1
Box-Gum	BG2	2023	38.4	27.5	54.7	38.7
Box-Gum	BG2	2024	41.4	54.6	43.8	46.2
Core Riparian	CR1	2022	8.7	13.7	18.3	13
Core Riparian	CR1	2023	5.9	12.1	38.2	14
Core Riparian	CR1	2024	8.7	25.3	17.4	15.7
Core Riparian	CR2	2022	43.3	78.7	31	47.3
Core Riparian	CR2	2023	46.9	88	82.7	69.9
Core Riparian	CR2	2024	62.2	88.7	85.8	77.9

Appendix C Nest Box Inventory

Ecological and Rehabilitation Monitoring Report 2024

Lynwood Quarry, NSW

Holcim Australia Pty Ltd

SLR Project No.: 630.031740.00001

27 March 2025

Table C-15: Result of Nest Box Inspection

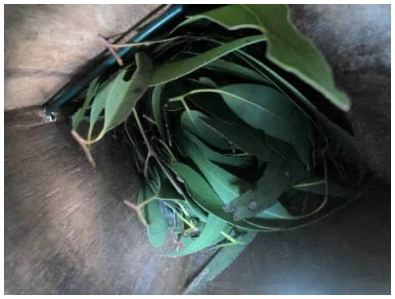
Box ID	Box Type	Native Fauna Occupancy (Y/N)				Pests (Y/N)	Repair (Y/N)	Comment (species present, signs of use, repair etc.)	Photo/ video number
		Fauna	Nest	Eggs	Young				
JC-1-1	Squirrel Glider	Y	Y	N	N	N	N	2x Gliders. Chew marks. Leaf nest.	15:57
JC-1-2	Squirrel Glider	N	Y	N	N	N	N	Chew marks. Leaf nest. Scratches on front.	15:54
JC-1-3	Squirrel Glider	N	Y	N	N	N	N	Chew marks. Leaf nest.	16:02
JC-1-4	Micro-Bat	N	N	N	N	N	N	Empty.	16:00
JC-2-1	Brushtail Possum	N	Y	N	N	N	N	Leaf litter. Feathers.	15:13
JC-2-2	Squirrel Glider	N	Y	N	N	N	N	Chew marks. Leaf litter.	15:17
JC-2-3	Squirrel Glider	Y	Y	N	N	N	N	Glider. Leaf nest.	15:33
JC-2-4	Micro-Bat	N	N	N	N	N	N	Empty.	15:27
JC-2-5	Squirrel Glider	N	Y	N	N	N	N	Chew marks. Leaf litter.	15:21
JC-3-1	Squirrel Glider	Y	Y	N	N	N	N	Glider. Chew marks. Leaf nest.	14:45
JC-3-2	Squirrel Glider	N	Y	N	N	N	N	Chew marks. Leaf nest.	14:48
JC-3-3	Squirrel Glider	Y	Y	N	N	N	N	2x Gliders. Chew marks. Leaf litter.	14:51
JC-3-4	Micro-Bat	N	N	N	N	N	N	Empty.	15:03
JC-4-1	Squirrel Glider	N	Y	N	N	N	N	Chew marks. Leaf nest.	14:30
JC-4-2	Squirrel Glider	N	Y	N	N	N	N	Chew marks. Leaf nest.	14:27
JC-4-3	Brushtail Possum	N	Y	N	N	N	N	Feathers. Nest. Eggshells.	14:38
JC-4-4	Squirrel Glider	N	Y	N	N	N	N	Leaf nest. Chew marks (old).	14:34
JC-4-5	Micro-Bat	N	N	N	N	N	N	Empty.	14:28
JC-5-1	Squirrel Glider	N	Y	N	N	N	Y	Chew marks. Inactive Bees nest. Leaf litter.	15:39
JC-5-2	Squirrel Glider	Y	Y	N	N	N	Y	Sugar Glider. Chew marks. Leaf nest. Repair roof hinge.	15:43
JC-5-3	Squirrel Glider	N	Y	N	N	N	N	Chew marks. Leaf nest.	15:38
HMA-1-1	Brushtail Possum	N	Y	Y	N	N	N	1x Egg. Leaf litter.	11:58

Box ID	Box Type	Native Fauna Occupancy (Y/N)				Pests (Y/N)	Repair (Y/N)	Comment (species present, signs of use, repair etc.)	Photo/ video number
		Fauna	Nest	Eggs	Young				
HMA-1-2	Squirrel Glider	N	Y	N	N	N	N	Chew marks. Leaf nest.	11:54
HMA-1-3	Squirrel Glider	Y	Y	N	N	N	N	1x Sugar Glider in nest. Chew marks. Leaf nest.	11:43
HMA-1-4	Ringtail Possum	Y	N	N	N	N	N	Brushtail Possum. Chew marks.	11:48
HMA-1-5	Micro-Bat	N	N	N	N	N	N	Empty.	11:51
HMA-1-6	Owlet Nightjar	N	Y	N	N	N	N	Chew marks. Leaf nest.	11:55
HMA-1-7	Owlet Nightjar	N	Y	N	N	N	N	Chew marks. Leaf nest.	11:45
HMA-2-1	Squirrel Glider	N	Y	N	N	N	N	Chew marks. Leaf litter.	13:08
HMA-2-2	Brushtail Possum	Y	N	N	N	N	N	Brushtail Possum.	13:12
HMA-2-3	Rosella	N	Y	N	N	N	N	Chew marks. Leaf litter – bald patch.	12:56
HMA-2-4	Owlet Nightjar	Y	Y	N	N	N	N	Chew marks. Glider in leaf nest.	13:10
HMA-2-5	Micro-Bat	N	N	N	N	N	N	Empty.	13:05
HMA-3-1	Ringtail Possum	N	Y	N	N	N	N	Leaf litter.	12:34
HMA-3-2	Brushtail Possum	N	N	N	N	N	N	Feather pile.	12:31
HMA-3-3	Brushtail Possum	Y	N	N	N	N	N	Brushtail Possum.	12:43
HMA-3-4	Owlet Nightjar	N	Y	N	N	N	N	Chew marks. Leaf nest.	12:36
HMA-3-5	Rosella	N	Y	N	N	N	N	Chew marks. Leaf nest (old).	12:38
HMA-4-1	Brushtail Possum	Y	N	N	N	N	N	Brushtail Possum.	13:40
HMA-4-2	Rosella	N	Y	N	N	N	N	Chew marks. Leaf litter.	13:31
HMA-4-3	Squirrel Glider	Y	Y	N	N	N	N	2x Gliders. Chew marks. Leaf nest.	13:36
HMA-4-4	Micro-Bat	N	N	N	N	N	N	Empty.	13:30
HMA-5-1	Owlet Nightjar	N	Y	N	N	N	N	Chew marks. Leaf nest.	11:37
HMA-5-2	Micro-Bat	N	N	N	N	N	N	Empty.	11:30

Box ID	Box Type	Native Fauna Occupancy (Y/N)				Pests (Y/N)	Repair (Y/N)	Comment (species present, signs of use, repair etc.)	Photo/ video number
		Fauna	Nest	Eggs	Young				
HMA-5-3	Rosella	N	Y	N	N	N	N	Chew marks. Leaf nest.	11:35
HMA-5-4	Squirrel Glider	N	Y	N	N	N	N	Leaf litter. Chew marks.	12:27
HMA-6-1	Ringtail Possum	N	Y	N	N	N	N	Leaf nest. Feather pile.	12:27
HMA-6-2	Brushtail Possum	Y	N	N	N	N	N	Brushtail Possum.	12:17
HMA-6-3	Ringtail Possum	N	Y	Y	N	N	N	1x Egg. Leaf nest.	11:35
HMA-6-4	Brushtail Possum	N	Y	N	N	N	N	Leaf litter. Broken shells.	12:26
HMA-12-2	Micro-bat	N	N	N	N	N	N	Empty.	10:53
HMA-12-3	Possum/ Glider	N	Y	N	N	N	N	Chew marks. Leaf litter.	10:52
HMA-13-1	Possum/ Glider	N	Y	N	N	N	N	Leaf nest.	10:59
HMA-13-2	Possum/ Glider	N	Y	N	N	N	N	Leaf litter. Feathers. Chew marks.	11:00
HMA-13-5	Possum/ Glider	N	Y	N	N	N	N	Leaf litter. Chew marks.	11:04
HMA-13-6	Possum/ Glider	Y	Y	N	N	N	N	2x Sugar Gliders left box, 1x Sugar glider inside box. Chew marks. Leaf nest.	11:03
HMA-13-7	Possum/ Glider	N	Y	N	N	N	N	Leaf nest.	11:11
HMA-13-8	Possum/ Glider	N	Y	N	N	N	N	Leaf nest (Old). Chew marks.	11:13
HMA-13-9	Possum/ Glider	N	Y	N	N	N	N	Leaf nest.	11:07
HMA-13-10	Possum/ Glider	N	Y	N	N	N	N	Leaf litter. Chew marks.	11:06

Table C-2: Photograph Thumbnails of Nest Box Inspections

		
JC-1-1	JC-1-2	JC-1-3
		
JC-1-4	JC-2-1	JC-2-2
		
JC-2-3	JC-2-4	JC-2-5
		
JC-3-1	JC-3-2	JC-3-3

		
JC-3-4	JC-4-1	JC-4-2
		
JC-4-3	JC-4-4	JC-4-5
		
JC-5-1	JC-5-2	JC-5-3
		
HMA-1-1	HMA-1-2	HMA-1-3

		
HMA-1-4	HMA-1-5	HMA-1-6
		
HMA-1-7	HMA-2-1	HMA-2-2
		
HMA-2-3	HMA-2-4	HMA-2-5
		
HMA-3-1	HMA-3-2	HMA-3-3

		
HMA-3-4	HMA-3-5	HMA-4-1
		
HMA-4-2	HMA-4-3	HMA-4-4
		
HMA-5-1	HMA-5-2	HMA-5-3
		
HMA-5-4	HMA-6-1	HMA-6-2

		
HMA-6-3	HMA-6-4	HMA-12-2
		
HMA-12-3	HMA-13-1	HMA-13-2
		
HMA-13-5	HMA-13-6	HMA-13-7
		
HMA-13-8	HMA-13-9	HMA- 13-10

Appendix D Hoary Sunray Monitoring Plot Data

Ecological and Rehabilitation Monitoring Report 2024

Lynwood Quarry, NSW

Holcim Australia Pty Ltd

SLR Project No.: 630.031740.00001

27 March 2025

Table D-1: Hoary Sunray Counts at (4m^2 plot) for 2024

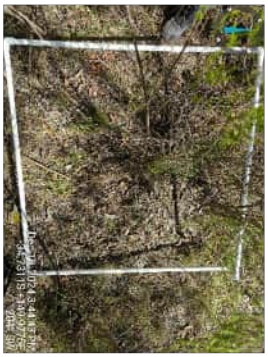
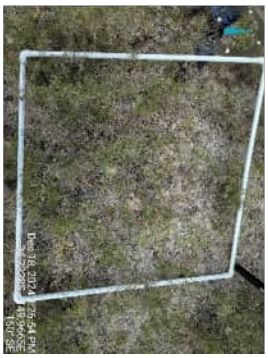
Site ID	% cover estimate	Q1	Q2	Q3	Q4	Total
HS1	1	2	6	2	1	11
HS2	0.1	0	0	1	0	1
HS3	0	0	0	0	0	0
HS4	0.1	0	0	4	0	4
HS5	0	0	0	0	0	0
HS6	2	3	6	4	3	16
HS7	20	14	14	6	11	45
HS8	0.1	0	0	1	0	1
HS9	3	10	6	2	3	21
HS10	0.1	0	2	0	0	2
HS11	0	0	0	0	0	0

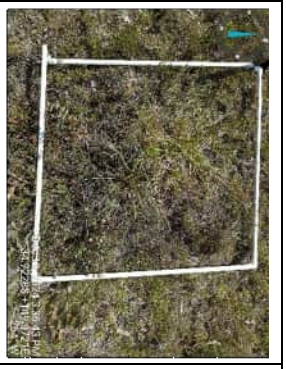
Table D-2: Hoary Sunray Health and Disturbance Impact Notes

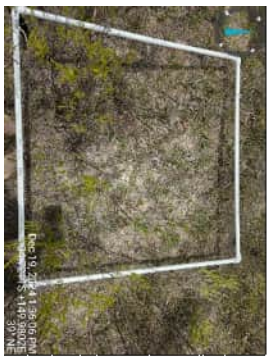
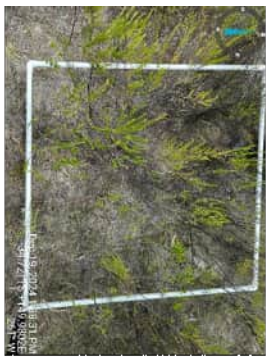
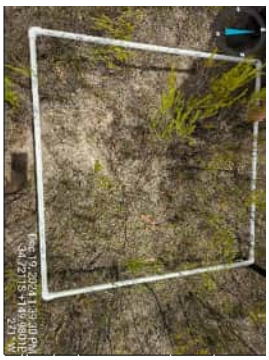
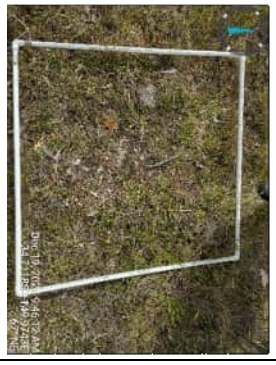
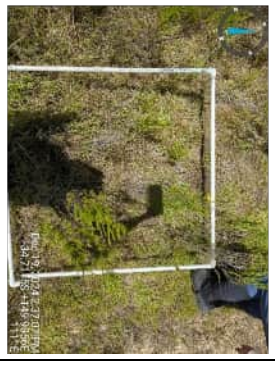
Site ID	Erosion (Severity/Age)		Grazing (Severity/Age)		Weediness (Severity/Age)		General Health	General Notes
	Sv	Ag	Sv	Ag	Sv	Ag		
HS1	0	0	1	R	1	R	Moderate	Evidence of grazing. Occurrence of Hoary Sunray in surrounding area and few scattered around. Moderate density of Sifton Bush.
HS2	0	0	1	R	1	R	Moderate	Hoary Sunray evident in surrounding area. Evidence of native grazing. Sifton bush around plot area.
HS3	0	0	1	R	1	R	Poor	No Hoary Sunray found in plot. Evidence of native grazing. Sifton bush and Kunzea surrounding.
HS4	0	0	1	R	1	R	Moderate	Some native grazing (scats). Two Hoary Sunray flowering. Minor weed infestation. Dense Kunzea surrounding.
HS5	0	0	1	R	1	R	Poor	Hoary Sunray found in surrounding area. Sifton bush abundant. Some native grazing evident.
HS6	0	0	1	R	1	R	Moderate	Some native grazing evident. Moderate density of Sifton Bush surrounding.
HS7	1	R	1	R	1	R	Moderate	Minor erosion present. Some native grazing (scats). Sifton surrounding.
HS8	0	0	1	R	1	R	Poor	Dense Sifton Bush surrounding. Evidence of native grazing.
HS9	0	0	1	R	1	R	Moderate	Dense Sifton bush in area. Evidence of native grazing.
HS10	0	0	1	R	1	R	Moderate	Hoary Sunray found adjacent to plot area. Some native grazing (scats). Moderate density Sifton Bush surrounding.
HS11	0	0	1	R	1	R	Poor	Hoary Sunray surrounding plot. None recorded in plot. Dense Sifton Bush surrounding. Evidence of native grazing.

KEY: Health (indicated by vigour, leaf browning, size of clumps): Poor, moderate, good. Severity: 0 = no evidence, 1=light, 2=moderate, 3=severe. Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

Table D-3: Photograph Thumbnails of Hoary Sunray Monitoring Plots

Site	Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4
HS1				
HS2				
HS3				
HS4				

Site	Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4
HS5				
HS6				
HS7				
HS8				

Site	Quadrant 1	Quadrant 2	Quadrant 3	Quadrant 4
HS9				
HS10				
HS11				

Appendix E Assessment of Competion Criteria

Ecological and Rehabilitation Monitoring Report 2024

Lynwood Quarry, NSW

Holcim Australia Pty Ltd

SLR Project No.: 630.031740.00001

27 March 2025

Table E-1: Assessment of Revegetated Areas Preliminary Completion Criteria (applies to the Amenity Bund ie RM1)

Area	Objective / Performance Indicator	Preliminary Completion Criteria	Timing	Assessment
Planting or direct seeding areas	Vegetation has been established at the revegetation area and there are no additional works required to be undertaken to assist to meet the requirements of the rehabilitation management plan or any other management plan.	Ground cover comparable to surrounding environment and the establishment of revegetation is such that it no longer requires attention to assure its successful development (>3 years of growth).	Monitor annually until condition criteria achieved.	On track. Native vegetation was planted at the western side of Amenity Bund in 2022. Ground cover improvement (such as grass and herb planting of species from Box Gum Woodland) is recommended. Ensure whole western side of amenity bund is sufficiently planted.
Amenity Bund and emplacement areas	Rehabilitated areas are stable.	Areas of exposed soils are revegetated to achieve cohesive ground cover using a native plant species mix compatible with the surrounding environment and erosion has stabilised and resembles natural processes.	Monitor annually until condition criteria achieved.	On track. Light erosion noted at RM1 plot. Erosion also noted at northern and southern ends of the amenity bund. Ongoing erosion control required for the amenity bund.
Natural areas	The site is managing significant weed or feral animal infestations	No increase in weed and feral pest populations and monitoring indicates the absence of or decline in weed species. Weeds comprise no more than 15%.	Annual weed monitoring. When monitoring indicates weeds comprise no more than 15% monitoring can be amended to every 3 years. Every 7 years feral animal monitoring is undertaken.	Not applicable to amenity bund
Planting or direct seeding areas	The rehabilitated community is representative of the targeted vegetation community being PCT1330 - Yellow Box - Blakely's Red	Revegetation is progressing towards a sustainable ecosystem and only requires maintenance that is consistent with the	When monitoring indicates revegetation has established on disturbed areas and stratum has reached more	On track. Native vegetation was planted at the western side of Amenity Bund in 2022. Trees approximately 0.5-

Area	Objective / Performance Indicator	Preliminary Completion Criteria	Timing	Assessment
	Gum grassy woodland on the tablelands, South Eastern Highlands Bioregion.	intended final land use. More than 56% of established trees are healthy and growing and the rehabilitation is recognisable as PCT 1330.	than 56% established, healthy trees (1.5 to 2m in height) or approximately 10 years from planting.	2m height in areas. Some sections more successful than others.
Habitat areas devoid of habitat features and accessible for log and rock placement.	Use cleared trees and boulders to create habitat features in accessible habitat management areas	All logs and boulders available for relocation have been placed in habitat areas that are accessible by machinery.	Monitor every 2 years with the intent to achieve completion within 10 years of clearing activities.	Not applicable to amenity bund as the area is too steep
Areas where assisted natural regeneration is primary activity.	Monitoring has indicated that natural regeneration is occurring.	Signs of seeding occurring and signs of recruitment in all strata. Or evidence to demonstrate that the ecosystem will progress towards recruitment.	When monitoring indicates natural regeneration is establishing itself and weed coverage is <15% of the area to be regenerated.	Not applicable to amenity bund
Fencing, exclusion, and protection works	Rehabilitated areas signposted and fenced off from active quarry operations to prevent access.	All fences are in place, no barb wire exists in the internal fencing, signs are in place and gates are secured and operational. Internal fences that are no longer required are removed.	As completed and monitored annually for maintenance purposes.	Not applicable to amenity bund. SLR has assumed that the amenity bund will not be fenced and is not readily accessible in any case.

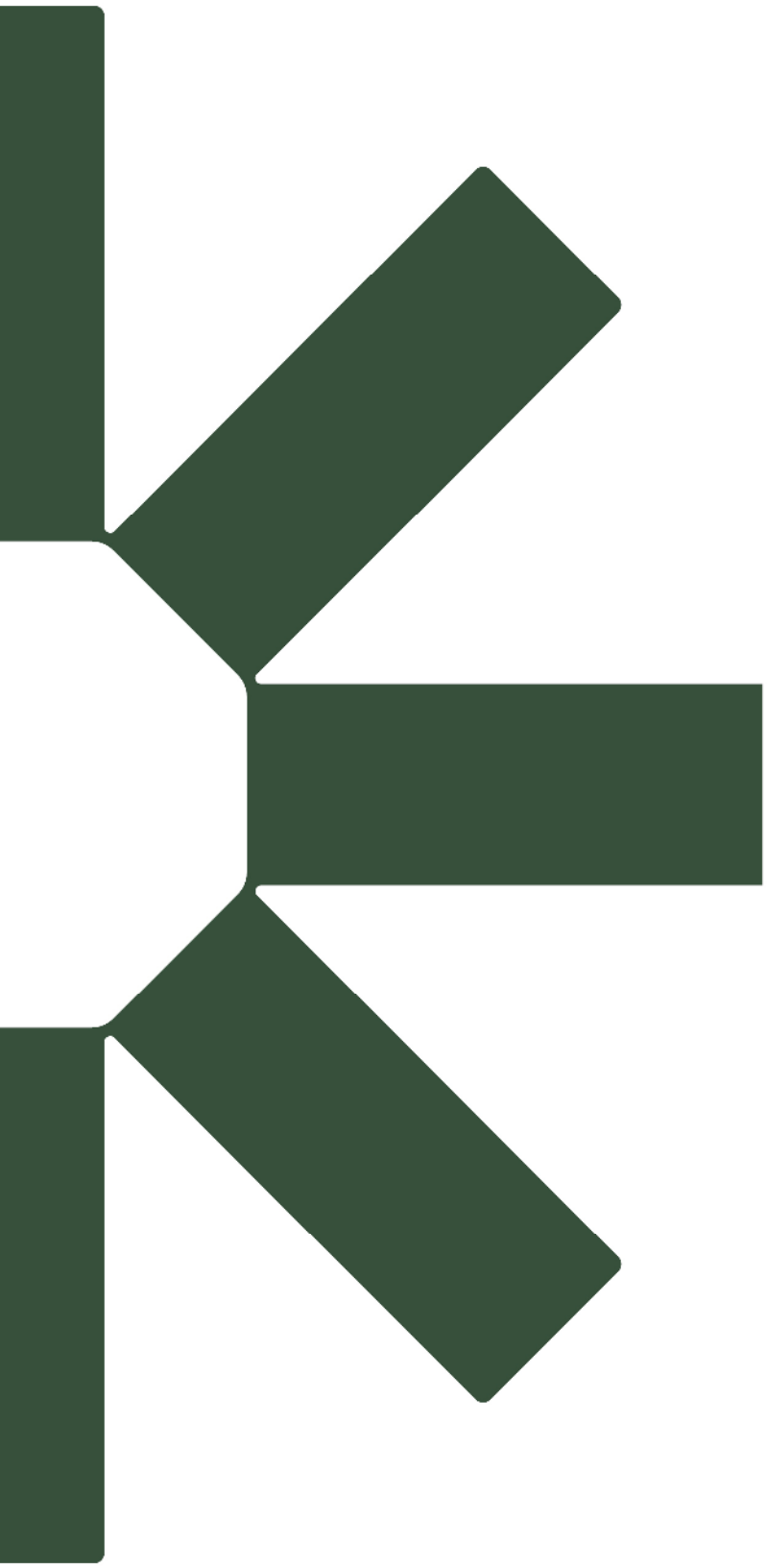
Table E-2: Assessment of Habitat Management Area Preliminary Completion Criteria (applies to the northern HMA i.e. RM2 and RM3)

Objective / Performance Indicator	Preliminary Completion Criteria	Timing	Assessment
The boundary of the HMA has been fenced and internal fencing has no barb wire.	HMA signposted and fenced off from active quarry operations to prevent access. Barb wire completely removed from internal fencing.	Within 5 years of implementing the Rehabilitation and Landscape Management Plan.	Not assessed. Fencing GIS data and photos required for HMA to allow comparison to management area boundaries. Evidence of fencing has been noted at RM2 and RM3.
Cattle have been excluded from the area and appropriate signage erected.	Installation of fencing around the perimeter of the HMA to exclude cattle.	Within 6 months of implementing the Rehabilitation and Landscape Management Plan.	Not assessed. Fencing GIS data and photos required for HMA to allow comparison to management areas. No evidence of cattle noted in HMA during monitoring (2020-2024).
Nest boxes have been established, monitored and are being maintained.	Nest boxes are being utilised or show signs of use by native species. Each nest box installed should be in good structural condition and functioning in the landscape.	Completed within 5 years of clearing activities	On track, fifth and final year of nest box monitoring completed for most nest boxes. Good evidence of usage and minor maintenance recommended. Ongoing monitoring required for any additional nest boxes.
The site is managing significant weed or feral animal infestations with a demonstrable reduction pre-construction.	Weed and pest inspections show no increase in weed population and monitoring indicates the absence of or decline in weed species.	Annual weed monitoring. When monitoring indicates weeds comprise no more than 15% monitoring can be amended to every 3 years. Every 7 years feral animal monitoring is undertaken.	On track. Weed reduction noted in 2023. Evidence of pests generally low.
Natural regeneration is occurring.	Signs of recruitment in all stratum or evidence to demonstrate that the ecosystem will progress towards recruitment. More than 56% of trees are healthy and growing and are recognisable as PCT 1330.	When monitoring indicates revegetation has established and no longer requires assistance.	Not met. Whilst natural regeneration was found to be occurring in all layers within parts of the HMA (e.g. around RM2), the lower more heavily grazed sections (e.g. around RM3, or the southeast end of the HMA) were found to require Sifton Bush control and planting of trees.

Table E-3: Assessment of Core Riparian Corridors Preliminary Completion Criteria (applies to the Core Riparian Corridors of Jaorimin Creek and Marulan Creek)

Objective / Performance Indicator	Preliminary Completion Criteria	Timing	Assessment
The required areas have been fenced to exclude cattle where required.	Installation of fencing around the perimeter of the corridor to exclude cattle	Within 6 months of implementing the Rehabilitation and Landscape Management Plan	Not assessed. Fencing GIS data and photos required for riparian corridor to allow comparison to management area boundaries. Evidence of fencing has been noted at R2 and CR2.
Revegetation works have occurred along Jaorimin Creek south of the Main Southern Railway.	Signs of recruitment in all stratum or evidence to demonstrate that the ecosystem will progress towards recruitment. More than 56% of trees are healthy and growing.	When monitoring indicates revegetation has established on disturbed areas and stratum has reached more than 56% established, healthy trees (1.5m to 2m in height) or approximately 10 years from planting.	Not met. Rehabilitation monitoring commenced along Jaorimin Creek in 2022 with the establishment of CR1. No revegetation efforts were observed along the creek line.
Nest boxes along Jaorimin Creek have been established, monitored and are being maintained.	Nest boxes are being utilised or show signs of use by native species. Each nest box installed should be in good structural condition and functioning in the landscape	Completed within 5 years of clearing activities	On track, fifth and final year of nest box monitoring completed for majority of the boxes, with good evidence of usage. Monitoring program requires review to determine which boxes need ongoing monitoring. Maintenance activities have been recommended.
The site is managing significant weed or feral animal infestations with a demonstrable reduction pre-construction.	Weed and pest inspections show no increase in weed population and monitoring indicates the absence of or decline in weed species	Annual weed monitoring. When monitoring indicates weeds comprise no more than 15% monitoring can be amended to every 3 years. Every 7 years feral animal monitoring is undertaken.	On track. Weed covers overall declined in 2023 (but still very high at CR1). No evidence of major pest infestations (e.g. networks of active burrows). Ongoing weed control and feral animal management required.
Monitoring has indicated that natural regeneration is occurring.	Signs of recruitment in all stratum or evidence to demonstrate that the ecosystem will progress towards recruitment. More than 56% of trees are healthy and growing	When monitoring indicates any revegetation has established and stratum has reached more than 56% establishment or approximately 10 years	Not met. Rehabilitation monitoring was established in 2022 along Jaorimin Creek (CR1) and Marulan Creek (CR2). Natural regeneration of native trees and shrubs were

Objective / Performance Indicator	Preliminary Completion Criteria	Timing	Assessment
	and are recognisable as PCT 1330.	from any revegetation works.	observed at CR2 however CR1 contained very little revegetation and will require assistance to meet criteria through revegetation works.



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