Salt Water Gully Combined and Extended Flora and Vegetation Survey

Prepared for Talison Lithium
18 June 2024

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EXECUTIVE SUMMARY

Talison Lithium Pty Ltd (Talison) currently operates a lithium mine at Greenbushes, situated approximately 250 km south of Perth in south-west Western Australia. Talison is proposing to increase output from the Greenbushes Mine and has proposed construction of a new water storage and waste rock landform to accommodate additional process water requirements and storage of waste rock from mining operations; herein this is referred to as the 'study area'. To support environmental approvals, Onshore Environmental Consultants Pty Ltd (Onshore Environmental) was commissioned by Talison to review data from four previous flora and vegetation surveys, and undertake a reconnaissance field survey to update previous mapping content and complete additional targeted conservation significant flora searches.

Detailed flora and vegetation surveys were completed within the study area in October 2022 and November 2023 (Onshore Environmental 2022, 2023a) and reconnaissance levels surveys in May 2023 (Onshore Environmental 2023b, 2023c). The May 2024 assessment was a reconnaissance level survey conducted by a Principal Botanist who was directly involved with all of the previous survey work.

A total number of 255 plant taxa (including varieties and subspecies) from 60 families and 161 genera were recorded from the study area. Species representation was greatest among the Fabaceae, Cyperaceae, Orchidaceae, Poaceae, Asteraceae, Asparagaceae, Myrtaceae, Stylidiaceae, Ericaceae, Proteaceae and Goodeniaceae families. The most speciose genera were *Acacia,* (10 taxa), *Caladenia* and *Lomandra* (8 taxa), *Stylidium* (7 taxa), *Lepidosperma* (6 taxa), and *Drosera* and *Senecio* (4 taxa).

None of the plant taxa recorded from the study area were listed as Threatened Flora under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or the Western Australian *Biodiversity Conservation Act 2016* (BC Act). Additionally, no species were listed as Priority flora by the Department of Biodiversity Conservation and Attractions (DBCA).

Two collections from the study area could not be identified to species level and were considered to be a species of interest: *Gonocarpus* sp. ONS-3762 and *Lepidosperma* sp. ONS6731. The *Gonocarpus* sp. ONS-3762 specimen has since been reviewed by The Perth Taxonomic Review Committee and was not recognised as a new species, but recommended for future collection of fruiting material. The *Lepidosperma* sp. ONS6731 collection remains unresolved in June 2024 with the group under review over the past few years and this review ongoing.

The total flora included 50 introduced plant species, with four of these species listed as a Declared Pest under the *Biosecurity and Agriculture Management Act 2007* (BAM Act): **Asparagus asparagoides, Galium aparine, *Rubus anglocandicans* and **Zantedeschia aethiopica.*

The majority of the study area supported cleared annual pasture (farmland, 339.7 ha or 72%). Remnant native vegetation was restricted to state forest and road reserve in the northwest sector (39.8 ha or 8% of the study area) and broadly comprised Jarrah *(Eucalyptus marginata)* and Marri *(Corymbia calophylla)* forest on lateritic hill crests and hill slopes. The north-eastern sector of the study area supported softwood timber plantations, with farmland dissected by the Salt Water Gully. Sections of the drainage line had been disturbed by historical tin mining and rehabilitated with non-provenance tree species, with a mix of remnant Marri, Yarri *(Eucalyptus patens)*, and Flooded Gum *(Eucalyptus rudis* subsp. *rudis)* forest occurring further downstream. Large sections of the drainage line were infested by the Declared Pest **Rubus*

anglocandicans (Blackberry) and other weeds encroaching from adjacent farmland, and vegetation condition was rated as degraded or completely degraded.

Ten vegetation types were described and mapped from the study area. None of the vegetation types were aligned with any Commonwealth or State listed Threatened Ecological Communities (TECs) or State listed Priority Ecological Communities (PECs). Remnant native vegetation present in the study area was determined to be well represented at the state-wide, bioregional and local government authority levels.

TABLE OF CONTENTS

EXECUTIVE SUMMARY i
TABLE OF CONTENTS iii

1.0 INTRODUCTION 1
1.1 Preamble 1
1.2 Survey Objective 1

2.0 EXISTING ENVIRONMENT 4
2.1 Climate 4
2.2 Biogeographic Regions 4
2.3 Land Use 5
2.4 Landforms, Soils 5
2.5 Flora and Vegetation 5

3.0 METHODOLOGY 9
3.1 Legislation and Guidance Statements 9
3.2 Desktop Assessment 9
3.2.1 Literature Review 9
3.2.2 Database Searches 9
3.2.3 Assessment of Conservation Significance 10
3.2.4 Assessment of Likelihood of Occurrence in the Study Area 10
3.3 Survey Methodology 11
3.3.1 Timing and Personnel 11
3.3.2 Sampling of Study Sites 11
3.3.3 Targeted Surveys for Conservation Significant Species 13
3.3.4 Weed Survey and Mapping 13
3.3.5 Vegetation Type Mapping 14
3.3.6 Vouchering 14
3.3.7 Field Survey Constraints 14

4.0 RESULTS 16
4.1 Desktop Review 16
4.1.1 Previous Flora and Vegetation Surveys 16
4.1.2 Threatened Flora listed under the EPBC Act 20
4.1.3 Threatened Flora listed under the BC Act 20
4.1.4 Priority Flora recognised by the DBCA 20
4.1.5 Likelihood of Occurrence 20
4.1.6 TECs listed under State and Federal Legislation 20
4.1.7 PECs recognised by DBCA 20
4.1.8 Environmentally Sensitive Areas 20
4.2 Flora Species 22
4.3 Significant Flora 23
4.3.1 Threatened Flora listed under the EPBC Act and BC Act 23
4.3.2 Significant Flora 23
4.3.3 Species of Interest 23
4.4 Introduced Flora 23
4.5 Vegetation Condition 25
4.6 Vegetation 27

4.7 Representation and Reservation of Vegetation 41
4.7.1 Beard (1981) Vegetation Associations 41
4.7.2 Mattiske and Havel (1998) Vegetation Complexes 41
4.8 Conservation Significance of Vegetation 44
4.8.1 National Significance 44
4.8.2 State Significance 44
4.8.3 Local Significance 44
5.0 SUMMARY 45
6.0 STUDY TEAM 46
7.0 REFERENCES 47
APPENDIX 1
Conservation Codes 50
APPENDIX 2
Vegetation condition scale (as developed by Keighery 1994) 56
APPENDIX 3
Vegetation classifications for the study area based on Muir (1997). 58
APPENDIX 4
Total flora list from the study area 60
APPENDIX 5
Representative photographs, raw data and total flora spreadsheets recorded for the 13 quadrats assessed within the study area 66

List of Tables

Table 1 Ranking system used to assign the likelihood that a flora species would occur in the study area. 11
Table 2 Relevance of limitations, as identified by EPA (2016a), to the flora and vegetation survey. 15
Table 3 Results from flora and vegetation surveys previously completed within, or near to, the study area. 17
Table 4 Significant flora potentially occurring within a 40 km radius of the study area (from database searches), and the likelihood of these taxa occurring within the study area 21
Table 5 Statistics for total flora recorded from the study area. 22
Table 6 Vegetation condition within the study area. 25
Table 7 Vegetation types mapped within the study area. 28
Table 8 Pre-European extent of vegetation represented on the basis of identified datasets (Government of Western Australia 2018). 43

List of Figures

Figure 1 Location of the study area. 2
Figure 2 Previous flora and vegetation surveys intersecting or nearby the study area. 3
Figure 3 Rainfall and temperature data from the Bridgetown Weather Station (Bureau of Meteorology 2024) 4
Figure 4 Beard (1981) vegetation associations represented within the study area. 7
Figure 5 Mattiske and Havel (1998) vegetation complexes represented within the study area. 8
Figure 6 Location of study sites (quadrats) within the study area. 12
Figure 7 Location of 'species of interest' within the study area. 24
Figure 8 Vegetation condition map for the study area. 26
Figure 9 Vegetation type map for the study area. 30

1.0 INTRODUCTION

1.1 Preamble

Talison is a Western Australian mining company with operations based adjacent to the town of Greenbushes in south-west Western Australia. The Greenbushes Mine is located approximately 250 km south of Perth and 80 km south-east of the port of Bunbury (Figure 1). The site comprises a number of open cut mining operations for tantalum, tin and spodumene (lithium). An underground tantalum operation has also been developed but is currently under care and maintenance. The Greenbushes pegmatitie is the world's largest hard rock tantalum resource and the largest and highest-grade lithium minerals resource in the world. Minerals produced at Talison's Greenbushes Mine can be found in many different applications including mobile phones, computers, surgical implants, electronic devices, glassware, ceramics and batteries.

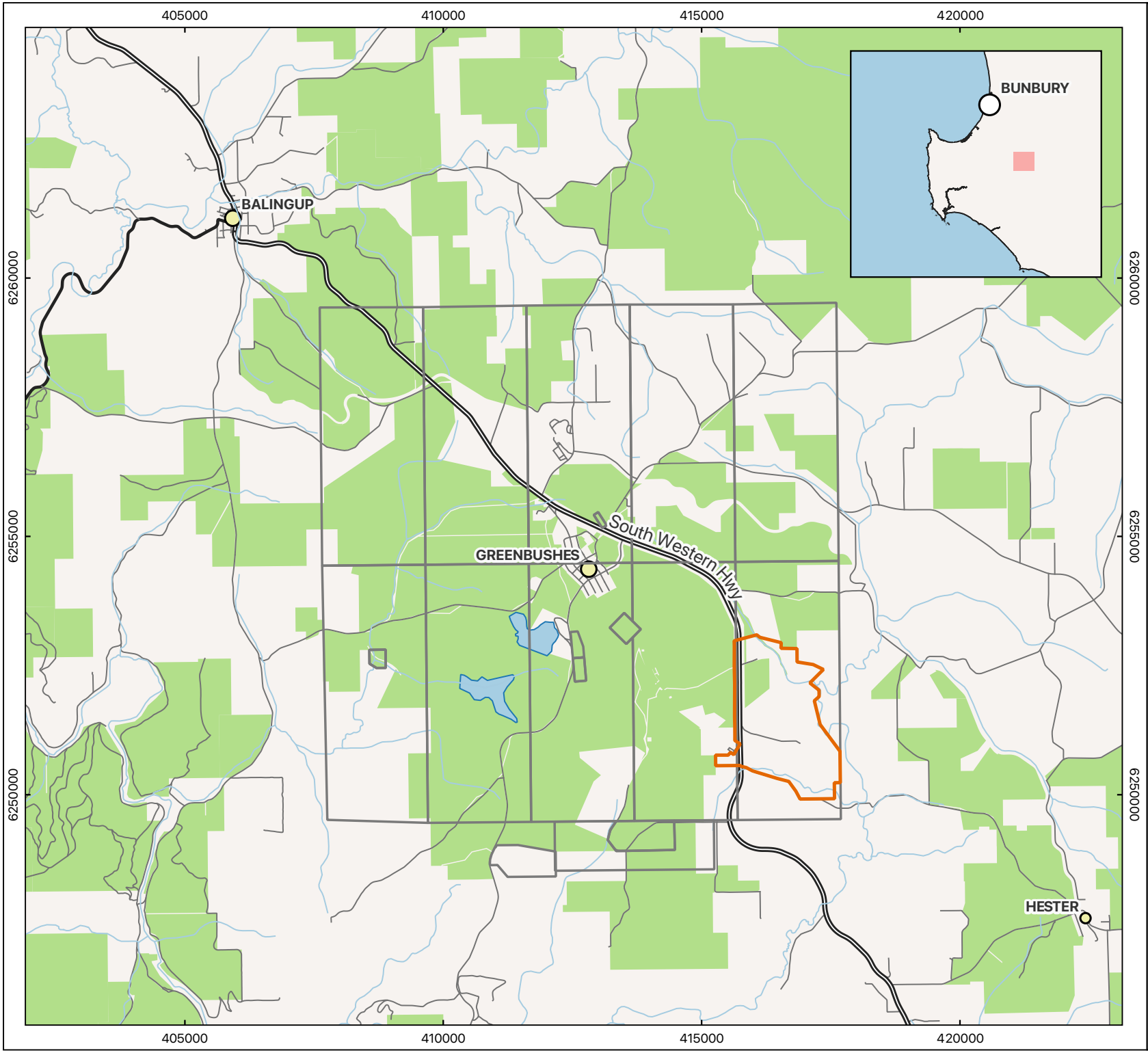
Talison is proposing an expansion at the Greenbushes Mine aimed at increasing supply of lithium to the world market. Longer term mine planning has identified the requirement for additional process water supply and storage capacity for waste rock from mining operations. The study area is located to the east of Floyd's Waste Rock Landform and intersects the South Western Highway, Greenbushes State Forest and privately owned farmland (Figure 1).

Two detailed flora and vegetation surveys have previously been completed within native vegetation in the northern sector of the study area (Onshore Environmental 2022, 2023a), with two reconnaissance flora and vegetation surveys covering a large proportion of the southern extent (Onshore Environmental 2023b, 2023c). Access was not granted into a small area of privately owned farmland in the southern extent of the study area where vegetation mapping has been inferred. The previous surveys intersecting the study area are listed below and shown in Figure 2:

- Onshore Environmental (2022) New Water Storage Area: single season detailed flora and vegetation survey in October 2022;
- Onshore Environmental (2023a) Salt Water Gully Downstream: reconnaissance flora and vegetation survey in May 2023;
- Onshore Environmental (2023b) Additional Areas North: single season detailed flora and vegetation survey in November 2023; and
- Onshore Environmental (2023c) S8 Waste Rock Landform: reconnaissance flora and vegetation survey in May 2023.

1.2 Survey Objective

To support future environmental approvals, Onshore Environmental was commissioned by Talison to undertake a reconnaissance flora and vegetation survey aimed at collating data from all previous survey work within the revised study area boundary, and undertaking a reconnaissance field survey to review currency of previously recorded data. It is noted that access onto the privately owned farmland lot in the southern sector of the study area was not granted (Figure 2).



ONSHORE ENVIRONMENTAL

TALISON LITHIUM
Salt Water Gully

Figure 1
Location of Study Area

Legend

- SWG Study Area
- Talison Lithium Tenements
- State Forest

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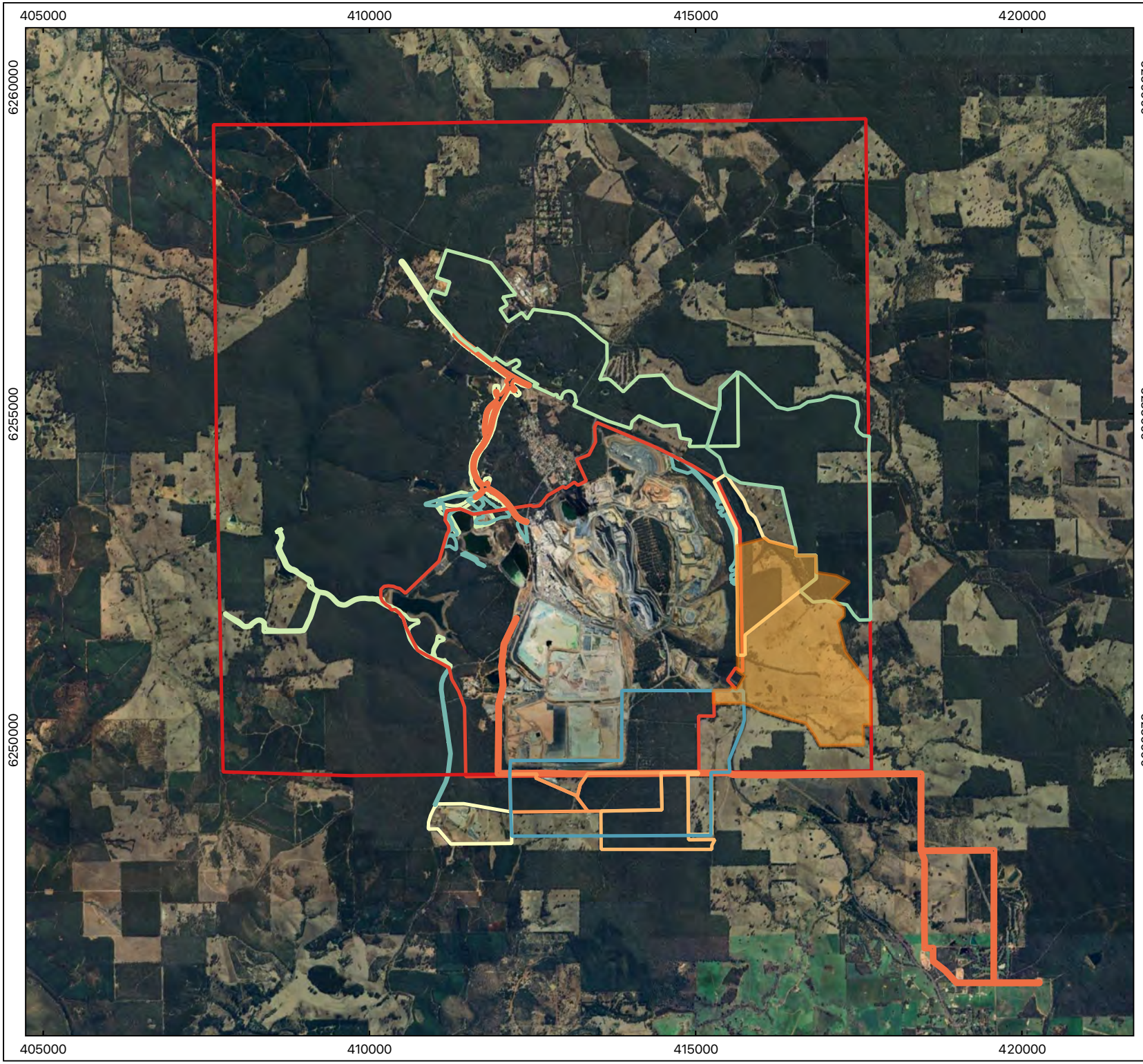

TALISON LITHIUM
Salt Water Gully

Figure 2
Previous flora and vegetation surveys intersecting or nearby the study area.

Legend

- Salt Water Gully Study Area

Previous Surveys

- Onshore Environmental 2012
- Onshore Environmental 2018
- Onshore Environmental 2019a
- Onshore Environmental 2021
- Onshore Environmental 2022a
- Onshore Environmental 2022b
- Onshore Environmental 2022c
- Onshore Environmental 2022d
- Onshore Environmental 2022e
- Onshore Environmental 2023a
- Onshore Environmental 2023b
- Onshore Environmental 2024a
- Onshore Environmental 2024b
- Onshore Environmental 2024c

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2.0 EXISTING ENVIRONMENT

2.1 Climate

The study area occurs on a boundary between the dry Mediterranean region to the north which experiences six dry months per year, and the moderate Mediterranean region to the south which experiences four dry months per year (Beard 1981). The Greenbushes region has cool wet winters and hot dry summers. Average annual rainfall for the town of Greenbushes is 923.0 mm (1893-2021) (Bureau of Meteorology [BOM] 2024), with the majority of falls occurring during the winter months of June and July associated with cold fronts moving across the south-west of Western Australia. No rainfall data from 2022 onwards was recorded at the Greenbushes weather station. The nearest available rainfall data is from Bridgetown (approximately 10 km south-east of the study area). Average annual rainfall for Bridgetown is 723.4 mm (1998-2024) (Bureau of Meteorology [BOM] 2024).

Annual rainfall at Bridgetown between 2018 and 2023 has ranged from 585.4 mm to 945.2 mm, with four of the six years recording below average annual totals. The 2023/2024 Summer and Autumn period at Bridgetown was very dry with just 7.6 mm recorded for the five-months from December 2023 to April 2024, compared to the long-term average of 114.5 mm for the same period (Figure 3).

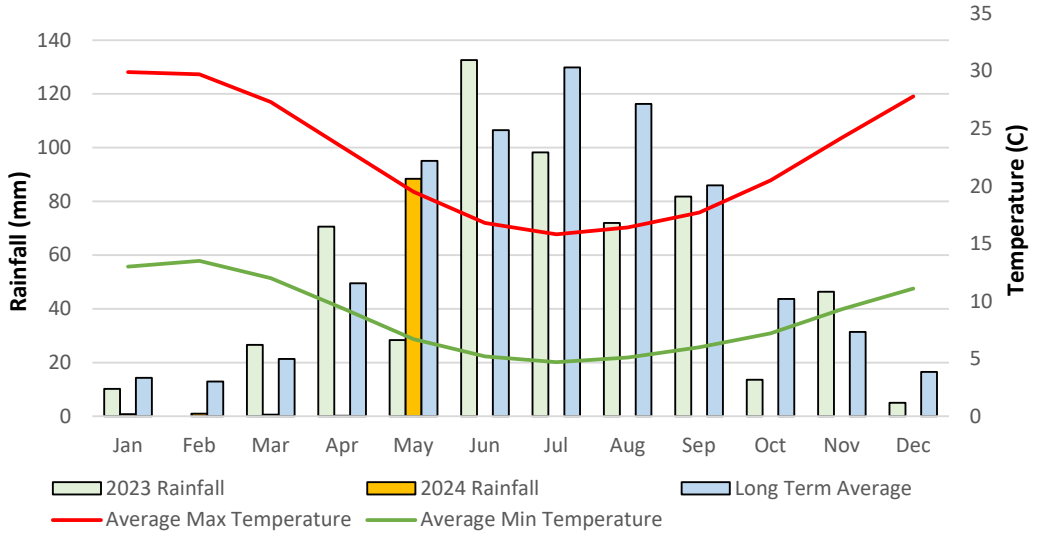


Figure 3 Rainfall and temperature data from the Bridgetown Weather Station (Bureau of Meteorology 2024).

2.2 Biogeographic Regions

The latest version of the Interim Biogeographic Regionalisation for Australia divides Australia into 89 bioregions based on climate, geology, landform, native vegetation and species information, and includes 419 sub-regions (Department of the Environment and Energy 2013). The bioregions and sub-regions are the reporting unit for assessing the status of native ecosystems and their level of protection in the National Reserve System. The study area is located within the Southern Jarrah Forest (JF2) sub-region within the Jarrah Forest bioregion. The Southern Jarrah Forest sub-region is described as “Duricrusted plateau of Yilgarn Craton characterised by Jarrah-Marri forest on laterite gravels and, in the eastern part, by Marri-Wandoo woodlands

on clayey soils. Eluvial and alluvial deposits support *Agonis* shrublands. In areas of Mesozoic sediments, Jarrah forests occur in a mosaic with a variety of species-rich shrublands. The climate is Warm Mediterranean" (Hearn *et al*. 2002). The vegetation of the sub-region is described as "Jarrah-Marri forest in the west grading to Marri and Wandoo woodlands in the east. There are extensive areas of swamp vegetation in the south-east, dominated by Paperbarks and Swamp Yate. The understorey component of the forest and woodland reflects the more mesic nature of this area. The majority of the diversity in the communities occurs on the lower slopes or near granite soils where there are rapid changes in site conditions" (Hearn *et al*. 2002).

2.3 Land Use

The major land uses in the Greenbushes region are state forest, residential, mining and agriculture. The study area intersects the Greenbushes State Forest, with the northern sector excised for the current MDE. There are three privately owned rural lots occurring in the southwest and eastern sector of the study area, with all three predominantly cleared for annual pasture. Nearby towns include Bridgetown (10 km to the south-east) and Balingup (10 km to the north-west).

2.4 Landforms, Soils

Tille (1996) has mapped soils of the Wellington-Blackwood District, which includes the town sites of Greenbushes and Bridgetown on its southern boundary. The study area occurs within the Hester Sub-system of the Darling Plateau System, and consists of undulating ridges and hill crests formed on laterite and gneiss which typically slope downwards off the main plateau into the surrounding Lowden Valleys System. The soils are mostly loamy gravels, sandy gravels and loamy earths.

The geology of the Greenbushes area is described as Archean granite of the Yilgarn Block (Wilde and Walker 1982) and the major soil types have been mapped by Tille (1961). The study area intersects four subsystems, all of the Darling Plateau system within the Western Darling Range zone:

- Dwellingup subsystem (DW) - broad, undulating lateritic divides with gravels and sands;
- Grimwade (GR) - valleys (30-70 m deep) with low gradients (5-20%), loams and loamy gravels;
- Hester (HR) - lateritic and granitic ridges and hill crests with gravels and loams; and
- Yarragil (YG) - minor valleys in lateritic terrain with gentle to low slopes and swampy floors. Soils are mainly loamy gravels and sandy gravels with some loamy earths and deep sands.

2.5 Flora and Vegetation

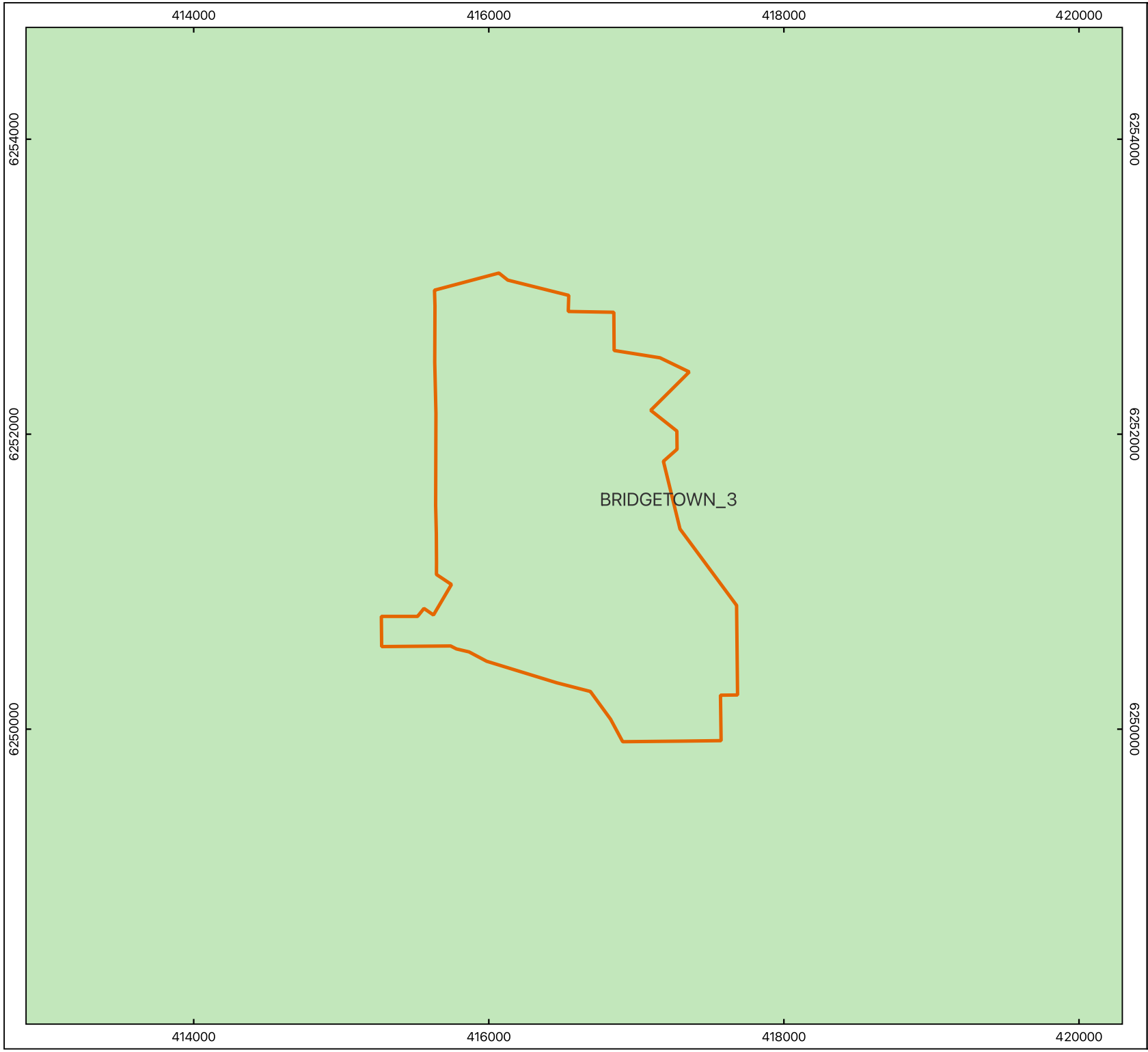
The study area occurs in the Menzies Sub-district of the Darling Botanical District, in the South-West Botanical Province (Beard 1981). The Menzies Sub-district (southern jarrah forest) covers a total area of 26,572 km^2, of which 18,715 km^2 (70%) originally supported jarrah and jarrah-marri forest (Beard 1990). It is estimated that approximately 61% of the total area has been cleared since European settlement, mainly in the valleys which are free of laterite, leaving the forest intact on laterised higher plateau levels.

The Menzies Sub-district is characterised by Jarrah stands on laterite within some Marri and Wandoo woodlands. Valley soils are often richer and Blackbutt (*Eucalyptus patens)* is more dominant in these areas. Flooded Gum (*Eucalyptus rudis)* is common along stream banks and Bullich (*Eucalyptus megacarpa)* is also present in some areas. Within the Greenbushes area vegetation is dominated by Jarrah *(Eucalyptus marginata)* and Marri *(Corymbia calophylla)* forest over the tall shrubs bull banksia *(Banksia grandis)* and snotty gobble *(Persoonia longifolia).* The lower understorey strata generally contains a range of plant genera including *Hakea, Acacia, Xanthorrhoea, Adenanthos, Hovea, Leucopogon, Macrozamia, Leucopogon, Bossiaea, Daviesia, Grevillea, Patersonia, Styphelia* and *Kennedia.*

A variety of published studies that relate to flora and vegetation of the southern jarrah forest are listed below:

- Distribution and prehistory of karri, jarrah and marri (Churchill 1968);
- Structure and composition of the karri forest around Pemberton (McArthur and Clifton 1975);
- Vegetation mapping of the Manjimup-Pemberton area (Smith 1972);
- Vegetation mapping of the Swan area (Beard 1981, see Figure 4);
- Vegetation mapping of the Darling System (Heddle *et al.* 1980); and
- Vegetation mapping as part of the Regional Forest Agreement (Mattiske and Havel 1998, see Figure 5).

Vegetation complexes of the southern jarrah forest have most recently been defined by Heddle *et al.* (1980) and updated by Mattiske and Havel (1998). Mattiske and Havel (1998) map the study area as occurring predominantly within the Grimwade (GR), Balingup (BL) and Hester (HR) complexes, with minor representation of the Catterick (CC1) and Dwellingup (D1) complexes (Figure 5).



ONSHORE ENVIRONMENTAL

TALISON LITHIUM
Salt Water Gully

Figure 4
Beard (1981) vegetation associations represented within the study area

Legend

Study Area

Bread Vegetation Associations

BRIDGETOWN_3

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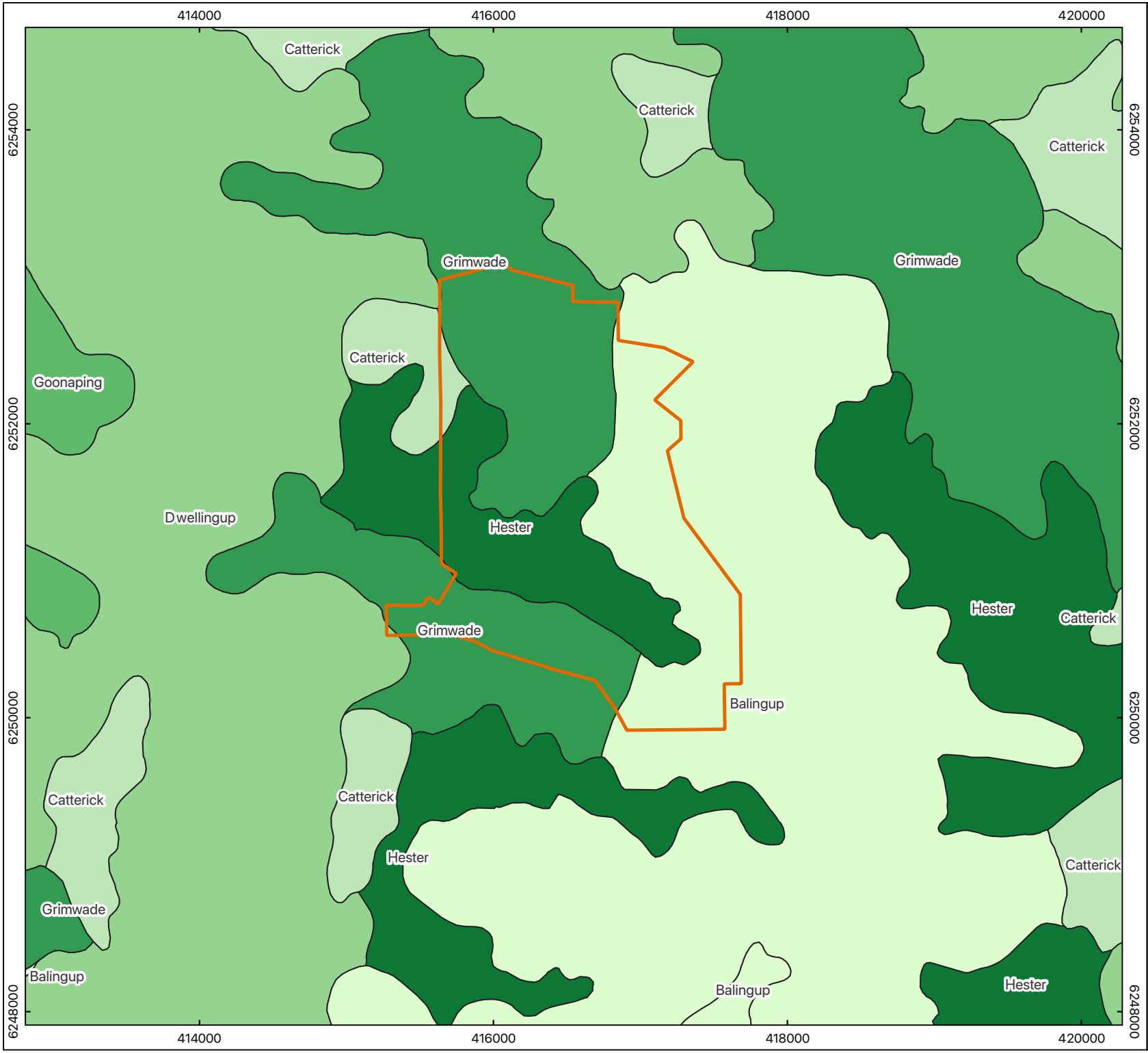

ONSHORE ENVIRONMENTAL

TALISON LITHIUM
Salt Water Gully

Figure 5
Mattiske and Havel (1998) vegetation complexes represented within the study area.

Legend

- Study Area

Vegetation Complexes

- Balingup
- Catterick
- Dwellingup
- Goonaping
- Grimwade
- Hester

0 0.5 1 1.5 km

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3.0 METHODOLOGY

3.1 Legislation and Guidance Statements

The flora and vegetation survey was carried out in a manner that is compliant with Environmental Protection Authority (EPA) requirements for the environmental surveying and reporting of flora and vegetation in Western Australia:

- Technical Guidance Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016a);
- Environmental Factor Guideline: Flora and Vegetation (EPA 2016b); and
- Statement of Environmental Principles, Factors and Objectives (EPA 2020).

Native vegetation have previously been assessed during a combination of detailed and reconnaissance flora and vegetation surveys (Onshore Environmental 2022, 2023a, 2023b, 2023c). The May 2024 assessment collated relevant data from the four previous surveys, and included a reconnaissance level field survey component aimed at updating previous mapping content and undertaking targeted conservation significant flora searches of the study area.

3.2 Desktop Assessment

3.2.1 Literature Review

Regional scale reports relevant to the study area locality were reviewed, including:

- a summary of bioregional data (Hearn *et al*. 2002); and
- vegetation description and mapping by Beard (1981), and more recently by Heddle, Loneragan and Havel (1980), and by Mattiske and Havel (1998).

In addition, there was a review of all publicly available literature and internal reports commissioned and held by Talison. There were 18 flora and vegetation surveys previously completed between 1991 and 2023 in the vicinity of the study area. As part of the desktop review total flora lists for these surveys were reviewed to ensure nomenclature was accurate, consistent and current. The previous survey work is summarised in more detail in Section 4.1.

3.2.2 Database Searches

Desktop searches included databases relating to significant flora, TECs and PECs previously collected or described within, or in close proximity to, the study area. The search was extended beyond the study area to place flora values into a local and regional context. The following databases were searched:

- DBCA's Threatened and Priority flora database was searched to confirm the Naturemap results (30 km radial search) (DBCA 2022a);
- DBCA's TEC, PEC and Environmentally Sensitive Areas (ESAs) database was searched to identify significant communities (50 km radial search) (DBCA 2022b);
- Environmental Protection and Biodiversity Conservation (EPBC) Act Protected Matters Database (30 km radial search) (DCCEEW 2024); and
- Atlas of Living Australia (ALA) spatial database search of the study area boundary (ALA 2024).

3.2.3 Assessment of Conservation Significance

The conservation significance of flora and ecological communities are classified at a Commonwealth, State and Local level on the basis of various Acts and Agreements, including:
International Level:

- IUCN: The IUCN 'Red List' lists species at risk under nine categories (status codes) (Appendix 1).

Commonwealth Level:

- EPBC Act: The DCCEEW lists Threatened flora and ecological communities, which are determined by the Threatened Species Scientific Committee according to criteria set out in the Act. The Act lists flora that are considered to be of conservation significance under one of six categories (Appendix 1).

State Level:

- BC Act: At a State level, native flora species are protected under the BC Act – Wildlife Conservation Notice. A number of species are assigned an additional level of conservation significance based on a limited number of known populations and the perceived threats to these locations (Appendix 1); and
- DBCA Priority list: DBCA produces a list of Priority species and ecological communities that have not been assigned statutory protection under the WC Act. Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added under Priorities 1, 2 or 3. Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been removed from the threatened species list for other taxonomic reasons, are placed in Priority 4. These species require regular monitoring (see Appendix 1). The list of PECs identifies those that need further investigation before nomination for TEC status at a State level.

Local Level:

- Species may be considered of local conservation significance because of their patterns of distribution and abundance. Although not formally protected by legislation, such species are acknowledged to be in decline as a result of threatening processes, primarily habitat loss through land clearing.

3.2.4 Assessment of Likelihood of Occurrence in the Study Area

A list of conservation significant flora species occurring within a 50 km radius of the study area was compiled during the literature review and database searches. The likelihood of each taxon occurring within the study area was assessed using a set of rankings and criteria (as described in Table 1). The criteria are based on presence of suitable landform (inferred from aerial imagery with contours overlayed, and from knowledge of the adjacent areas) and distance to known records.

Table 1 Ranking system used to assign the likelihood that a flora species would occur in the study area.

Rank	Criteria
Recorded	The species has been recorded in the study area.
Likely to occur	The species has previously been recorded from a landform/habitat which is present within the study area, and there are previous records within a 10 km radius of the study area.
Possible to occur	The species has previously been recorded from a landform/habitat which is present within the study area, and there are previous records within a 30 km radius of the study area.
Unlikely to occur	The landform/habitat from which the species has previously been recorded is absent within the study area.

3.3 Survey Methodology

3.3.1 Timing and Personnel

The single season flora and vegetation survey was completed by Principal Botanist Dr Jerome Bull between the 15th and 19th of May 2024.

3.3.2 Sampling of Study Sites

The previous field surveys involved systematic sampling using quadrats (referred to as study sites). The study sites were 10 metres by 10 metres in size which is standard for the Jarrah Forest bioregion. A total of 13 quadrats have previously been formally assessed within the study area (Figure 6). Study site locations were chosen based on consideration of the following requirements as per the technical guidelines for flora and vegetation surveys (EPA 2016a):

- A minimum of three quadrats in each vegetation type observed within the study area;
- Vegetation within the quadrat was representative of the typical vegetation occurring within a vegetation type (i.e. quadrats were not placed within an area of transition between vegetation types or in close proximity to tracks or other significant disturbance);
- Quadrats were positioned to provide adequate spatial coverage across the study area; and
- Quadrats were positioned to capture the typical range of variability in landforms, geology, soils, vegetation and other physical characteristics that were present across a vegetation type.

In addition to quadrats, relevé vegetation descriptions were made to increase the accuracy of vegetation mapping and capture additional information on the flora and vegetation of the study area. Relevé vegetation descriptions were utilised to target unusual areas or specific features of geology, soil, landforms or vegetation. They were also conducted in areas where conservation significant flora or previously unrecorded species were observed outside formal quadrats.

ONSHORE ENVIRONMENTAL

TALISON LITHIUM
Salt Water Gully

Figure 6
Location of study sites (quadrats) within the study area

Legend

- Study Area
- Quadrat Locations

0 250 500 750 m

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Datum: GDA 94
Projection: MGA Zone 50

Date: 17/06/2024
Status: Final
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The quadrats were assessed to provide a list of the total flora occurring within the study area and a description of the vegetation structure. Data recorded covered a range of environmental parameters including:

- Landform and habitat;
- Aspect;
- Soil colour and soil type;
- Rock type;
- Slope (angle);
- Vegetation condition;
- Disturbance (caused by fire, clearing, grazing etc.);
- Age since fire;
- Broad floristic formation;
- Vegetation type description; and
- Height and percentage ground cover provided by individual plant taxa.

Other parameters recorded for each study site were:

- Study site number and date of assessment;
- Names of the botanists undertaking the assessment;
- Location description - a waypoint - GPS coordinate (GDA94) using a handheld GPS; and
- Photograph number (taken from north-west corner).

Vegetation condition for each of the study sites was determined using a recognised rating scale (based on Keighery 1994, see Appendix 2).

3.3.3 Targeted Surveys for Conservation Significant Species

Ground truthing conducted across the study area and between quadrats provided an opportunity to record opportunistic locations for conservation significant flora and to undertake closer examination of specific landforms where conservation significant flora would be expected to occur.

Targeted searches for species of conservation significance were completed at habitats where it was anticipated that significant flora might occur based on habitat preferences (according to the database searches) and from previous knowledge of the species. These habitats were intensively covered during the field survey due to their increased likelihood to support a number of conservation significant species. Where species of conservation significance were identified during the survey a relevé was conducted to record details of the species and the associated habitat. Relevé information formed the basis for additional targeted searches within the wider study area based on soils, landforms, vegetation and microhabitats.

3.3.4 Weed Survey and Mapping

Introduced species were recorded from the quadrats formally assessed within the study area. Opportunistic collections were also made while moving throughout the study area, with targeted weed searches completed in high moisture habitats.

3.3.5 Vegetation Type Mapping

The classification of vegetation types within the study area follows the height, life form and density classes of Muir (1997) (see Appendix 3). This is largely a structural classification suitable for broader scale mapping, but taking all ecologically significant strata into account. The vegetation code and associated description incorporates not only the structural and floristic components described above but extends the conservative definition of mapping to incorporate relationships with landform and underlying soils and hydrology.

A unique code was applied to each vegetation type present within the study area. Each vegetation type code commenced with a two letter capital prefix to indicate the landform, e.g., HC = hill crest, HS = hill slopes, LS = lower slopes, GR = granite outcrops and rockpiles, DF = drainage flats, MI = minor drainage lines, ME = medium drainage lines, WE = wetlands[1]. The landform was followed by a sequence of two letter codes with the first letter (capital) representing the genus and the second letter (lower case) representing the species. There are up to five plant taxa represented within each vegetation stratum, with a space between a string of codes representing a change in the stratum. There is a maximum of five vegetation strata represented within each vegetation type, listed from the tallest stratum (first) down to the shortest stratum (last).

The vegetation type mapping utilised high-resolution aerial photography of the entire study area at a scale of 1:5,000, with definition of vegetation polygons based on contrasting shading patterns. Ground-truthing of the study area was completed during the field surveys with vegetation descriptions made within selected vegetation polygons to confirm dominant structural layers and associated plant taxa. The 13 study sites were overlaid on the aerial photography, and associated flora and vegetation data was used to provide vegetation type descriptions for individual polygons defined.

3.3.6 Vouchering

At least one voucher specimen was taken for each species collected to verify identification. Taxonomy was completed by Dr Jerome Bull at the Western Australian Herbarium (WAH) with use made of the WAH for confirmation of species identification.

3.3.7 Field Survey Constraints

The EPA Technical Guidance for Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia (EPA 2016a) list seven potential limitations that field surveys may encounter. These limitations are addressed in Table 2.

[1] Landform categories were developed by Onshore Environmental on the basis of extensive in-field knowledge of the Southern Jarrah Forest, and records made from formal study sites at the Greenbushes Mine over a 24 year period.

Table 2 Relevance of limitations, as identified by EPA (2016a), to the flora and vegetation survey.

Constraint	Relevance
Availability of contextual information at a regional and local scale	NOT A LIMITATION There has been 18 previous flora and vegetation surveys completed within State forest adjacent to the study area, with four of these surveys intersecting the study area. This provided a comprehensive local database.
Proportion of flora recorded and/or collected, any identification issues	NOT A LIMITATION It is likely that a large proportion of the total flora occurring within the study area has previously been recorded given the high intensity of sampling completed over multiple seasons and across multiple years (October 2022, May 2023, November 2023). It is also noted that the dominant vegetation complexes represented within the study area are well represented locally and regionally.
Survey timing, rainfall, season of survey	NOT A LIMITATION Field surveys within the study have been completed in October 2022, May 2023 and November 2023. These survey times include peak flowering periods and are within seasonal windows recommended by the EPA (2016).
Disturbance that may have affected the results of the survey such as fire, flood or clearing	NOT A LIMITATION There were no disturbances recorded within the study area that influenced survey outcomes. Disturbances within the study area included clearing for annual pasture and plantation timber on farmland lots, historical hardwood logging within State Forest, *Phytophthora* dieback, historical dredge mining for tin along the main drainage channel of Salt Water Gully, the South Western Highway sealed road corridor, and edge effects along disturbed boundaries.
Was the appropriate area fully surveyed (effort and extent)	LIMITATION ON PRIVATE LOTS IN THE SOUTHERN EXTENT OF THE STUDY AREA The study area has been assessed during four separate flora and vegetations, of which two were detailed level assessments. The field work was completed by a Principal Botanist with over 20 years' experience working at Greenbushes and the wider Southern Jarrah Forest. There have been 13 quadrats formally assessed within the study area, supplemented by numerous relevé sites. This represents an extensive survey effort. There were privately owned farmland lots in the southern extent of the study area where access was not granted, and vegetation mapping was therefore inferred from the perimeter. These properties were cleared farmland areas with isolated stands of parkland cleared trees, or degraded drainage lines with scattered remnant trees.
Access restrictions within the survey area	NOT A LIMITATION The study area was accessed on foot, noting that vegetation mapping was facilitated by high-resolution aerial photography. Access did not pose any restrictions to undertaking the field survey, noting that access was restricted on farmland in the southern extent of the study area. .
Competency/experience of the team carrying out the survey, including experience in the bioregion surveyed	NOT A LIMITATION The Principal Botanist working on the survey (Dr Jerome Bull) has over 20 years' experience working locally and has completed numerous surveys around Greenbushes since 2012.

4.0 RESULTS

4.1 Desktop Review

4.1.1 Previous Flora and Vegetation Surveys

Results from the previous flora and vegetation surveys in the Greenbushes area are presented in Table 3 and summarised below. The 18 surveys have recorded one Threatened Flora taxon and six Priority flora taxa within a 20 km radius of the study area, noting that none of these species occur within the study area:

- *Caladenia harringtoniae* (Threatened, Vulnerable);
- *Caladenia validinervia* (Priority 1);
- *Eucalyptus relicta* (Priority 2);
- *Dillwynia* sp. Capel (P.A. Jurjevich 1771) (Priority 3);
- *Melaleuca viminalis* (Priority 2)[2];
- *Tetratheca parvifolia* (Priority 3); and
- *Acacia semitrullata* (Priority 4).

Two plant taxa with restricted distributions were determined to be 'species of interest' that require further taxonomic investigation to confirm species level identification; both of these taxa were recorded from one location within the study area:

- *Gonocarpus* sp. indet; and
- *Lepidosperma* sp. ONS6731.

Two species have been identified as occurring outside of their known distribution (i.e. range extensions); they did not occur within the study area:

- **Cyperus involucratus* (80 km southeast of nearest known population); and
- *Hybanthus epacroides* (180 km west of nearest known population).

Vegetation types recorded during the previous surveys were not aligned with any Commonwealth or State listed TECs or DBCA listed PECs, and are regarded as being well represented and adequately reserved.

[2] Likely introduced through revegetation around the Greenbushes Swimming Pool.

Table 3 Results from flora and vegetation surveys previously completed within, or near to, the study area.

Survey	Consultant	Year	Field Survey Date	Flora Statistics	Significant Flora	Introduced (Weed) Taxa
A Flora and Vegetation Survey of Part of the Greenbushes Leases	Trudgen and Morgan	1991	13-14 April 1991	91 plant taxa 35 families 65 genera	None	9 introduced taxa including one Declared Plant listed under the BAM Act; **Rubus anglocandicans* (Blackberry)
Bridgetown RWSS Pipelines Millstream Dam to Greenbushes Link Biological Survey	AECOM Australia Pty Ltd	2010	Spring 2009	86 plant taxa 37 families 70 genera	None	29 introduced taxa including three Declared Plant listed under the BAM Act; **Rubus ulmifolius* (Blackberry), **Asparagus asparadoidies* (Bridal Creeper), **Echium plantagineum* (Paterson's Curse)
Flora and Vegetation Survey Greenbushes Mine Site: Vegetation surrounding south east corner of the TSF	Onshore Environmental Consultants	2006	13th April 2006	135 plant taxa 37 families 97 genera	None	27 introduced taxa including one Declared Plant listed under the BAM Act; **Rubus anglocandicans* (Blackberry)
Flora and Vegetation Survey Greenbushes Mining Leases	Onshore Environmental Consultants	2012	13-21 October 2011	368 plant taxa 73 families 208 genera	*Caladenia harringtoniae* (T); *Tetratheca parvifolia* (P3)	86 introduced taxa including three Declared Plants listed under the BAM Act; **Asparagus asparagoides* (Bridal Creeper), **Galium aparine* (Goosegrass), **Rubus ulmifolius* (Blackberry)
Greenbushes Mining Operations Detailed Flora and Vegetation Survey	Onshore Environmental Consultants	2018	27 February - 2 March and 26 September, 4, 16-18 October 2018	365 plant taxa 63 families 200 genera	*Acacia semitrullata* (P4), **Cyperus involucratus* (range extension)	66 introduced taxa, including three Declared Plants listed under the BAM Act; **Asparagus asparagoides* (Bridal Creeper), **Rubus anglocandicans* (Blackberry) and **Rumex acetosella* (Sorrell)

Survey	Consultant	Year	Field Survey Date	Flora Statistics	Significant Flora	Introduced (Weed) Taxa
Greenbushes Infrastructure Corridors Detailed Flora and Vegetation Survey	Onshore Environmental Consultants	2019a	30 July - 6 August and 26-27, 29-30 September, 3-4 and 18 October 2018	280 plant taxa 60 families 157 genera	*Acacia semitrullata* (P4), *Melaleuca viminalis* (P2), *Hybanthus epacroides* (range extension)	45 introduced taxa, including two Declared Plants listed under the BAM Act; **Asparagus asparagoides* (Bridal Creeper) and **Rubus anglocandicans* (Blackberry)
Targeted Flora Survey Greenbushes Lithium Mine	Onshore Environmental Consultants	2019b	19-20 September and 10 October 2019	Not assessed	*Acacia semitrullata* (P4)	Not assessed
Targeted Survey for *Eucalyptus relicta* Greenbushes Lithium Operations	Onshore Environmental Consultants	2020	20-24 July and 5-15 August 2020	Not assessed	*Eucalyptus relicta* (P2)	Not assessed
Detailed Flora and Vegetation Survey Greenbushes Mine Expansion Area 2 and Area 4	Onshore Environmental Consultants	2021	26 -31 October 2021	272 plant taxa, 60 families and 162 genera	None	49 introduced taxa
Detailed Flora and Vegetation Survey - Floyd's Waste Rock Landform Extension	Onshore Environmental Consultants	2022a	26-30 September 2022	132 plant taxa, 45 families and 102 genera	None	14 introduced species (none listed as Declared Plants under the BAM Act
Greenbushes Rehabilitation Materials Stockpiles - Reconnaissance Flora and Vegetation Survey	Onshore Environmental Consultants	2022b	21 September 2022	Not recorded	None	One Declared Plant listed under the BAM Act; **Rubus ulmifolius* (Blackberry)
Detailed Flora and Vegetation Survey - New Water Storages	Onshore Environmental Consultants	2022c	1-5 October 2022	236 plant taxa, 55 families and 142 genera	None One species of interest: *Gonocarpus* sp. indet	Four plant taxa listed as Declared Plants under the BAM Act; **Rubus anglocandicans* (Blackberry), **Asparagus asparagoides* (Bridal Creeper), **Zantedeschia aethiopica* (Arum Lilly) and **Galium aparine* (Cleavers)
Greenbushes Proposed Village - Reconnaissance Flora and Vegetation Survey	Onshore Environmental Consultants	2022d	20 September 2022	Not recorded	None	One Declared Plant listed under the BAM Act; **Rubus ulmifolius* (Blackberry)

Survey	Consultant	Year	Field Survey Date	Flora Statistics	Significant Flora	Introduced (Weed) Taxa
Greenbushes Mine Access Road - Reconnaissance Flora and Vegetation Survey	Onshore Environmental Consultants	2022e	19-20 September 2022	Not recorded	None	Three plant taxa were listed as Declared Plants under the BAM Act; **Rubus ulmifolius* (Blackberry), **Asparagus asparagoides* (Bridal Creeper) and **Zantedeschia aethiopica* (Arum Lilly)
Additional Areas at Water Storages Reconnaissance Flora and Vegetation Survey	Onshore Environmental Consultants	2023a	7-8 and 15-16 December 2022	Not recorded	*Acacia semitrullata* (P4)	Not recorded
Targeted Flora Survey New Zealand Gully	Onshore Environmental Consultants	2023b	5-9 September 2023	Not recorded	*Caladenia validinervia* (P1), *Dillwynia* sp. Capel (P.A. Jurjevich 1771) (P3).	Not recorded
Detailed Flora and Vegetation Survey Additional Areas North	Onshore Environmental Consultants	2024a	15-23 November 2023	330 plant taxa	Species of interest: *Lepidosperma* sp. ONS6731	75 introduced plant species (three species listed as Declared Pests under the Biosecurity and Agriculture Management Act 2007 (BAM Act): *Gomphocarpus fruticosus* (Narrowleaf Cottonbush), *Rubus anglocandicans* (Blackberry) and *Asparagus asparagoides* (Bridal Creeper).
Reconnaissance Flora and Vegetation Survey Greenbushes Operations - Upcoming Clearing Approvals	Onshore Environmental Consultants	2024b	2-5 April 2024	141 plant taxa, 40 families and 96 genera	*Acacia semitrullata* (P4)	Not recorded

4.1.2 Threatened Flora listed under the EPBC Act

A search of the EPBC Protected Matters database was undertaken for a 10 km radius around the study area (DCCEEW 2024). The search identified three records of Threatened flora potentially occurring within the buffer of the study area; *Caladenia hoffmanii* (Endangered), *Caladenia harringtoniae* and *Diuris micrantha* (Vulnerable) (Table 4).

4.1.3 Threatened Flora listed under the BC Act

A total of three Threatened Flora taxa were identified from the DBCA rare flora database search (DBCA 2022a) as occurring within a 40 km radius of the study area; *Caladenia harringtoniae, Caladenia christineae* and *Diuris drummondii* (Table 4).

4.1.4 Priority Flora recognised by the DBCA

A total of 24 Priority flora taxa were identified as potentially occurring within a 40 km radius of the study area (DBCA 2022a) (Table 4).

4.1.5 Likelihood of Occurrence

The combined database searches resulted in a list of 27 species of conservation significance with the potential to occur within the study area (Table 4). None of the 27 taxa was considered 'likely' to occur within the study area based on occurrence of habitat and proximity of previous records (Table 4). Six taxa were considered 'possible' to occur within the study area, and the remaining 21 taxa were determined as 'unlikely' to occur within the study area.

4.1.6 TECs listed under State and Federal Legislation

A search of the EPBC Protected Matters database (DCCEEW 2024) confirmed there were no Commonwealth listed TECs previously recorded within a 30 km radius of the study area.

A search of the DBCA ecological community database (DBCA 2022b) confirmed there were no Western Australian listed TEC records within a 30 km radius of the study area.

4.1.7 PECs recognised by DBCA

A search of DBCA's ecological community database (DBCA 2022b) confirmed that there were no PECs occurring within a 30 km radius of the study area.

4.1.8 Environmentally Sensitive Areas

There was one Environmentally Sensitive Area (ESA) identified approximately 2 km to the north-west of the study area, and 560 m northwest from the intersection of Huitson Road and Maranup Ford Road. The ESA incorporates the winter-wet dampland supporting the Threatened orchid species *Caladenia harringtoniae*. This landform was not represented within the study area. There were no *Caladenia harringtoniae* plants recorded from within the study area.

Table 4 Significant flora potentially occurring within a 40 km radius of the study area (from database searches), and the likelihood of these taxa occurring within the study area.

Taxon	Code	Habitat Preference	Likelihood
Acacia parkerae	3	Loam soils.	Unlikely
Acacia semitrullata	4	Grey sand.	Possible
Acacia tayloriana	4	Grey or yellow/orange sandy soils, lateritic gravel, clay loam.	Unlikely
Andersonia barbata	2	White sand. Swampy areas.	Unlikely
Aponogeton hexatepalus	4	Freshwater: ponds, rivers, claypans.	Unlikely
Caladenia christineae	T (V)	Winter- wet flats (on the margins as well as in standing water) in heath and tall scrub.	Unlikely
Caladenia harringtoniae	T (V)	Swamps and flats which are inundated for several months of the year; creek lines.	Possible
Caladenia uliginosa subsp. *patulens*	1	Clay loam and gravel. Well drained soils amongst dense shrubs.	Unlikely
Caladenia validivervia	1	Jarrah-Marri woodland	Possible
Carex tereticaulis	3	Black peaty sand.	Unlikely
Chorizema carinatum	3	Sand, sandy clay.	Unlikely
Dampiera heteroptera	3	Sandy soils. Swampy areas.	Unlikely
Dillwynia sp. Capel (P.A. Jurjevich 1771)	3	Littered grey loamy sand, rocky soils. Valleys, rangelands.	Possible
Diuris drummondii	T (V)	Low-lying depressions in peaty and sandy clay swamps.	Unlikely
Eucalyptus relicta	2	Grey clay-loam. Undulating upper slopes, along creeklines.	Possible
Gastrolobium formosum	3	Clay loam. Along river banks or in swamps.	Unlikely
Grevillea bronwenae	3	Grey sand over laterite, lateritic loam. Hillslopes.	Unlikely
Grevillea ripicola	4	Sandy clay, clay or gravelly loam. Swampy flats, granite outcrops, drainages.	Unlikely
Melaleuca viminalis	2	Drainage lines and flats.	Unlikely
Pultenaea skinneri	4	Sandy or clayey soils. Winter-wet depressions.	Unlikely
Scaevola ballajupensis	1	Brown sandy gravel, laterite, granite. Outcrops.	Unlikely
Synaphea otiostigma	3	Clayey laterite, gravelly loam, sand.	Unlikely
Netrostylis sp. Blackwood River (A.R. Annels 3043)	3	Loam soil.	Unlikely
Netrostylis sp. Nannup (P.A. Jurjevich 1133)	1	Laterite.	Unlikely
Tetratheca parvifolia	3	Loam soils.	Possible
Thysanotus formosus	1	Clayey sand, sandy loam. In situations often inundated in winter.	Unlikely
Thysanotus gageoides	3	Sand, clay, granite, sandstone, laterite.	Unlikely

4.2 Flora Species

A total number of 255 plant taxa (including varieties and subspecies) from 60 families and 161 genera were recorded from the study area (Table 5, Appendix 4). Species representation was greatest among the Fabaceae, Cyperaceae, Orchidaceae, Poaceae, Asteraceae, Asparagaceae, Myrtaceae, Stylidiaceae, Ericaceae, Proteaceae and Goodeniaceae families. The most speciose genera were *Acacia,* (10 taxa), *Caladenia* and *Lomandra* (8 taxa), *Stylidium* (7 taxa), *Lepidosperma* (6 taxa), and *Drosera* and *Senecio* (4 taxa).

Table 5 Statistics for total flora recorded from the study area.

Overview	No. Taxa
Families	60
Genera	161
Taxa (species, subspecies, varieties)	255
Native Taxa	205
Introduced Taxa	55
Threatened Flora	0
Priority Flora	0
Range Extensions	0
Speciose Families	**No. Taxa**
Fabaceae	37
Cyperaceae	21
Orchidaceae	18
Poaceae	17
Asteraceae	15
Asparagaceae	14
Myrtaceae	13
Stylidiaceae	8
Ericaceae	7
Proteaceae	7
Speciose Genera	**No. Taxa**
Acacia	10
Lomandra	8
Caladenia	8
Stylidium	7
Lepidosperma	6
Styphelia	5
**Acacia*	5
Drosera	4
Senecio	4
Bossiaea	3
Kennedia	3
Isolepis	3
Hybanthus	3
Hibbertia	3
Daviesia	3
Eucalyptus	3
Hakea	3
Leptocarpus	3
Pterostylis	3

4.3 Significant Flora

4.3.1 Threatened Flora listed under the EPBC Act and BC Act

None of the plant taxa recorded from the study area were listed as Threatened Flora under the Commonwealth EPBC Act or the Western Australian BC Act.

4.3.2 Significant Flora

None of the plant taxa recorded from the study area were listed by the DBCA as Priority Flora.

4.3.3 Species of Interest

The total flora included two species of interest that could not be identified to species level: *Gonocarpus* sp. ONS-3762 and *Lepidosperma* sp. ONS6731.

Gonocarpus sp. ONS-3762 was recorded at a single location in the central western sector of the study area where it occurred within verge vegetation alongside the South Western Highway (Figure 7). The localised population comprised 85 plants. Specimens were submitted to the WA Herbarium but it was unable to be identified to species level. The Perth Taxonomic Review Committee did not recognise the voucher as a new species but recommended future collection of fruiting material.

Lepidosperma sp. ONS-6731 was recorded as 13 plants from one spot locations along a drainage line on the south eastern perimeter of the study area (Figure 7). An additional 39 plants were recorded from seven nearby locations along the same drainage line but outside of the study area in May 2023 (Figure 7, Onshore Environmental 2023b). The original collection was submitted to the WA Herbarium for further evaluation on the 19 February 2023 however it remained unresolved in April 2024, when additional high resolution images were requested and forwarded to the DBCA. It is noted that a revision of the *Lepidosperma* group commenced at the WA Herbarium a number of years ago and currently remains incomplete. There are five sedges in the south-west region that are superficially similar to *Lepidosperma* sp. ONS-6731: *Lepidosperma effusum, Lepidosperma squamatum, Lepidosperma longitudinale, Lepidosperma drummondii* and *Lepidosperma costale.*

4.4 Introduced Flora

There were 50 introduced species recorded from the study area (Appendix 4). Four weed species were listed as Declared Pests under the BAM Act:

- **Asparagus asparagoides* (Bridal Creeper) - Declared Pest s22(2);
- *Galium aparine* (Cleavers) - Declared Pest s22(2)
- **Rubus anglocandicans* (Blackberry) - Declared Pest s22(2); and
- **Zantedeschia aethiopica* (Arum Lily) - Declared Pest s22(2).

ONSHORE ENVIRONMENTAL

TALISON LITHIUM
Salt Water Gully

Figure 7
Location of species of interest

Legend

Study Area

Species of Interest

Gonocarpus sp.

Lepidosperma sp.

0 250 500 750 m

1:20,000

Datum: GDA 94
Projection: MGA Zone 50

Date: 17/06/2024
Status: Final
Figure: 7
Sheet Size: A4
File Name Reference: TA_SWG_Fig7_species.pdf
Drawn by: JW
Requested by: DB

4.5 Vegetation Condition

The study area was predominantly cleared annual pasture (farmland) with isolated paddock trees (Marri) or occasionally small parkland cleared remnants (Figure 8, Table 6).

There were ten vegetation types described and mapped from remnant vegetation. The largest consolidated block of native vegetation occurred in state forest and road reserve (South Western Highway) at the northern sector of the study area, with vegetation condition ranging from good (in the western sector) to degraded in the eastern sector (Figure 8). Disturbances noted within the road reserve and state forest precincts included hardwood logging, altered surface drainage along South Western Highway, and edge effects along the cleared alignment forming the highway primarily related to surface soil disturbance and increased loading of introduced weed species. The majority of vegetation within the state forest block showed evidence of recent fire within the past two years, and edge effects were evident where perimeter boundaries were shared with farmland.

The north-eastern sector of the study area was dissected by Salt Water Gully. The medium sized drainage line was disturbed by historical alluvial tin mining and the natural drainage pattern has been altered through construction of a series of dams. There was evidence of historical rehabilitation that included the non-provenance tree species **Corymbia maculata* and **Eucalyptus resinifera,* and parts of the drainage line were infested with numerous introduced species including the Declared Pest **Rubus anglocandicans* (Blackberry). The north-east corner of the study area supported softwood plantation timber. Vegetation condition along the drainage line was generally rated as degraded or completely degraded (Figure 8).

Overall, 72% of the study area had been cleared for annual pasture (farmland) with a further 18% of the study area supporting vegetation condition rated as degraded or completely degraded (Figure 8). Remnant native vegetation rated as good accounted for 39.8 ha (8% of the study area) and was to state forest and road reserve in the northwest sector of the study area (Table 6, Figure 8).

Table 6 Vegetation condition within the study area.

Condition	Area (ha)	% of Total
Pristine	0	0
Excellent	0	0
Very Good	0	0
Good	39.77	8.4
Degraded	31.96	6.8
Completely Degraded	51.93	11.0
Cleared (farmland, access)	339.67	71.91
Standing Water (dams, drainage line pools)	9.01	1.9
Total	**472.34**	**100.00**

TALISON LITHIUM
Salt Water Gully

Figure 8
Vegetation conditon map for the study area

Legend

- Study Area

Vegetation Condition

- Cleared
- Completely Degraded
- Degraded
- Good
- Water

0 250 500 750 m

1:20,000

Datum: GDA 94
Projection: MGA Zone 50

Date: 17/06/2024
Status: Final
Figure: 8
Sheet Size: A4
File Name Reference: TA_SWG_Fig9_cond.pdf
Drawn by: JW
Requested by: DB

4.6 Vegetation

Ten vegetation types classified as four broad floristic formations were described and mapped from the study area (Figure 9, Table 7). Raw data for the 13 study sites is presented in Appendix 5.

Vegetation broadly comprised Jarrah *(Eucalyptus marginata)* and Marri *(Corymbia calophylla)* forest on lateritic hill crests and hill slopes, changing to Marri and Yarri *(Eucalyptus patens)* forest on foot slopes, and Flooded Gum *(Eucalyptus rudis* subsp. *rudis)* forest along the main drainage line of Salt Water Gully (Figure 9).

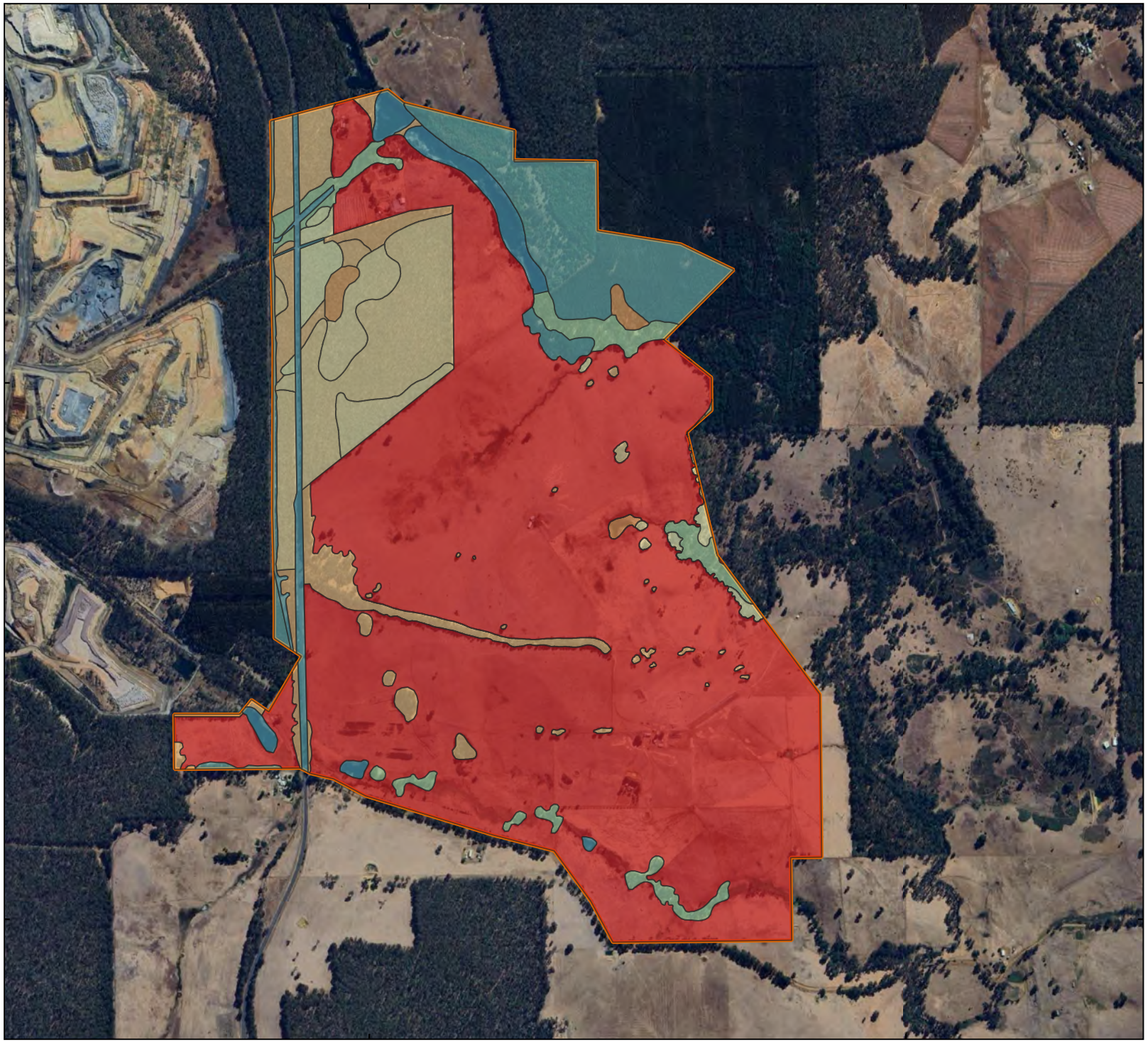
The study area was predominantly cleared for annual pasture and two highly altered vegetation types were mapped on farmland; scattered Marri trees (parkland cleared) and a localised area along a minor drainage line supporting tall sedges of *Machaerina rubiginosa* (Common Twig Rush).

None of the seven vegetation types described and mapped from the study area were aligned with TECs or PECs documented from the Jarrah Forest bioregion.

Table 7 Vegetation types mapped within the study area.

Vegetation Code	Broad Floristic Formation	Description	Condition	Area (ha) and of study area	Quadrats
HC EmCc BgPl PeMr(Bl) BoLc	Corymbia Forest	Forest of Corymbia calophylla and Eucalyptus marginata subsp. marginata over Low Woodland A of Banksia grandis and Persoonia longifolia over Open Low Scrub A/B of Pteridium esculentum and Macrozamia riedlei (Bossiaea linophylla) over Dwarf Scrub D of Bossiaea ornata and/or Leucopogon capitellatus on brown loamy sand on hill crests and upper hill slopes	Good	1.53 ha (0.3%)	AN02, AN04, AN07, AN19, AN39
HS EmCc BoLc	Eucalyptus Forest	Forest of Eucalyptus marginata subsp. marginata and Corymbia calophylla over Low Heath D of Bossiaea ornata and Leucopogon capitellatus on grey/brown sandy loam on hill crests and upper hill slopes	Good to Degraded	30.61 ha (6.5%)	WS-08, WS-10, WS11, WS-14
HS EmCc PeMr LcBo	Eucalyptus Forest	Forest of Eucalyptus marginata subsp. marginata and Corymbia calophylla over Low Scrub A of Pteridium esculentum and Macrozamia riedlei over Low Heath D of Leucopogon capitellatus and Bossiaea ornata on brown loamy sand on lateritic hill slopes	Good	10.95 ha (2.3%)	WS-06, WS-15, WS-23, WS-24
HS CcEm Bl Pe(XpMr) LcBoHam	Corymbia Forest	Forest of Corymbia calophylla and Eucalyptus marginata subsp. marginata over Scrub of Bossiaea linophylla over Low Scrub B of Pteridium esculentum (Xanthorrhoea preissii, Macrozamia rieldei) over Open Dwarf Scrub D of Leucopogon capitellatus, Bossiaea ornata and Hibbertia amplexicaulis on brown sandy loam on lateritic hill slopes	Good to Degraded	10.44 ha (2.2%)	WS-04, WS-09, WS-13
HS CcEm	Corymbia Forest	Forest (to Open Woodland) of Corymbia calophylla and Eucalyptus marginata over parkland cleared understorey	Completely Degraded	16.56 ha (3.5%)	Parkland Cleared
LS CcEpEm Hp Xp HaBdLc NjLlDf	Corymbia Forest	Forest of Corymbia calophylla, Eucalyptus marginata subsp. marginata and Eucalyptus patens over Open Scrub of Hakea prostrata over Open Low Scrub A of Xanthorrhoea preissii over Dwarf Scrub D of Hypocalymma angustifolium, Banksia dallanneyi subsp. sylvestris and Lysiandra calycina over Open Low Sedges of Netrostylis sp. Jarrah Forest (R. Davis 7391), Lepidosperma leptostachyum and Desmocladus fasciculatus on red brown loam on lower valley slopes	Good to Degraded	0.62 ha (0.1%)	WS-05, WS-17, WS20, WS-21
LS CcEpEm BlXp Pe(XpLvMr) LcCcSp	Corymbia Forest	Forest of Corymbia calophylla, Eucalyptus patens and Eucalyptus marginata subsp. marginata over Scrub of Bossiaea linophylla and Xanthorrhoea preissii over Low Scrub B of Pteridium esculentum (Xanthorrhoea preissii, Leucopogon verticillatus, Macrozamia riedlei) over Open Dwarf Scrub D of Leucopogon capitellatus, Chorizema cordatum and Styphelia propinqua on brown loam on lower hill slopes and footslopes	Good	5.76 ha (1.2%)	WS-12, WS-22, WS-25

Vegetation Code	Broad Floristic Formation	Description	Condition	Area (ha) and of study area	Quadrats
GR CcEp XpApHs Hi HaHcSg	Corymbia Low Woodland A	Low Woodland A of Corymbia calophylla and Eucalyptus patens over Open Low Scrub A of Xanthorrhoea preissii, Acacia pulchella and Hakea lissocarpha over Low Scrub B of Hemigenia incana over Dwarf Scrub D of Hypocalymma angustifolium, Hibbertia commutata and Stypandra glauca on brown sandy and silty loam on granitic slopes	Degraded	1.15 ha (0.2%)	AN22, AN23, AN25
DF Mr Jp	Machaerina Tall Sedges	Tall Sedges of Machaerina rubiginosa over Very Open Low Sedges of Juncus pallidus on brown light medium clay on drainage zone amongst annual pasture	Degraded	0.57 ha (0.1%)	<1 ha (modified)
ME Er(CcEp) BliClAs(Mr) TlPe LeJp	Eucalyptus Forest	Forest of Eucalyptus rudis subsp. rudis (Corymbia calophylla, Eucalyptus patens) over Low Woodland A of Banksia littoralis, Callistachys lanceolata and Acacia saligna (Melaleuca rhaphiophylla) over Low Scrub A of Taxandria linearifolia and Pteridium esculentum over Very Open Tall Sedges of Lepidosperma effusum and Juncus pallidus on brown loam on medium drainage lines and floodplains	Degraded	14.05 ha (3.0%)	WS-01, WS-02, WS-03, WS-18
PL		Plantation	Completely Degraded	35.28 ha (7.5%)	Non-native
RT		Roads, tracks and infrastructure corridors	Completely Degraded	8.76 ha (1.8%)	Cleared
WB		Water Bodies / Dams	Completely Degraded	9.21 ha (2.0%)	Standing Water
CF		Farmland (Annual Pasture)	Completely Degraded	326.85 ha (69.2%)	Non-native



TALISON LITHIUM
Salt Water Gully

Figure 9
Vegetation type map for the study area

Legend

VegetationTypes

- Cleared Farmland
- DF Mr Jp
- GR CcEp XpApHs Hi HaHcSg
- HC EmCc BgPl PeMr(Bl) BoLc
- HS CcEm
- HS CcEm Bl Pe(XpMr) LcBoHam
- HS EmCc BoLc
- HS EmCc PeMr LcBo
- LS CcEpEm BlXp Pe(XpLvMr) LcCcSp
- LS CcEpEm Hp Xp HaBdLc NjLlDf
- ME Er(CcEp) BliClAs(Mr) TlPe LeJp
- Mine Rehabilitation
- Plantation
- Roads/Tracks
- Waterbodies

0 250 500 750 m

1:20,000

Datum: GDA 94
Projection: MGA Zone 50

Date: 17/06/2024
Status: Final
Figure: 9
Sheet Size: A4
File Name Reference: TA_SWG_Fig8_veg.pdf
Drawn by: JW
Requested by: DB

Code	HC EmCc BgPl PeMr(Bl) BoLc
Broad Floristic Formation	*Eucalyptus* Forest
Vegetation Type	Forest of Corymbia calophylla and Eucalyptus marginata subsp. marginata over Low Woodland A of Banksia grandis and Persoonia longifolia over Open Low Scrub A/B of Pteridium esculentum and Macrozamia riedlei (Bossiaea linophylla) over Dwarf Scrub D of Bossiaea ornata and/or Leucopogon capitellatus on brown loamy sand on hill crests and upper hill slopes

Quadrats Sampled	AN02, AN04, AN07, AN19, AN39
Area (ha)	1.53 ha (0.3% of the study area)
Soils and Geology	Brown loamy sands
Land Form	Lateritic hill crests and upper hill slopes
Priority Ecological Community	No
Conservation Significant Flora	None
Vegetation Condition	Very Good
Disturbances	Historical logging, road/ access track, weed invasion
Average Fire Age	Old (>6 years)

Code	HS EmCc BoLc
Broad Floristic Formation	*Eucalyptus* Forest
Vegetation Type	Forest of Eucalyptus marginata subsp. marginata and Corymbia calophylla over Low Heath D of Bossiaea ornata and Leucopogon capitellatus on grey/brown sandy loam on hill crests and upper hill slopes

Quadrats Sampled	WS-08, WS-10, WS11, WS-14
Area (ha)	30.61 ha (6.5% of the study area)
Soils and Geology	Brown sandy loam, loam, sandy clay loam
Land Form	Hill crests and upper hill slopes
Priority Ecological Community	No
Conservation Significant Flora	None
Vegetation Condition	Good to Degraded
Disturbances	Road / Access Track, Rubbish, Weeds, Historical Logging, Soil Disturbance
Average Fire Age	Recent (0-2 years) to Old (>6 years)

Code	HS EmCc PeMr LcBo
Broad Floristic Formation	*Eucalyptus* Forest
Vegetation Type	Forest of Eucalyptus marginata subsp. marginata and Corymbia calophylla over Low Scrub A of Pteridium esculentum and Macrozamia riedlei over Low Heath D of Leucopogon capitellatus and Bossiaea ornata on brown loamy sand on lateritic hill slopes

Quadrats Sampled	WS-06, WS-15, WS-23, WS-24
Area (ha)	10.95 ha (2.3% of the study area)
Soils and Geology	Brown loamy sand, loam, sandy loam
Land Form	Lateritic hill slopes
Priority Ecological Community	No
Conservation Significant Flora	None
Vegetation Condition	Good
Disturbances	Weeds, Historical Logging, Road / Access Track, Rubbish
Average Fire Age	Variable – ranging from Recent (0-2 years) to Moderate (3-5 years) to Old (>6 years)

Code	HS CcEm Bl Pe(XpMr) LcBoHam
Broad Floristic Formation	*Corymbia* Forest
Vegetation Type	Forest of Corymbia calophylla and Eucalyptus marginata subsp. marginata over Scrub of Bossiaea linophylla over Low Scrub B of Pteridium esculentum (Xanthorrhoea preissii, Macrozamia rieldei) over Open Dwarf Scrub D of Leucopogon capitellatus, Bossiaea ornata and Hibbertia amplexicaulis on brown sandy loam on lateritic hill slopes

Quadrats Sampled	WS-04, WS-09, WS-13
Area (ha)	10.44 ha (2.2% of the study area)
Soils and Geology	Brown sandy loam, loam, loamy sand
Land Form	Lateritic hill slopes
Priority Ecological Community	No
Conservation Significant Flora	None
Vegetation Condition	Good to Degraded
Disturbances	Road/ Access Track, Rubbish, Weeds, Historical Logging, Historical Soil disturbance
Average Fire Age	Old (>6 years)

Code	HS CcEm
Broad Floristic Formation	*Corymbia* Forest
Vegetation Type	Forest (to Open Woodland) of Corymbia calophylla and Eucalyptus marginata over parkland cleared understorey

Quadrats Sampled	Parkland Cleared (not formally sampled as completely degraded)
Area (ha)	16.56 ha (3.5% of the study area)
Soils and Geology	Brown sandy loam; laterite
Land Form	Hill slopes
Priority Ecological Community	No
Conservation Significant Flora	None
Vegetation Condition	Completely Degraded
Disturbances	Historical logging, intensive grazing of understorey by domestic stock over an extended period, surrounded by cleared annual pasture (unfenced), weeds
Average Fire Age	Old (>6 years)

Code	LS CcEpEm Hp Xp HaBdLc NjLlDf
Broad Floristic Formation	*Corymbia* Woodland
Vegetation Type	Forest of Corymbia calophylla, Eucalyptus marginata subsp. marginata and Eucalyptus patens over Open Scrub of Hakea prostrata over Open Low Scrub A of Xanthorrhoea preissii over Dwarf Scrub D of Hypocalymma angustifolium, Banksia dallanneyi subsp. sylvestris and Lysiandra calycina over Open Low Sedges of Netrostylis sp. Jarrah Forest (R. Davis 7391), Lepidosperma leptostachyum and Desmocladus fasciculatus on red brown loam on lower valley slopes

Quadrats Sampled	WS-05, WS-17, WS20, WS-21
Area (ha)	0.62 ha (0.1% of the study area)
Soils and Geology	Brown loamy sand, loam, sandy loam
Land Form	Lateritic hill slopes
Priority Ecological Community	No
Conservation Significant Flora	None
Vegetation Condition	Good to Degraded
Disturbances	Road/ Access Track, Weeds, Historical Logging, Soil Disturbance, Road Impact, Nearby Rehabilitation
Average Fire Age	Old (>6 years)

Code	LS CcEpEm BlXp Pe(XpLvMr) LcCcSp
Broad Floristic Formation	*Corymbia* Forest
Vegetation Type	Forest of Corymbia calophylla, Eucalyptus patens and Eucalyptus marginata subsp. marginata over Scrub of Bossiaea linophylla and Xanthorrhoea preissii over Low Scrub B of Pteridium esculentum (Xanthorrhoea preissii, Leucopogon verticillatus, Macrozamia riedlei) over Open Dwarf Scrub D of Leucopogon capitellatus, Chorizema cordatum and Styphelia propinqua on brown loam on lower hill slopes and footslopes

Quadrats Sampled	WS-12, WS-22, WS-25
Area (ha)	5.76 ha (1.2% of the study area)
Soils and Geology	Brown loam
Land Form	Lower hill slopes and foot slopes
Priority Ecological Community	No
Conservation Significant Flora	None
Vegetation Condition	Degraded
Disturbances	Access tracks, weeds, pine plantation, rabbits, kangaroos, historical disturbances, fence line
Average Fire Age	Moderate (3 to 5 yrs)

Code	GR CcEp XpApHs Hi HaHcSg
Broad Floristic Formation	*Corymbia* Low Woodland A
Vegetation Type	Low Woodland A of Corymbia calophylla and Eucalyptus patens over Open Low Scrub A of Xanthorrhoea preissii, Acacia pulchella and Hakea lissocarpha over Low Scrub B of Hemigenia incana over Dwarf Scrub D of Hypocalymma angustifolium, Hibbertia commutata and Stypandra glauca on brown sandy and silty loam on granitic slopes

Quadrats Sampled	AN22, AN23, AN25
Area (ha)	1.15 ha (0.2% of the study area)
Soils and Geology	Brown sandy and silty loams
Land Form	Granitic boulders/ rockpiles
Priority Ecological Community	No
Conservation Significant Flora	None
Vegetation Condition	Degraded, Good
Disturbances	Historical logging, road/ access tracks, weed invasion, pine plantation
Average Fire Age	Moderate (3 to 5 yr)

Code	DF Mr Jp
Broad Floristic Formation	*Machaerina* Tall Sedges
Vegetation Type	Tall Sedges of Machaerina rubiginosa over Very Open Low Sedges of Juncus pallidus on brown light medium clay on drainage zone amongst annual pasture

Quadrats Sampled	Unit <1ha in total area and degraded to completely degraded state
Area (ha)	0.57 ha (0.1% of the study area)
Soils and Geology	Brown light medium clay
Land Form	Minor drainage line / drainage zone
Priority Ecological Community	No
Conservation Significant Flora	None
Vegetation Condition	Degraded
Disturbances	Grazing, rubbish, weeds, paddocks (edge effects)
Average Fire Age	Old (>6 years)

Code	ME Er(CcEp) BliClAs(Mr) TlPe LeJp
Broad Floristic Formation	*Eucalyptus* Forest
Vegetation Type	Forest of Eucalyptus rudis subsp. rudis (Corymbia calophylla, Eucalyptus patens) over Low Woodland A of Banksia littoralis, Callistachys lanceolata and Acacia saligna (Melaleuca rhaphiophylla) over Low Scrub A of Taxandria linearifolia and Pteridium esculentum over Very Open Tall Sedges of Lepidosperma effusum and Juncus pallidus on brown loam on medium drainage lines and floodplains

Quadrats Sampled	WS-01, WS-02, WS-03, WS-18
Area (ha)	14.05 ha (3.0% of the study area)
Soils and Geology	Red brown clay loam
Land Form	Medium drainage lines and floodplains
Priority Ecological Community	No
Conservation Significant Flora	None
Vegetation Condition	Degraded
Disturbances	Access tracks, grazing, very weedy
Average Fire Age	Moderate (3 to 5 yrs)

4.7 Representation and Reservation of Vegetation

4.7.1 Beard (1981) Vegetation Associations

Regional vegetation mapping completed by Beard (1981) was utilised to assess representation of vegetation within the study area. A single Beard vegetation association was represented within the study area; 3 Medium forest; jarrah-marri (Table 8, Figure 4). In terms of representation, the Western Australian Government is committed to the National Objectives Targets for Biodiversity Conservation which includes a target that prevents clearance of ecological communities with an extent below 30% of that present at pre-European settlement (Department of Natural Resources and Environment 2002, EPA 2000). When considering representation at the State level, Beard vegetation association 3 currently has 67.76% of the pre-European extent remaining (Table 8, Government of Western Australia 2018). The study area is located within the Jarrah Forest Bioregion, specifically within the Southern Jarrah Forest Subregion (as discussed in Section 2.2). When considering the representation of vegetation association 3 at the IBRA regional and sub-regional levels, 67.10% and 59.40% of the pre-European extent remains respectively (Table 8). The study area falls entirely within the Shire of Bridgetown-Greenbushes. At this local level 56.35% of the pre-European extent remains for vegetation association 3 (Table 8). Vegetation within the study area is therefore determined to be well represented at all levels (state-wide, bioregional [IBRA region and IBRA sub-region] and local government authority).

In terms of reservation, there is a benchmark for a minimum of 15% of each Beard (1981) vegetation association to be protected in Class I-IV reserves (Commonwealth of Australia 1997). The proportion of the current extent of vegetation association 3 occurring within Class I-IV reserves at a state-wide, bioregional and local government authority level ranges between 23.44% and 31.13%, noting that larger proportions (ranging from 78.50% to 86.77%) occur within DBCA managed lands (Table 8). Hence the reservation status is determined to be above the minimum benchmark confirming adequate reservation for vegetation association 3.

4.7.2 Mattiske and Havel (1998) Vegetation Complexes

The pre-1750 distribution of vegetation complexes of the South West Forest Region of Western Australia has been mapped at 1:50,000 scale by Mattiske and Havel (1998) as part of the biodiversity assessment for the comprehensive regional assessment for the South West Forest Region. Interrogation of this database confirmed there were five vegetation complexes represented within the study area, with the Grimwade, Hester and Catterick complexes intersecting the larger blocks of remnant native vegetation in the northern sector. The Balingup complex aligned with cleared farmland, and the Dwellingup complex was restricted to 0.3 ha in the south-west tip of the study area (Table 8, Figure 5):

- D1 (Dwellingup) - Open forest of *Eucalyptus marginata-Corymbia calophylla* on lateritic uplands in mainly humid and subhumid zones;
- BL (Balingup) - Tall open forest to open forest of *Corymbia calophylla-Eucalyptus marginata* with *Eucalyptus patens* on slopes and *Eucalyptus rudis* over some *Agonis flexuosa* on lower slopes in the humid zone;
- CC1 (Catterick) - Open forest of *Eucalyptus marginata-Corymbia calophylla* mixed with *Eucalyptus patens* on slopes, *Eucalyptus rudis* and *Banksia littoralis* on valley floors in the humid zone;

- GR (Grimwade) - Tall open forest to open forest of *Corymbia calophylla-Eucalyptus marginata* with *Eucalyptus patens* on slopes and *Eucalyptus rudis* over some *Agonis flexuosa* on lower slopes in the humid zone; and
- HR (Hester) - Tall open forest to open forest of *Eucalyptus marginata* subsp. *marginata-Corymbia calophylla* on lateritic uplands in perhumid and humid zones.

Four of five vegetation complexes currently have between 50.3% and 86.8% of the pre-European extent remaining within the South West Forest Region, between 5.9% and 15.0% of the current extent within Class I-IV conservation reserves, and between 43.4% and 82.3% of the current extent within DBCA managed lands (Table 8). The Balingup complex has 29.4% of the pre-European extent remaining, 1.5% of the current extent within Class I-IV conservation reserves, and 15.3% of the current extent within DBCA managed lands (Table 8). However, within study area the Balingup complex has been cleared for farmland and the small native remnants remaining are degraded or completely degraded.

On this basis vegetation within the study area is generally determined to be well represented in terms of pre-European extent and occurrence within DBCA managed lands, but would benefit from increased formal reservation within Class I-IV reserves.

Table 8 Pre-European extent of vegetation represented on the basis of identified datasets (Government of Western Australia 2018).

Vegetation System / Association	Pre-European Extent (ha)	Current Extent (ha)	% Pre-European Extent Remaining	Current Extent in Class I-IV Reserves (ha)	% Current Extent in Class I-IV Reserves	Current Extent DBCA Managed Lands (ha)	% Current Extent DBCA Managed Lands
State-wide							
3 Medium forest; jarrah-marri	2,661,404.62	1,803,437.48	67.76	485,223.00	26.91	1,469,765.60	81.50
Beard Vegetation System							
3 Bridgetown	700,920.83	455,092.38	64.93	131,748.88	28.95	377,759.27	83.01
IBRA Region							
3 Jarrah Forest	2,390,591.54	1,604,101.56	67.10	385,183.08	24.01	1,299,263.74	81.00
IBRA Sub-Region							
3 Southern Jarrah Forest	1,482,491.85	880,655.65	59.40	274,167.05	31.13	691,319.44	78.50
Local Government Authority							
Shire of Bridgetown-Greenbushes	121,152.70	68,275.41	56.35	16,006.81	23.44	59,243.12	86.77
Mattiske & Havel Complexes							
Balingup, BL	59,446.57	17,466.47	29.38	883.65	1.49	9,120.37	15.34
Dwellingup, D1	208,490.90	181,038.81	86.83	17,407.23	8.35	171,561.01	82.29
Catterick, CC1	27,385.55	16,733.59	61.10	1,875.21	6.85	15,210.18	55.54
Grimwade, GR	22,046.59	11,083.33	50.27	1,307.17	5.93	9,556.20	43.35
Hester, HR	32,249.57	23,762.74	73.68	4,825.98	14.96	21,647.46	67.12

4.8 Conservation Significance of Vegetation

4.8.1 National Significance

None of the vegetation types recorded from the study area supported Threatened Flora listed under the EPBC Act, or were aligned with any Commonwealth listed TECs. Therefore, vegetation within the study area was not considered to be of national significance.

4.8.2 State Significance

None of the vegetation types recorded from the study area supported Threatened Flora listed under the Western Australian BC Act or were aligned with any state listed TECs or PECs. As well, vegetation types did not support Priority flora taxa listed by the DBCA. Vegetation within the study area was not considered to be of state significance.

4.8.3 Local Significance

Vegetation within the study area did not support new or previously undescribed flora, or plant taxa considered to represent significant range extensions outside of their known distribution. Two collections from the study area could not be identified to species level and were subsequently submitted to the WA Herbarium for further taxonomic investigation: *Gonocarpus* sp. ONS-3762 was submitted in July 2023, and *Lepidosperma* sp. ONS6731 was submitted in February 2024. The Perth Taxonomic Review Committee did not recognise *Gonocarpus* sp. ONS-3762 as a new species but recommended future collection of fruiting material. The *Lepidosperma* sp. ONS6731 submission remains unresolved in June 2024 with the complex group under review over the past few years.

Hence, vegetation within the study area was not considered to be of local conservation significance.

5.0 SUMMARY

All areas of native vegetation within the study area were previously assessed during detailed flora and vegetation surveys completed in October 2022 and November 2023 (Onshore Environmental 2022, 2023a) and reconnaissance levels surveys completed in May 2023 (Onshore Environmental 2023b, 2023c). The May 2024 assessment collated relevant data from the four previous surveys, and included a reconnaissance field survey to update previous mapping content and undertake additional targeted conservation significant flora searches.

The total flora included 255 plant taxa (including varieties and subspecies) from 60 families and 161 genera, with dominant families including Fabaceae, Cyperaceae, Orchidaceae, Poaceae, Asteraceae, Asparagaceae, Myrtaceae, Stylidiaceae, Ericaceae, Proteaceae and Goodeniaceae. The most speciose genera were *Acacia,* (10 taxa), *Caladenia* and *Lomandra* (8 taxa), *Stylidium* (7 taxa), *Lepidosperma* (6 taxa), and *Drosera* and *Senecio* (4 taxa). The total flora included 50 introduced plant species, with four of the weed species listed as a Declared Pest under the BAM Act: **Asparagus asparagoides, Galium aparine, *Rubus anglocandicans* and **Zantedeschia aethiopica.* None of the plant taxa recorded from the study area were listed as Threatened Flora under the Commonwealth EPBC Act or the Western Australian BC Act. Additionally, no species were listed as Priority flora by the DBCA.

Two plant taxa could not be identified to species level and were considered to be a species of interest: *Gonocarpus* sp. ONS-3762 and *Lepidosperma* sp. ONS6731. The *Gonocarpus* sp. ONS-3762 specimen has since been reviewed by The Perth Taxonomic Review Committee and was not recognised as a new species, but recommended for future collection of fruiting material. The *Lepidosperma* sp. ONS6731 collection remains unresolved in June 2024 with the group under review over the past few years and this review continuing.

The majority of the study area supported cleared annual pasture (farmland, 339.7 ha or 72%). Remnant native vegetation was restricted to state forest and road reserve in the northwest sector (39.8 ha or 8% of the study area) and broadly comprised Jarrah *(Eucalyptus marginata)* and Marri *(Corymbia calophylla)* forest on lateritic hill crests and hill slopes. The north-eastern sector of the study area supported softwood timber plantations, with farmland dissected by the Salt Water Gully. Sections of the drainage line had been disturbed by historical tin mining and rehabilitated with non-provenance tree species, with a mix of remnant Marri, Yarri *(Eucalyptus patens)*, and Flooded Gum *(Eucalyptus rudis* subsp. *rudis)* forest occurring further downstream. Large sections of the drainage line were infested by the Declared Pest **Rubus anglocandicans* (Blackberry) and other weeds encroaching from adjacent farmland, and vegetation condition was rated as degraded or completely degraded.

The ten native vegetation types recorded from the study area were not aligned with Commonwealth or State listed TECs or State listed PECs. Vegetation was determined to be well represented at the state-wide, bioregional and local government authority levels.

6.0 STUDY TEAM

The flora and vegetation survey was planned, co-ordinated and executed by the following personnel:

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Project Staff

Dr Darren Brearley	PhD	Project Manager
Dr Jerome Bull	PhD	Principal Botanist (Flora licence number: FB62000102-2)
Ms Jessica Waters	BSc	Principal Ecologist

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APPENDIX 1

Conservation Codes

Conservation codes for Western Australian Flora and Fauna

Department of **Biodiversity, Conservation and Attractions**

GOVERNMENT OF WESTERN AUSTRALIA

CONSERVATION CODES

For Western Australian Flora and Fauna

Threatened, Extinct and Specially Protected fauna or flora[1] are species[2] which have been adequately searched for and are deemed to be, in the wild, threatened, extinct or in need of special protection, and have been gazetted as such.

The *Wildlife Conservation (Specially Protected Fauna) Notice 2018* and the *Wildlife Conservation (Rare Flora) Notice 2018* have been transitioned under regulations 170, 171 and 172 of the *Biodiversity Conservation Regulations 2018* to be the lists of Threatened, Extinct and Specially Protected species under Part 2 of the *Biodiversity Conservation Act 2016*.

Categories of Threatened, Extinct and Specially Protected fauna and flora are:

T **Threatened species**

Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the *Biodiversity Conservation Act 2016* (BC Act).

Threatened fauna is that subset of 'Specially Protected Fauna' listed under schedules 1 to 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for Threatened Fauna.

Threatened flora is that subset of 'Rare Flora' listed under schedules 1 to 3 of the *Wildlife Conservation (Rare Flora) Notice 2018* for Threatened Flora.

The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.

CR **Critically endangered species**

Threatened species considered to be "*facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for critically endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for critically endangered flora.

EN **Endangered species**

Threatened species considered to be "*facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for endangered fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for endangered flora.

VU **Vulnerable species**

Threatened species considered to be "*facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines*".

Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for vulnerable fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for vulnerable flora.

Extinct species

Listed by order of the Minister as extinct under section 23(1) of the BC Act as extinct or extinct in the wild.

EX Extinct species

Species where "*there is no reasonable doubt that the last member of the species has died*", and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).

Published as presumed extinct under schedule 4 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for extinct fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for extinct flora.

EW Extinct in the wild species

Species that "*is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form*", and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).

Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.

Specially protected species

Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection.

Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.

MI Migratory species

Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act).

Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the *Convention on the Conservation of Migratory Species of Wild Animals* (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.

Published as migratory birds protected under an international agreement under schedule 5 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

CD Species of special conservation interest (conservation dependent fauna)

Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act).

Published as conservation dependent fauna under schedule 6 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

OS Other specially protected species

Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act).

Published as other specially protected fauna under schedule 7 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

P **Priority species**

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or flora.

Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.

Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.

1 **Priority 1: Poorly-known species**

Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.

2 **Priority 2: Poorly-known species**

Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.

3 **Priority 3: Poorly-known species**

Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.

4 **Priority 4: Rare, Near Threatened and other species in need of monitoring**

(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands.
(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent.
(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

[1] The definition of flora includes algae, fungi and lichens
[2] Species includes all taxa (plural of taxon - a classificatory group of any taxonomic rank, e.g. a family, genus, species or any infraspecific category i.e. subspecies or variety, or a distinct population).

Last updated 3 January 2019

Conservation categories for flora described under the EPBC Act

Category	Description
Extinct (Ex)	A species is extinct if there is no reasonable doubt that the last member of the species has died.
Extinct in the Wild (EW)	A species is categorised as extinct in the wild if it is only known to survive in cultivations, in captivity, or as a naturalised population well outside its past range; or if it has not been recorded in its known/expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
Critically Endangered (CE)	The species is facing an extremely high risk of extinction in the wild and in the immediate future.
Endangered (EN)	The species is likely to become extinct unless the circumstances and factors threatening its abundance, survival, or evolutionary development cease to operate; or its numbers have been reduced to such a critical level, or its habitats have been so drastically reduced, that it is in immediate danger of extinction.
Vulnerable (VU)	Within the next 25 years, the species is likely to become endangered unless the circumstances and factors threatening its abundance, survival or evolutionary development cease to operate.
Conservation Dependent (CD)	The species is the focus of a specific conservation program, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.

Conservation categories for species described under the IUCN

Category	Description
Extinct (Ex)	A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.
Extinct in the Wild (EW)	A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed Extinct in the Wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.
Critically Endangered (CE)	A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered, and it is therefore considered to be facing an extremely high risk of extinction in the wild.
Endangered (EN)	A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered, and it is therefore considered to be facing a very high risk of extinction in the wild.
Vulnerable (VU)	A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable, and it is therefore considered to be facing a high risk of extinction in the wild.
Near Threatened (NT)	A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.
Data Deficient (DD)	A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases great care should be exercised in choosing between DD and a threatened status. If the range of a taxon is suspected to be relatively circumscribed, and a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.

APPENDIX 2

Vegetation condition scale
(as developed by Keighery 1994)

Condition	Code	Description
Pristine	1	Pristine or nearly so, no obvious signs of disturbance or damage caused by human activities since European settlement.
Excellent	2	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. Damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle tracks.
Very Good	3	Vegetation structure altered, obvious signs of disturbance. Disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
Good	4	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
Degraded	5	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds at high density, partial clearing, dieback and grazing.
Completely Degraded	6	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as ‘parkland cleared’ with the flora comprising weed or crop species with isolated native trees and shrubs.

APPENDIX 3

Vegetation classifications for the study area based on Muir (1997).

LIFE FORM / HEIGHT	CANOPY COVER			
CLASS	DENSE 70 % - 100%	MID DENSE 30% - 70%	SPARSE 10% - 30%	VERY SPARSE 2% - 10%
Trees > 30 m	Dense Tall Forest	Tall Forest	Tall Woodland	Open Tall Woodland
Trees 15 – 30 m	Dense Forest	Forest	Woodland	Open Woodland
Trees 5 – 15 m	Dense Low Forest A	Low Forest A	Low Woodland A	Open Low Woodland A
Trees < 5 m	Dense Low Forest B	Low Forest B	Low Woodland B	Open Low Woodland B
Mallee tree form	Dense Tree Mallee	Tree Mallee	Open Tree Mallee	Very Open Tree Mallee
Mallee shrub form	Dense Shrub Mallee	Shrub Mallee	Open Shrub Mallee	Very Open Shrub Mallee
Shrubs > 2 m	Dense Thicket	Thicket	Scrub	Open Scrub
Shrubs 1.5 – 2 m	Dense Heath A	Heath A	Low Scrub A	Open Low Scrub A
Shrubs 1 - 1.5 m	Dense Heath B	Heath B	Low Scrub B	Open Low Scrub B
Shrubs 0.5 – 1 m	Dense Low Heath C	Low Heath C	Dwarf Scrub C	Open Dwarf Scrub C
Shrubs 0 - 0.5 m	Dense Low Heath D	Low Heath D	Dwarf Scrub D	Open Dwarf Scrub D
Mat plants	Dense Mat Plants	Mat Plants	Open Mat Plants	Very Open Mat Plants
Hummock grass	Dense Hummock Grass	Mid-Dense Hummock Grass	Hummock Grass	Open Hummock Grass
Bunch grass > 0.5 m	Dense Tall Grass	Tall Grass	Open Tall Grass	Very Open Tall Grass
Bunch grass < 0.5 m	Dense Low Grass	Low Grass	Open Low Grass	Very Open Low Grass
Herbaceous spp.	Dense Herbs	Herbs	Open Herbs	Very Open Herbs
Sedges > 0.5 m	Dense Tall Sedges	Tall Sedges	Open Tall Sedges	Very Open Tall Sedges
Sedges < 0.5 m	Dense Low Sedges	Low Sedges	Open Low Sedges	Very Open Low Sedges
Ferns	Dense Ferns	Ferns	Open Ferns	Very Open Ferns
Mosses, liverworts	Dense Mosses	Mosses	Open Mosses	Very Open Mosses

APPENDIX 4

Total flora list from the study area

* Denotes introduced flora species

Family	Genus	Species	Rank	Infra Name
Agapanthaceae	*Agapanthus	praecox		
Amaranthaceae	Ptilotus	manglesii		
Apiaceae	Daucus	glochidiatus		
Apiaceae	Pentapeltis	peltigera		
Apiaceae	Xanthosia	candida		
Araceae	*Zantedeschia	aethiopica		
Araliaceae	Hydrocotyle	callicarpa		
Araliaceae	Trachymene	pilosa		
Asparagaceae	*Asparagus	asparagoides		
Asparagaceae	Chamaescilla	corymbosa		
Asparagaceae	Dichopogon	preissii		
Asparagaceae	Laxmannia	squarrosa		
Asparagaceae	Lomandra	caespitosa		
Asparagaceae	Lomandra	hermaphrodita		
Asparagaceae	Lomandra	pauciflora		
Asparagaceae	Lomandra	preissii		
Asparagaceae	Lomandra	sericea		
Asparagaceae	Lomandra	suaveolens		
Asparagaceae	Lomandra		cf.	integra
Asparagaceae	Lomandra		sp.	indet
Asparagaceae	Sowerbaea	laxiflora		
Asparagaceae	Thysanotus	patersonii		
Asteraceae	*Carduus	pycnocephalus		
Asteraceae	*Erigeron	bonariensis		
Asteraceae	*Hypochaeris	glabra		
Asteraceae	*Sonchus	asper		
Asteraceae	*Sonchus	oleraceus		
Asteraceae	Craspedia	variabilis		
Asteraceae	Lagenophora	huegelii		
Asteraceae	Millotia	tenuifolia	var.	tenuifolia
Asteraceae	Quinetia	urvillei		
Asteraceae	Rhodanthe	citrina		
Asteraceae	Senecio	diaschides		
Asteraceae	Senecio	glomeratus	subsp.	glomeratus
Asteraceae	Senecio	hispidulus		
Asteraceae	Senecio	quadridentatus		
Asteraceae	Trichocline	spathulata		
Brassicaceae	*Rorippa	nasturtium-aquaticum		
Campanulaceae	Lobelia	anceps		
Campanulaceae	Wahlenbergia	multicaulis		
Celastraceae	Stackhousia	huegelii		
Colchicaceae	Burchardia	congesta		
Cyperaceae	*Isolepis	prolifera		
Cyperaceae	Chorizandra	cymbaria		
Cyperaceae	Gahnia	aristata		
Cyperaceae	Isolepis	cernua	var.	cernua
Cyperaceae	Isolepis	cyperoides		
Cyperaceae	Isolepis	marginata		
Cyperaceae	Lepidosperma	costale		
Cyperaceae	Lepidosperma	effusum		
Cyperaceae	Lepidosperma	leptostachyum		
Cyperaceae	Lepidosperma	squamatum		
Cyperaceae	Lepidosperma	tetraquetrum		
Cyperaceae	Lepidosperma		sp.	ONS6731

Family	Genus	Species	Rank	Infra Name
Cyperaceae	Leptocarpus	canus		
Cyperaceae	Leptocarpus	decipiens		
Cyperaceae	Leptocarpus	kraussii		
Cyperaceae	Machaerina	rubiginosa		
Cyperaceae	Machaerina	vaginalis		
Cyperaceae	Mesomelaena	tetragona		
Cyperaceae	Morelotia	octandra		
Cyperaceae	Netrostylis		sp.	Jarrah Forest (R. Davis 7391)
Cyperaceae	Schoenus	unispiculatus		
Dennstaedtiaceae	Pteridium	esculentum		
Dilleniaceae	Hibbertia	amplexicaulis		
Dilleniaceae	Hibbertia	commutata		
Dilleniaceae	Hibbertia	diamesogenos		
Droseraceae	Drosera	erythrorhiza		
Droseraceae	Drosera	gigantea		
Droseraceae	Drosera	pallida		
Droseraceae	Drosera		cf.	huegelii
Elaeocarpaceae	Tetratheca	affinis		
Elaeocarpaceae	Tetratheca	hirsuta	subsp.	viminea
Elaeocarpaceae	Tremandra	diffusa		
Ericaceae	Leucopogon	capitellatus		
Ericaceae	Leucopogon	verticillatus		
Ericaceae	Styphelia	discolor		
Ericaceae	Styphelia	erectifolia		
Ericaceae	Styphelia	glaucifolia		
Ericaceae	Styphelia	pallida		
Ericaceae	Styphelia	propinqua		
Fabaceae	*Acacia	baileyana		
Fabaceae	*Acacia	decurrens		
Fabaceae	*Acacia	longifolia		
Fabaceae	*Acacia	podalyriifolia		
Fabaceae	*Acacia	pycnantha		
Fabaceae	*Lotus	subbiflorus		
Fabaceae	*Trifolium	ligusticum		
Fabaceae	*Trifolium	subterraneum		
Fabaceae	Acacia	browniana		
Fabaceae	Acacia	celastrifolia		
Fabaceae	Acacia	dentifera		
Fabaceae	Acacia	extensa		
Fabaceae	Acacia	lateriticola		
Fabaceae	Acacia	nervosa		
Fabaceae	Acacia	pulchella		
Fabaceae	Acacia	saligna		
Fabaceae	Acacia	stenoptera		
Fabaceae	Acacia	urophylla		
Fabaceae	Bossiaea	aquifolium		
Fabaceae	Bossiaea	linophylla		
Fabaceae	Bossiaea	ornata		
Fabaceae	Callistachys	lanceolata		
Fabaceae	Chorizema	cordatum		
Fabaceae	Daviesia	cordata		
Fabaceae	Daviesia	decurrens	subsp.	decurrens
Fabaceae	Daviesia	preissii		
Fabaceae	Gastrolobium	bilobum		

Family	Genus	Species	Rank	Infra Name
Fabaceae	Gastrolobium	praemorsum		
Fabaceae	Gompholobium	marginatum		
Fabaceae	Gompholobium	polymorphum		
Fabaceae	Hardenbergia	comptoniana		
Fabaceae	Isotropis	cuneifolia	subsp.	cuneifolia
Fabaceae	Kennedia	carinata		
Fabaceae	Kennedia	coccinea		
Fabaceae	Kennedia	prostrata		
Fabaceae	Labichea	punctata		
Fabaceae	Mirbelia	dilatata		
Geraniaceae	Geranium	solanderi		
Goodeniaceae	Dampiera	alata		
Goodeniaceae	Dampiera	linearis		
Goodeniaceae	Goodenia	eatoniana		
Goodeniaceae	Goodenia	trinervis		
Goodeniaceae	Grevillea	trifida		
Goodeniaceae	Scaevola	calliptera		
Haemodoraceae	Anigozanthos	flavidus		
Haemodoraceae	Conostylis	aculeata	subsp.	aculeata
Haemodoraceae	Conostylis	pusilla		
Haemodoraceae	Haemodorum	laxum		
Haloragaceae	Gonocarpus		sp.	ONS-3762
Hemerocallidaceae	Caesia	micrantha		
Hemerocallidaceae	Dianella	revoluta		
Hemerocallidaceae	Stypandra	glauca		
Hemerocallidaceae	Tricoryne	humilis		
Hypericaceae	*Hypericum	perforatum		
Iridaceae	*Romulea	rosea		
Iridaceae	*Watsonia	marginata		
Iridaceae	Patersonia	babianoides		
Iridaceae	Patersonia	occidentalis	subsp.	occidentalis
Juncaceae	*Juncus	microcephalus		
Juncaceae	Juncus	pallidus		
Juncaceae	Luzula	meridionalis		
Lamiaceae	*Lavandula	stoechas	subsp.	stoechas
Lamiaceae	Hemiandra	pungens		
Lamiaceae	Hemigenia	incana		
Lauraceae	Cassytha	glabella		
Lauraceae	Cassytha	racemosa	forma	racemosa
Loganiaceae	Orianthera	serpyllifolia	subsp.	angustifolia
Lythraceae	*Lythrum	hyssopifolia		
Malvaceae	Thomasia	grandiflora		
Myrtaceae	*Corymbia	maculata		
Myrtaceae	*Eucalyptus	resinifera		
Myrtaceae	Astartea	scoparia		
Myrtaceae	Babingtonia	camphorosmae		
Myrtaceae	Corymbia	calophylla		
Myrtaceae	Eucalyptus	marginata	subsp.	marginata
Myrtaceae	Eucalyptus	patens		
Myrtaceae	Eucalyptus	rudis	subsp.	rudis
Myrtaceae	Hypocalymma	angustifolium		
Myrtaceae	Melaleuca	cuticularis		
Myrtaceae	Melaleuca	incana	subsp.	incana
Myrtaceae	Taxandria	linearifolia		

Family	Genus	Species	Rank	Infra Name
Myrtaceae	Taxandria	parviceps		
Oleaceae	*Olea	europaea		
Orchidaceae	Caladenia	arrecta		
Orchidaceae	Caladenia	ferruginea		
Orchidaceae	Caladenia	flava	subsp.	flava
Orchidaceae	Caladenia	longiclavata		
Orchidaceae	Caladenia	macrostylis		
Orchidaceae	Caladenia	pectinata		
Orchidaceae	Caladenia	reptans	subsp.	reptans
Orchidaceae	Caladenia		sp.	indet
Orchidaceae	Cyrtostylis	huegelii		
Orchidaceae	Diuris	corymbosa		
Orchidaceae	Diuris	longifolia		
Orchidaceae	Elythranthera	brunonis		
Orchidaceae	Pterostylis	barbata		
Orchidaceae	Pterostylis	crispula		
Orchidaceae	Pterostylis	vittata		
Orchidaceae	Pyrorchis	nigricans		
Orchidaceae	Thelymitra	crinita		
Orchidaceae	Thelymitra	graminea		
Orobanchaceae	*Orobanche	minor		
Oxalidaceae	*Oxalis	pes-caprae		
Oxalidaceae	Oxalis	exilis		
Oxalidaceae	Oxalis	perennans		
Phyllanthaceae	Lysiandra	calycina		
Phyllanthaceae	Poranthera	huegelii		
Phyllanthaceae	Poranthera	microphylla		
Pinaceae	*Pinus	pinaster		
Pinaceae	*Pinus	radiata		
Pittosporaceae	Billardiera	fusiformis		
Pittosporaceae	Billardiera	variifolia		
Plantaginaceae	*Plantago	lanceolata		
Poaceae	*Avena	barbata		
Poaceae	*Briza	maxima		
Poaceae	*Briza	minor		
Poaceae	*Bromus	diandrus		
Poaceae	*Bromus	hordeaceus		
Poaceae	*Cortaderia	selloana		
Poaceae	*Cynodon	dactylon		
Poaceae	*Cynosurus	echinatus		
Poaceae	*Ehrharta	longiflora		
Poaceae	*Holcus	lanatus		
Poaceae	*Lolium	rigidu**m**		
Poaceae	*Stenotaphrum	secundatum		
Poaceae	Austrostipa	campylachne		
Poaceae	Cyathochaeta	avenacea		
Poaceae	Neurachne	alopecuroidea		
Poaceae	Poa	porphyrocladus		
Poaceae	Tetrarrhena	laevis		
Podocarpaceae	Podocarpus	drouynianus		
Polygonaceae	*Rumex	acetosella		
Primulaceae	*Lysimachia	arvensis		
Primulaceae	Samolus		cf.	junceus
Proteaceae	Banksia	dallanneyi	subsp.	sylvestris

Family	Genus	Species	Rank	Infra Name
Proteaceae	Banksia	littoralis		
Proteaceae	Hakea	amplexicaulis		
Proteaceae	Hakea	lissocarpha		
Proteaceae	Hakea	prostrata		
Proteaceae	Persoonia	longifolia		
Proteaceae	Synaphea	gracillima		
Pteridaceae	Cheilanthes	austrotenuifolia		
Ranunculaceae	Clematis	pubescens		
Ranunculaceae	Ranunculus	colonorum		
Restionaceae	Desmocladus	fasciculatus		
Restionaceae	Hypolaena	exsulca		
Rhamnaceae	Cryptandra	arbutiflora	var.	tubulosa
Rhamnaceae	Trymalium	odoratissimum	subsp.	trifidum
Rosaceae	*Rubus	anglocandicans		
Rosaceae	Acaena	echinata		
Rubiaceae	*Galium	aparine		
Rubiaceae	*Galium	murale		
Rubiaceae	Opercularia	apiciflora		
Rubiaceae	Opercularia	hispidula		
Rutaceae	Boronia	spathulata		
Rutaceae	Philotheca	spicata		
Santalaceae	Leptomeria	cunninghamii		
Solanaceae	*Solanum	nigrum		
Stylidiaceae	Levenhookia	pusilla		
Stylidiaceae	Stylidium	adnatum		
Stylidiaceae	Stylidium	amoenum		
Stylidiaceae	Stylidium	calcaratum		
Stylidiaceae	Stylidium	schoenoides		
Stylidiaceae	Stylidium	spathulatum		
Stylidiaceae	Stylidium	tenue	subsp.	tenue
Stylidiaceae	Stylidium		cf.	crassifolium
Thymelaeaceae	Pimelea	ciliata	subsp.	ciliata
Typhaceae	Typha	orientalis		
Violaceae	Hybanthus	calycinus		
Violaceae	Hybanthus	debilissimus		
Violaceae	Hybanthus	floribundus	subsp.	floribundus
Xanthorrhoeaceae	Xanthorrhoea	gracilis		
Xanthorrhoeaceae	Xanthorrhoea	preissii		
Zamiaceae	Macrozamia	riedlei		

APPENDIX 5

Representative photographs, raw data and total flora spreadsheets recorded for the 13 quadrats assessed within the study area

Study Sites

Site	Date	Landform	BFF	Veg. Type	Condition	Aspect	Slope	Soil Type	Soil Colour	Fire	Disturbance	Easting	Northing
WS-03	1/10/2022	Medium Drainage Line	Eucalyptus Forest	Forest of Eucalyptus rudis subsp. rudis and Corymbia calophylla over Low Woodland A of Callistachys lanceolata, Acacia saligna and *Acacia longifolia over Dwarf Scrub C of *Rubus anglocandicans and Pteridium esculentum over Open Low Grass of *Stenotaphrum secundatum over Open Scrub of Taxandria linearifolia over Very Open Low Sedges of Juncus pallidus and Machaerina vaginalis	Degraded	North/ East	Low	Medium Clay	Brown	Old (6+ yr)	Road/ Access Track	415799	6252697
Ws-04	1/10/2022	Hillslope	Corymbia Forest	Forest of Corymbia calophylla and Eucalyptus marginata subsp. marginata over Scrub of Bossiaea linophylla and Acacia celastrifolia over Open Low Scrub B of Xanthorrhoea preissii, Pteridium esculentum and Macrozamia rieldei over Open Dwarf Scrub D of Leucopogon capitellatus, Hibbertia amplexicaulis and Bossiaea ornata over Open Low Sedges of Netrostylis sp. Jarrah Forest (R. Davis) and Morelotia octandra	Good	South/ East	Moderate	Sandy Loam	Brown	Old (6+ yr)	Road/ Access Track	415802	6252848
WS-10	2/10/2022	Hillcrest/ Upper Hillslope	Eucalyptus Forest	Forest of Eucalyptus marginata subsp. marginata and Corymbia calophylla (with Open Low Woodland of Eucalyptus marginata subsp. marginata and Corymbia calophylla) over Open Dwarf Scrub D of Leucopogon capitellatus, Hibbertia commutata and Bossiaea ornata over Very Open Low Grass of *Briza maxima over Open Herbs of Goodenia eatoniana, Scaevola calliptera and Lagenophora huegelii	Good	East	Low	Sandy Clay Loam	Brown	Recent (0 to 2 yr)	Frequent Fire	415836	6251800
WS-11	2/10/2022	Hillcrest/ Upper Hillslope	Eucalyptus Forest	Forest of Eucalyptus marginata subsp. marginata and Corymbia calophylla over Open Dwarf Scrub D of Hibbertia commutata, Styphelia propinqua and Opercularia hispidula over Very Open Low Grass of *Briza maxima over Open Herbs of Scaevola calliptera, Goodenia eatoniana, *Hypochaeris glabra and Dampiera alata	Degraded	South	Low	Loam	Brown	Recent (0 to 2 yr)	Frequent Fire	416178	6252141

Site	Date	Landform	BFF	Veg. Type	Condition	Aspect	Slope	Soil Type	Soil Colour	Fire	Disturbance	Easting	Northing
WS-13	2/10/2022	Hillslope	Eucalyptus Forest	Forest of Eucalyptus marginata subsp. marginata and Corymbia calophylla over Scrub of Bossiaea linophylla over Low Scrub A of Pteridium esculentum (Acacia pulchella) over Open Low Grass of *Briza maxima with Open Dwarf Scrub D of Lysiandra calycina, Styphelia propinqua and Leucopogon verticillatus	Degraded	North/ West	Low	Loam	Brown	Old (6+ yr)	Rubbish/ Litter	415941	6252485
WS-14	2/10/2022	Hillslope	Eucalyptus Forest	Forest of Eucalyptus marginata subsp. marginata and Corymbia calophylla over Open Dwarf Scrub C of Macrozamia riedlei and Styphelia propinqua over Open Dwarf Scrub D of Leucopogon capitellatus, Lysiandra calycina and Bossiaea ornata over Very Open Low Grass of *Briza maxima over Very Open Herbs of Lagenophora huegelli, Scaevola calliptera and *Hypochaeris glabra	Degraded	North/ East	Moderate	Sandy Loam	Brown	Recent (0 to 2 yr)	Frequent Fire	416222	6252461
WS-15	2/10/2022	Hillslope	Eucalyptus Forest	Forest of Eucalyptus marginata subsp. marginata and Corymbia calophylla over Low Scrub B of Pteridium esculentum and Macrozamia riedlei over Very Open Low Grass of *Briza maxima	Degraded	North/ West	Low	Loam	Brown	Recent (0 to 2 yr)	Frequent Fire	416039	6252366
WS-22	3/10/2022	Footslope	Eucalyptus Forest	Forest of Eucalyptus patens, Corymbia calophylla and Eucalyptus marginata subsp. marginata over Scrub of Bossiaea linophylla and Xanthorrhoea preissii over Low Scrub B of Xanthorrhoea preissii, Pteridium esculentum and Leucopogon verticillatus over Open Dwarf Scrub C of Chorizema cordatum, *Rubus anglocandicans and Styphelia propinqua over Very Open Low Grass of *Briza maxima	Good	North/ West	Low	Loam	Brown	Old (6+ yr)	Frequent Fire	415835	6252455
WS-23	3/10/2022	Hillslope	Eucalyptus Forest	Forest of Eucalyptus marginata subsp. marginata and Corymbia calophylla over Low Scrub A of Pteridium esculentum and Acacia pulchella over Open Dwarf Scrub C of Styphelia propinqua and Macrozamia riedlei over Very Open Low Sedges of Desmocladus fasiculatus over Very Open Low Grass of *Briza maxima	Good	North/ West	Moderate	Sand	Grey	Moderate (3 to 5 yr)	Frequent Fire	415875	6252128

Site	Date	Landform	BFF	Veg. Type	Condition	Aspect	Slope	Soil Type	Soil Colour	Fire	Disturbance	Easting	Northing
WS-24	3/10/2022	Hillcrest/ Upper Hillslope	Eucalyptus Forest	Forest of Eucalyptus marginata subsp. marginata and Corymbia calophylla over Low Scrub A of Pteridium esculentum over Open Low Grass of *Briza maxima over Very Open Herbs of Chamaescilla corymbosa, *Hypochaeris glabra and Xanthosia candida	Good	North/ West	Low	Loamy Sand	Brown	Recent (0 to 2 yr)	Frequent Fire	416010	6251909
WS-25	5/10/2022	Footslope	Corymbia Dense Forest	Dense Forest of Coymbia calophylla, Eucalyptus patens and Eucalyptus marginata subsp. marginata over Open Low Woodland A of *Acacia longifolia, *Acacia pycnantha and *Acacia decurrens over Scrub of Bossiaea linophylla over Low Scrub B of Pteridium esculentum and Macrozamia riedlei over Very Open Herbs of Sowerbaea laxiflora over Very Open Low Grass of *Briza maxima	Good	North/ West	Low	Loam	Brown	Old (6+ yr)	Mining Exploration	415873	6252423
AN-24	19/11/2023	Minor Drainage Line	Eucalyptus Forest	Forest of Eucalyptus rudis subsp. rudis, Corymbia calophylla and *Pinus radiata over Tall Grass of *Avena barbata, *Holcus sp. and *Briza maxima with Open Scrub of Taxandria linearifolia over Open Tall Sedges of Juncus pallidus over Open Low Sedges of *Cyperus prolifera	Degraded	East	Low	Sandy Clay Loam	Brown	Old (6+ yr)	Cattle Grazing	416777	6252197
AN-25	19/11/2023	Boulders/ Rockpiles	Eucalyptus Forest	Forest of Eucalyptus patens, Corymbia calophylla and *Pinus radiata over Low Scrub A of *Rubus anglocandicans and Xanthorrhoea preissii over Dwarf Scrub D of Netrostylis sp. Jarrah Forest (R. Davis), Styphelia glaucifolia and Morelotia octandra over Open Low Grass of *Briza maxima, *Bromus diandrus and *Avena barbata	Degraded	South/ West	Steep	Silty Loam	Brown	Old (6+ yr)	Road/ Access Track	416918	6252244

Flora

Site	Method	Date Observed	Genus	Species	Rank	Infra Name	Significant	Intro./Native	% Cover	Height (m)
AN-24	Quadrat	19/11/2023	*Asparagus	asparagoides			No	Introduced	<1	0.2
AN-24	Quadrat	19/11/2023	*Avena	barbata			No	Introduced	20	0.5-1
AN-24	Quadrat	19/11/2023	*Briza	maxima			No	Introduced	15	0.5
AN-24	Quadrat	19/11/2023	*Bromus	diandrus			No	Introduced	2	0.4
AN-24	Quadrat	19/11/2023	*Bromus	hordeaceus			No	Native	3	0.4
AN-24	Quadrat	19/11/2023	*Carduus	pycnocephalus			No	Introduced	1	1
AN-24	Quadrat	19/11/2023	*Cynodon	dactylon			No	Introduced	2	0.2
AN-24	Quadrat	19/11/2023	*Cynosurus	echinatus			No	Introduced	<1	0.4
AN-24	Quadrat	19/11/2023	*Ehrharta	longiflora			No	Introduced	1	0.4
AN-24	Quadrat	19/11/2023	*Holcus	lanatus			No	Introduced	5	0.5-1
AN-24	Quadrat	19/11/2023	*Hypericum	perforatum			No	Native	<1	0.5
AN-24	Quadrat	19/11/2023	*Hypochaeris	glabra			No	Introduced	2	0.3
AN-24	Quadrat	19/11/2023	*Isolepis	prolifera			No	Introduced	5	<0.5
AN-24	Quadrat	19/11/2023	*Lysimachia	arvensis			No	Introduced	0.5	0.2
AN-24	Quadrat	19/11/2023	*Lythrum	hyssopifolia			No	Introduced	<1	0.2
AN-24	Quadrat	19/11/2023	*Olea	europaea			No	Introduced	<1	0.5
AN-24	Quadrat	19/11/2023	*Pinus	radiata			No	Introduced	20	15-30
AN-24	Quadrat	19/11/2023	*Rorippa	nasturtium-aquaticum			No	Native	2	0.1
AN-24	Quadrat	19/11/2023	*Rubus	anglocandicans			No	Introduced	<1	0.3
AN-24	Quadrat	19/11/2023	*Sonchus	asper			No	Introduced	1	0.5-1
AN-24	Quadrat	19/11/2023	*Trifolium	ligusticum			No	Introduced	<1	0.1
AN-24	Quadrat	19/11/2023	*Trifolium	subterraneum			No	Introduced	0.5	0.1
AN-24	Quadrat	19/11/2023	Acacia	pulchella			No	Native	0.5	1-2
AN-24	Quadrat	19/11/2023	Corymbia	calophylla			No	Native	5	15-30
AN-24	Quadrat	19/11/2023	Eucalyptus	rudis	subsp.	rudis	No	Native	35	15-30
AN-24	Opportunistic	19/11/2023	Isolepis	cernua	var.	cernua	No	Native		
AN-24	Quadrat	19/11/2023	Isolepis	cernua	var.	setifolia	No	Native	<1	0.1
AN-24	Quadrat	19/11/2023	Juncus	pallidus			No	Native	3	1-2
AN-24	Quadrat	19/11/2023	Lobelia	anceps			No	Native	<1	0.4
AN-24	Quadrat	19/11/2023	Microlaena	stipoides			No	Native	4	0.4
AN-24	Quadrat	19/11/2023	Oxalis	perennans			No	Introduced	0.5	0.1

Site	Method	Date Observed	Genus	Species	Rank	Infra Name	Significant	Intro./Native	% Cover	Height (m)
AN-24	Quadrat	19/11/2023	Pteridium	esculentum			No	Native	1.5	1-2
AN-24	Quadrat	19/11/2023	Taxandria	linearifolia			No	Native	3	>2
AN-25	Quadrat	19/11/2023	*Asparagus	asparagoides			No	Introduced	<1	0.2
AN-25	Quadrat	19/11/2023	*Avena	barbata			No	Introduced	1	1
AN-25	Quadrat	19/11/2023	*Briza	maxima			No	Introduced	5	0.4
AN-25	Quadrat	19/11/2023	*Bromus	diandrus			No	Introduced	5	0.5
AN-25	Quadrat	19/11/2023	*Cynosurus	echinatus			No	Introduced	<1	0.3
AN-25	Quadrat	19/11/2023	*Ehrharta	longiflora			No	Introduced	1	0.5
AN-25	Quadrat	19/11/2023	*Lysimachia	arvensis			No	Introduced	<1	0.1
AN-25	Quadrat	19/11/2023	*Orobanche	minor			No	Introduced	<1	0.1
AN-25	Quadrat	19/11/2023	*Pinus	radiata			No	Introduced	40	15-30
AN-25	Quadrat	19/11/2023	*Rubus	anglocandicans			No	Introduced	15	1.5-2
AN-25	Quadrat	19/11/2023	*Sonchus	oleraceus			No	Introduced	<1	0.2
AN-25	Quadrat	19/11/2023	Corymbia	calophylla			No	Native	5	15-30
AN-25	Quadrat	19/11/2023	Eucalyptus	patens			No	Native	20	15-30
AN-25	Quadrat	19/11/2023	Geranium	solanderi			No	Native	<1	0.2
AN-25	Quadrat	19/11/2023	Hakea	lissocarpha			No	Native	0.5	1-2
AN-25	Quadrat	19/11/2023	Morelotia	octandra			No	Native	2	0.4
AN-25	Quadrat	19/11/2023	Netrostylis		sp.	Jarrah Forest (R. Davis 7391)	No	Native	5	0.5
AN-25	Quadrat	19/11/2023	Opercularia	hispidula			No	Native	0.5	0.5
AN-25	Quadrat	19/11/2023	Oxalis	perennans			No	Introduced	<1	0.1
AN-25	Quadrat	19/11/2023	Poa	porphyrocladus			No	Native	1.5	0.6
AN-25	Quadrat	19/11/2023	Stypandra	glauca			No	Native	6	0.4
AN-25	Quadrat	19/11/2023	Xanthorrhoea	preissii			No	Native	3	1.5-2
wp3406	Opportunistic	4/10/2022	Gonocarpus		sp.	ONS-3762	Yes	Native	<1	0.1
WP-4950	Opportunistic	6/05/2023	Lepidosperma		sp.	ONS-6731	Yes	Native	<1	1
WP-4951	Opportunistic	6/05/2023	Lepidosperma		sp.	ONS-6731	Yes	Native	<1	1
WP-4964	Opportunistic	6/05/2023	Lepidosperma		sp.	ONS-6731	Yes	Native	0.25	0.5-1
WP-4966	Opportunistic	6/05/2023	Lepidosperma		sp.	ONS-6731	Yes	Native	1	0.7-1.2
WP-4967	Opportunistic	6/05/2023	Lepidosperma		sp.	ONS-6731	Yes	Native	1	0.5-1.2
WP-4968	Opportunistic	6/05/2023	Lepidosperma		sp.	ONS-6731	Yes	Native	0.5	0.5-1
WS-03	Quadrat	1/10/2022	*Acacia	longifolia			No	Introduced	4	3-6

Site	Method	Date Observed	Genus	Species	Rank	Infra Name	Significant	Intro./Native	% Cover	Height (m)
WS-03	Quadrat	1/10/2022	*Asparagus	asparagoides			No	Introduced	1	Cl
WS-03	Quadrat	1/10/2022	*Hypochaeris	glabra			No	Introduced	<1	0.2
WS-03	Quadrat	1/10/2022	*Juncus	microcephalus			No	Introduced	1	0.2
WS-03	Quadrat	1/10/2022	*Juncus	microcephalus			No	Introduced		
WS-03	Quadrat	1/10/2022	*Romulea	rosea			No	Introduced	<1	0.2
WS-03	Quadrat	1/10/2022	*Rubus	anglocandicans			No	Introduced	10	0.5-1.5
WS-03	Quadrat	1/10/2022	*Stenotaphrum	secundatum			No	Introduced	<1	0.4
WS-03	Quadrat	1/10/2022	Acacia	saligna			No	Native	10	4-8
WS-03	Quadrat	1/10/2022	Callistachys	lanceolata			No	Native	12	4-10
WS-03	Quadrat	1/10/2022	Corymbia	calophylla			No	Native	5	15-30
WS-03	Quadrat	1/10/2022	Dampiera	linearis			No	Native	<1	0.1
WS-03	Quadrat	1/10/2022	Eucalyptus	rudis	subsp.	rudis	No	Native	60	15-10
WS-03	Quadrat	1/10/2022	Isolepis	marginata			No	Native	1	0.1
WS-03	Quadrat	1/10/2022	Juncus	pallidus			No	Native	3	1-2
WS-03	Quadrat	1/10/2022	Lobelia	anceps			No	Native		
WS-03	Quadrat	1/10/2022	Machaerina	vaginalis			No	Native	2	0.5-1
WS-03	Quadrat	1/10/2022	Netrostylis		sp.	Jarrah Forest (R. Davis 7391)	No	Native	<1	0.5
WS-03	Quadrat	1/10/2022	Pteridium	esculentum			No	Native	2	0.5-1.5
WS-03	Quadrat	1/10/2022	Stylidium	spathulatum			No	Native	<1	0.2
WS-03	Quadrat	1/10/2022	Taxandria	linearifolia			No	Native	4	2-3
WS-04	Quadrat	1/10/2022	*Asparagus	asparagoides			No	Introduced	<1	Cl
WS-04	Quadrat	1/10/2022	*Briza	maxima			No	Introduced	3	0.2
WS-04	Quadrat	1/10/2022	*Hypochaeris	glabra			No	Introduced	2	0.2
WS-04	Quadrat	1/10/2022	*Romulea	rosea			No	Introduced	2	0.1
WS-04	Quadrat	1/10/2022	Acacia	celastrifolia			No	Native	3	1-3
WS-04	Quadrat	1/10/2022	Acacia	pulchella			No	Native	1	0.5-1
WS-04	Quadrat	1/10/2022	Austrostipa	campylachne			No	Native	<1	0.3
WS-04	Quadrat	1/10/2022	Billardiera	fusiformis			No	Native	1	Cl
WS-04	Quadrat	1/10/2022	Bossiaea	linophylla			No	Native	1	2-4
WS-04	Quadrat	1/10/2022	Bossiaea	ornata			No	Native	1	0.4
WS-04	Quadrat	1/10/2022	Burchardia	congesta			No	Native	<1	0.4
WS-04	Quadrat	1/10/2022	Chamaescilla	corymbosa			No	Native	2	0.1

Site	Method	Date Observed	Genus	Species	Rank	Infra Name	Significant	Intro./Native	% Cover	Height (m)
WS-04	Quadrat	1/10/2022	Chorizema	cordatum			No	Native	0.5	0.5-1
WS-04	Quadrat	1/10/2022	Clematis	pubescens			No	Native	2	Cl
WS-04	Quadrat	1/10/2022	Corymbia	calophylla			No	Native	30	10-40
WS-04	Quadrat	1/10/2022	Dampiera	linearis			No	Native	<1	0.1
WS-04	Quadrat	1/10/2022	Dichopogon	preissii			No	Native	<1	0.1
WS-04	Quadrat	1/10/2022	Drosera	pallida			No	Native	<1	Cl
WS-04	Quadrat	1/10/2022	Eucalyptus	marginata	subsp.	marginata	No	Native	15	10-45
WS-04	Quadrat	1/10/2022	Gompholobium	marginatum			No	Native	<1	0.1
WS-04	Quadrat	1/10/2022	Grevillea	trifida			No	Native	1	0.5
WS-04	Quadrat	1/10/2022	Haemodorum	laxum			No	Native	<1	0.5
WS-04	Quadrat	1/10/2022	Hakea	amplexicaulis			No	Native	<1	1
WS-04	Opportunistic	1/10/2022	Hakea	prostrata			No	Native	-	-
WS-04	Quadrat	1/10/2022	Hibbertia	amplexicaulis			No	Native	1	0.3
WS-04	Quadrat	1/10/2022	Hibbertia	commutata			No	Native	1	0.3
WS-04	Quadrat	1/10/2022	Kennedia	carinata			No	Native	<1	Cr
WS-04	Quadrat	1/10/2022	Kennedia	coccinea			No	Native	<1	0.1
WS-04	Quadrat	1/10/2022	Leucopogon	capitellatus			No	Native	3	0.3
WS-04	Quadrat	1/10/2022	Lomandra	sericea			No	Native	<1	0.4
WS-04	Quadrat	1/10/2022	Macrozamia	riedlei			No	Native	3	0.5-1.5
WS-04	Quadrat	1/10/2022	Morelotia	octandra			No	Native	7	0.4
WS-04	Quadrat	1/10/2022	Netrostylis		sp.	Jarrah Forest (R. Davis 7391)	No	Native	20	0.4
WS-04	Quadrat	1/10/2022	Neurachne	alopecuroidea			No	Native	<1	0.1
WS-04	Quadrat	1/10/2022	Opercularia	hispidula			No	Native	0.5	0.5
WS-04	Quadrat	1/10/2022	Oxalis	exilis			No	Native	0.5	0.2
WS-04	Quadrat	1/10/2022	Persoonia	longifolia			No	Native	0.5	1-2
WS-04	Quadrat	1/10/2022	Pimelea	ciliata	subsp.	ciliata	No	Native	0.5	0.4
WS-04	Quadrat	1/10/2022	Pteridium	esculentum			No	Native	3	0.5-2
WS-04	Quadrat	1/10/2022	Styphelia	discolor			No	Native	<1	0.1
WS-04	Quadrat	1/10/2022	Styphelia	propinqua			No	Native	1.5	0.5-1
WS-04	Quadrat	1/10/2022	Tetratheca	hirsuta	subsp.	viminea	No	Native	0.5	0.3
WS-04	Quadrat	1/10/2022	Tricoryne	humilis			No	Native	<1	0.2
WS-04	Quadrat	1/10/2022	Xanthorrhoea	preissii			No	Native	3	0.5-1.5

Site	Method	Date Observed	Genus	Species	Rank	Infra Name	Significant	Intro./Native	% Cover	Height (m)
WS-10	Quadrat	2/10/2022	*Briza	maxima			No	Introduced	5	0.2
WS-10	Quadrat	2/10/2022	Acacia	nervosa			No	Native	<1	0.2
WS-10	Quadrat	2/10/2022	Acaena	echinata			No	Native	<1	0.1
WS-10	Quadrat	2/10/2022	Austrostipa	campylachne			No	Native	<1	0.1
WS-10	Quadrat	2/10/2022	Billardiera	variifolia			No	Native	<1	Cl
WS-10	Quadrat	2/10/2022	Boronia	spathulata			No	Native	<1	0.3
WS-10	Quadrat	2/10/2022	Bossiaea	ornata			No	Native	1	0.2
WS-10	Quadrat	2/10/2022	Burchardia	congesta			No	Native	<1	0.3
WS-10	Quadrat	2/10/2022	Caesia	micrantha			No	Native	<1	0.2
WS-10	Quadrat	2/10/2022	Caladenia	flava	subsp.	flava	No	Native	<1	0.1
WS-10	Quadrat	2/10/2022	Cassytha	racemosa	forma	racemosa	No	Native	<1	Cl
WS-10	Quadrat	2/10/2022	Chamaescilla	corymbosa			No	Native	<1	0.1
WS-10	Quadrat	2/10/2022	Clematis	pubescens			No	Native	0.5	0.5
WS-10	Quadrat	2/10/2022	Corymbia	calophylla			No	Native	15	10-25
WS-10	Quadrat	2/10/2022	Dampiera	alata			No	Native	2	0.15
WS-10	Quadrat	2/10/2022	Dampiera	linearis			No	Native	1	0.1
WS-10	Quadrat	2/10/2022	Daucus	glochidiatus			No	Native	<1	0.05
WS-10	Quadrat	2/10/2022	Dichopogon	preissii			No	Native	<1	0.1
WS-10	Opportunistic	2/10/2022	Diuris	longifolia			No	Native	-	-
WS-10	Quadrat	2/10/2022	Drosera	pallida			No	Native	<1	Cl
WS-10	Opportunistic	2/10/2022	Elyranthera	brunonis			No	Native	-	-
WS-10	Quadrat	2/10/2022	Eucalyptus	marginata	subsp.	marginata	No	Native	40	10-30
WS-10	Quadrat	2/10/2022	Goodenia	eatoniana			No	Native	6	0.1
WS-10	Quadrat	2/10/2022	Goodenia	trinervis			No	Native		
WS-10	Quadrat	2/10/2022	Hakea	lissocarpha			No	Native	0.5	0.5
WS-10	Quadrat	2/10/2022	Hibbertia	amplexicaulis			No	Native	<1	0.2
WS-10	Quadrat	2/10/2022	Hibbertia	commutata			No	Native	1.5	0.2
WS-10	Quadrat	2/10/2022	Hybanthus	floribundus	subsp.	floribundus	No	Native	<1	0.2
WS-10	Quadrat	2/10/2022	Kennedia	carinata			No	Native	<1	0.1
WS-10	Quadrat	2/10/2022	Kennedia	coccinea			No	Native	<1	0.1
WS-10	Quadrat	2/10/2022	Lagenophora	huegelii			No	Native	1.5	0.1
WS-10	Quadrat	2/10/2022	Leucopogon	capitellatus			No	Native	5	0.2

Site	Method	Date Observed	Genus	Species	Rank	Infra Name	Significant	Intro./Native	% Cover	Height (m)
WS-10	Quadrat	2/10/2022	Lomandra	sericea			No	Native	<1	0.2
WS-10	Quadrat	2/10/2022	Lomandra		sp.	indet	No	Native	0.5	0.2
WS-10	Quadrat	2/10/2022	Luzula	meridionalis			No	Native	<1	0.2
WS-10	Quadrat	2/10/2022	Lysiandra	calycina			No	Native	<1	0.2
WS-10	Quadrat	2/10/2022	Macrozamia	riedlei			No	Native	0.5	0.5
WS-10	Quadrat	2/10/2022	Netrostylis		sp.	Jarrah Forest (R. Davis 7391)	No	Native	<1	0.2
WS-10	Quadrat	2/10/2022	Opercularia	apiciflora			No	Native	<1	0.1
WS-10	Quadrat	2/10/2022	Orianthera	serpyllifolia	subsp.	angustifolia	No	Native	<1	0.2
WS-10	Quadrat	2/10/2022	Patersonia	babianoides			No	Native	<1	0.1
WS-10	Quadrat	2/10/2022	Pimelea	ciliata	subsp.	ciliata	No	Native	1.5	0.5
WS-10	Quadrat	2/10/2022	Scaevola	calliptera			No	Native	2	0.1
WS-10	Quadrat	2/10/2022	Senecio	hispidulus			No	Native	<1	0.3
WS-10	Quadrat	2/10/2022	Sowerbaea	laxiflora			No	Native	0.5	0.3
WS-10	Quadrat	2/10/2022	Stackhousia	huegelii			No	Native	<1	0.3
WS-10	Quadrat	2/10/2022	Stylidium	amoenum			No	Native	<1	0.1
WS-10	Quadrat	2/10/2022	Tetrarrhena	laevis			No	Native	<1	0.1
WS-10	Quadrat	2/10/2022	Tetratheca	affinis			No	Native	<1	0.2
WS-10	Quadrat	2/10/2022	Tetratheca	hirsuta	subsp.	viminea	No	Native	1	0.2
WS-10	Quadrat	2/10/2022	Thysanotus	patersonii			No	Native	<1	Cl
WS-10	Quadrat	2/10/2022	Trachymene	pilosa			No	Native	<1	0.05
WS-10	Quadrat	2/10/2022	Trichocline	spathulata			No	Native	<1	0.1
WS-10	Quadrat	2/10/2022	Xanthorrhoea	gracilis			No	Native	<1	0.5
WS-10	Quadrat	2/10/2022	Xanthosia	candida			No	Native	1.5	0.1
WS-11	Quadrat	2/10/2022	*Briza	maxima			No	Introduced	7	0.1
WS-11	Quadrat	2/10/2022	*Hypochaeris	glabra			No	Introduced	1	0.1
WS-11	Quadrat	2/10/2022	Acacia	urophylla			No	Native	<1	0.3
WS-11	Quadrat	2/10/2022	Austrostipa	campylachne			No	Native	<1	0.2
WS-11	Quadrat	2/10/2022	Billardiera	variifolia			No	Native	<1	Cl
WS-11	Quadrat	2/10/2022	Caesia	micrantha			No	Native	<1	0.2
WS-11	Quadrat	2/10/2022	Caladenia	flava	subsp.	flava	No	Native	<1	0.1
WS-11	Quadrat	2/10/2022	Caladenia		sp.	indet	No	Native	0.3	2
WS-11	Quadrat	2/10/2022	Cassytha	racemosa	forma	racemosa	No	Native	<1	Cl

Site	Method	Date Observed	Genus	Species	Rank	Infra Name	Significant	Intro./Native	% Cover	Height (m)
WS-11	Quadrat	2/10/2022	Chamaescilla	corymbosa			No	Native	<1	0.1
WS-11	Quadrat	2/10/2022	Clematis	pubescens			No	Native	0.5	0.2
WS-11	Quadrat	2/10/2022	Corymbia	calophylla			No	Native	17	10-25
WS-11	Quadrat	2/10/2022	Dampiera	alata			No	Native	2	0.1
WS-11	Quadrat	2/10/2022	Dampiera	linearis			No	Native		
WS-11	Quadrat	2/10/2022	Daucus	glochidiatus			No	Native	<1	0.05
WS-11	Quadrat	2/10/2022	Drosera	erythrorhiza			No	Native	<1	0.05
WS-11	Quadrat	2/10/2022	Drosera	pallida			No	Native	<1	Cl
WS-11	Quadrat	2/10/2022	Eucalyptus	marginata	subsp.	marginata	No	Native	50	15-40
WS-11	Quadrat	2/10/2022	Goodenia	eatoniana			No	Native	1.5	0.1
WS-11	Quadrat	2/10/2022	Hibbertia	amplexicaulis			No	Native	<1	0.2
WS-11	Quadrat	2/10/2022	Hibbertia	commutata			No	Native	1	0.3
WS-11	Quadrat	2/10/2022	Hybanthus	debilissimus			No	Native	<1	0.2
WS-11	Quadrat	2/10/2022	Hydrocotyle	callicarpa			No	Native	<1	0.03
WS-11	Quadrat	2/10/2022	Leucopogon	capitellatus			No	Native	<1	0.1
WS-11	Quadrat	2/10/2022	Lomandra		sp.	indet	No	Native	<1	0.3
WS-11	Quadrat	2/10/2022	Luzula	meridionalis			No	Native	<1	0.2
WS-11	Quadrat	2/10/2022	Lysiandra	calycina			No	Native	<1	0.1
WS-11	Quadrat	2/10/2022	Macrozamia	riedlei			No	Native	1.5	0.5-1
WS-11	Quadrat	2/10/2022	Neurachne	alopecuroidea			No	Native	0.5	0.1
WS-11	Quadrat	2/10/2022	Opercularia	hispidula			No	Native	0.5	0.3
WS-11	Quadrat	2/10/2022	Orianthera	serpyllifolia	subsp.	angustifolia	No	Native	<1	0.1
WS-11	Quadrat	2/10/2022	Pterostylis	crispula			No	Native	<1	0.1
WS-11	Quadrat	2/10/2022	Scaevola	calliptera			No	Native	2	0.1
WS-11	Quadrat	2/10/2022	Senecio	glomeratus	subsp.	glomeratus	No	Native	<1	0.3
WS-11	Quadrat	2/10/2022	Sowerbaea	laxiflora			No	Native	<1	0.3
WS-11	Quadrat	2/10/2022	Stackhousia	huegelii			No	Native	<1	0.3
WS-11	Quadrat	2/10/2022	Stylidium	amoenum			No	Native	<1	0.1
WS-11	Quadrat	2/10/2022	Styphelia	propinqua			No	Native	1.5	0.5
WS-11	Quadrat	2/10/2022	Tetrarrhena	laevis			No	Native	<1	0.1
WS-11	Quadrat	2/10/2022	Tetratheca	hirsuta	subsp.	viminea	No	Native	<1	0.2
WS-11	Quadrat	2/10/2022	Thysanotus	patersonii			No	Native	<1	Cl

Site	Method	Date Observed	Genus	Species	Rank	Infra Name	Significant	Intro./Native	% Cover	Height (m)
WS-11	Quadrat	2/10/2022	Trachymene	pilosa			No	Native	<1	0.1
WS-11	Quadrat	2/10/2022	Trichocline	spathulata			No	Native	<1	0.1
WS-11	Quadrat	2/10/2022	Wahlenbergia	multicaulis			No	Native	<1	.0.2
WS-11	Quadrat	2/10/2022	Xanthorrhoea	gracilis			No	Native	<1	0.5
WS-11	Quadrat	2/10/2022	Xanthosia	candida			No	Native	1.5	0.1
WS-13	Quadrat	2/10/2022	*Briza	maxima			No	Introduced	10	0.1
WS-13	Quadrat	2/10/2022	*Hypochaeris	glabra			No	Introduced	0.5	0.1
WS-13	Quadrat	2/10/2022	Acacia	pulchella			No	Native	1	0.5-2
WS-13	Quadrat	2/10/2022	Austrostipa	campylachne			No	Native	<1	0.5
WS-13	Quadrat	2/10/2022	Bossiaea	linophylla			No	Native	111	2-4
WS-13	Quadrat	2/10/2022	Chamaescilla	corymbosa			No	Native	0.5	0.1
WS-13	Quadrat	2/10/2022	Corymbia	calophylla			No	Native	25	25
WS-13	Quadrat	2/10/2022	Daucus	glochidiatus			No	Native	<1	0.05
WS-13	Quadrat	2/10/2022	Eucalyptus	marginata	subsp.	marginata	No	Native	25	25
WS-13	Quadrat	2/10/2022	Hibbertia	amplexicaulis			No	Native	<1	0.4
WS-13	Quadrat	2/10/2022	Hibbertia	commutata			No	Native	1	0.2
WS-13	Quadrat	2/10/2022	Lagenophora	huegelii			No	Native	0.5	1
WS-13	Quadrat	2/10/2022	Lepidosperma	leptostachyum			No	Native	<1	0.5
WS-13	Quadrat	2/10/2022	Leucopogon	verticillatus			No	Native	1	0.2
WS-13	Quadrat	2/10/2022	Luzula	meridionalis			No	Native	<1	0.2
WS-13	Quadrat	2/10/2022	Lysiandra	calycina			No	Native	3	0.3
WS-13	Quadrat	2/10/2022	Macrozamia	riedlei			No	Native	1	0.5-1
WS-13	Quadrat	2/10/2022	Morelotia	octandra			No	Native	<1	0.3
WS-13	Quadrat	2/10/2022	Netrostylis		sp.	Jarrah Forest (R. Davis 7391)	No	Native	<1	0.3
WS-13	Quadrat	2/10/2022	Opercularia	hispidula			No	Native	1	0.3
WS-13	Quadrat	2/10/2022	Oxalis	exilis			No	Native	0.5	0.1
WS-13	Quadrat	2/10/2022	Pteridium	esculentum			No	Native	13	1-2
WS-13	Quadrat	2/10/2022	Ptilotus	manglesii			No	Native	<1	0.1
WS-13	Quadrat	2/10/2022	Ranunculus	colonorum			No	Native	<1	0.4
WS-13	Quadrat	2/10/2022	Scaevola	calliptera			No	Native	0.5	0.1
WS-13	Quadrat	2/10/2022	Sowerbaea	laxiflora			No	Native	0.5	0.3
WS-13	Quadrat	2/10/2022	Styphelia	propinqua			No	Native	2	0.4

Site	Method	Date Observed	Genus	Species	Rank	Infra Name	Significant	Intro./Native	% Cover	Height (m)
WS-13	Quadrat	2/10/2022	Tetrarrhena	laevis			No	Native	<1	0.2
WS-13	Quadrat	2/10/2022	Thysanotus	patersonii			No	Native	<1	Cl
WS-14	Quadrat	2/10/2022	*Briza	maxima			No	Introduced	6	0.1
WS-14	Quadrat	2/10/2022	*Hypochaeris	glabra			No	Introduced	1	0.1
WS-14	Quadrat	2/10/2022	Acacia	celastrifolia			No	Native	1	2-3
WS-14	Quadrat	2/10/2022	Acacia	pulchella			No	Native	1	1-3
WS-14	Quadrat	2/10/2022	Austrostipa	campylachne			No	Native	<1	0.2
WS-14	Quadrat	2/10/2022	Bossiaea	ornata			No	Native	1	0.2
WS-14	Quadrat	2/10/2022	Burchardia	congesta			No	Native	<1	0.3
WS-14	Quadrat	2/10/2022	Caesia	micrantha			No	Native	<1	0.3
WS-14	Quadrat	2/10/2022	Caladenia	flava	subsp.	flava	No	Native	<1	0.1
WS-14	Quadrat	2/10/2022	Chamaescilla	corymbosa			No	Native	1.5	0.1
WS-14	Quadrat	2/10/2022	Clematis	pubescens			No	Native	1	Cl
WS-14	Quadrat	2/10/2022	Corymbia	calophylla			No	Native	35	15-40
WS-14	Quadrat	2/10/2022	Dampiera	linearis			No	Native	<1	0.1
WS-14	Quadrat	2/10/2022	Daucus	glochidiatus			No	Native	<1	0.05
WS-14	Quadrat	2/10/2022	Dichopogon	preissii			No	Native	<1	0.3
WS-14	Quadrat	2/10/2022	Eucalyptus	marginata	subsp.	marginata	No	Native	35	15-40
WS-14	Quadrat	2/10/2022	Haemodorum	laxum			No	Native	<1	0.4
WS-14	Quadrat	2/10/2022	Hakea	lissocarpha			No	Native	<1	0.4
WS-14	Quadrat	2/10/2022	Hibbertia	amplexicaulis			No	Native	<1	0.4
WS-14	Quadrat	2/10/2022	Hibbertia	commutata			No	Native	0.5	0.3
WS-14	Quadrat	2/10/2022	Labichea	punctata			No	Native	1	0.1
WS-14	Quadrat	2/10/2022	Lagenophora	huegelii			No	Native	1	0.1
WS-14	Quadrat	2/10/2022	Leucopogon	capitellatus			No	Native	3	0.2
WS-14	Quadrat	2/10/2022	Lomandra	caespitosa			No	Native	<1	0.1
WS-14	Quadrat	2/10/2022	Lomandra		sp.	indet	No	Native		
WS-14	Quadrat	2/10/2022	Luzula	meridionalis			No	Native	<1	0.2
WS-14	Quadrat	2/10/2022	Lysiandra	calycina			No	Native	2	0.2
WS-14	Quadrat	2/10/2022	Macrozamia	riedlei			No	Native	1	0.5-1.5
WS-14	Quadrat	2/10/2022	Morelotia	octandra			No	Native	<1	0.3
WS-14	Quadrat	2/10/2022	Netrostylis		sp.	Jarrah Forest (R. Davis 7391)	No	Native	0.5	0.3

Site	Method	Date Observed	Genus	Species	Rank	Infra Name	Significant	Intro./Native	% Cover	Height (m)
WS-14	Quadrat	2/10/2022	Neurachne	alopecuroidea			No	Native	0.5	0.1
WS-14	Quadrat	2/10/2022	Opercularia	hispidula			No	Native	2	0.6
WS-14	Quadrat	2/10/2022	Patersonia	babianoides			No	Native	<1	0.1
WS-14	Quadrat	2/10/2022	Poranthera	huegelii			No	Native	<1	0.2
WS-14	Quadrat	2/10/2022	Scaevola	calliptera			No	Native	2	0.1
WS-14	Quadrat	2/10/2022	Senecio	diaschides			No	Native	<1	0.5
WS-14	Quadrat	2/10/2022	Senecio	hispidulus			No	Native	<1	0.5
WS-14	Quadrat	2/10/2022	Sowerbaea	laxiflora			No	Native	0.5	0.1
WS-14	Quadrat	2/10/2022	Stylidium	amoenum			No	Native	<1	0.1
WS-14	Quadrat	2/10/2022	Styphelia	propinqua			No	Native	1.5	0.5-1
WS-14	Quadrat	2/10/2022	Tetrarrhena	laevis			No	Native	<1	0.1
WS-14	Quadrat	2/10/2022	Tetratheca	affinis			No	Native	<1	0.2
WS-14	Quadrat	2/10/2022	Tetratheca	hirsuta	subsp.	viminea	No	Native	<1	0.2
WS-14	Quadrat	2/10/2022	Thysanotus	patersonii			No	Native	<1	Cl
WS-14	Quadrat	2/10/2022	Trachymene	pilosa			No	Native	<1	0.05
WS-14	Quadrat	2/10/2022	Trichocline	spathulata			No	Native	<1	0.1
WS-14	Quadrat	2/10/2022	Xanthosia	candida			No	Native	0.5	0.1
WS-15	Opportunistic	2/10/2022	*Acacia	decurrens			No	Introduced	-	-
WS-15	Quadrat	2/10/2022	*Briza	maxima			No	Introduced	8	0.1
WS-15	Quadrat	2/10/2022	*Hypochaeris	glabra			No	Introduced	1	0.1
WS-15	Quadrat	2/10/2022	Acacia	celastrifolia			No	Native	1	2-3
WS-15	Quadrat	2/10/2022	Austrostipa	campylachne			No	Native	<1	0.3
WS-15	Quadrat	2/10/2022	Austrostipa	campylachne			No	Native	<1	0.3
WS-15	Quadrat	2/10/2022	Bossiaea	linophylla			No	Native	0.5	2-4
WS-15	Quadrat	2/10/2022	Burchardia	congesta			No	Native	<1	0.3
WS-15	Quadrat	2/10/2022	Caesia	micrantha			No	Native	<1	0.3
WS-15	Quadrat	2/10/2022	Caladenia	flava	subsp.	flava	No	Native	<1	0.1
WS-15	Quadrat	2/10/2022	Chamaescilla	corymbosa			No	Native	1	0.1
WS-15	Quadrat	2/10/2022	Corymbia	calophylla			No	Native	20	5-45
WS-15	Quadrat	2/10/2022	Cyrtostylis	huegelii			No	Native	0.5	0.1
WS-15	Quadrat	2/10/2022	Daucus	glochidiatus			No	Native	<1	0.05
WS-15	Quadrat	2/10/2022	Desmocladus	fasciculatus			No	Native	1.5	0.1

Site	Method	Date Observed	Genus	Species	Rank	Infra Name	Significant	Intro./Native	% Cover	Height (m)
WS-15	Quadrat	2/10/2022	Diuris	longifolia			No	Native	<1	0.3
WS-15	Quadrat	2/10/2022	Drosera	pallida			No	Native	<1	Cl
WS-15	Quadrat	2/10/2022	Eucalyptus	marginata	subsp.	marginata	No	Native	50	5-40
WS-15	Quadrat	2/10/2022	Haemodorum	laxum			No	Native	<1	0.4
WS-15	Quadrat	2/10/2022	Hardenbergia	comptoniana			No	Native	<1	Cl
WS-15	Quadrat	2/10/2022	Hibbertia	commutata			No	Native	<1	0.2
WS-15	Quadrat	2/10/2022	Isotropis	cuneifolia	subsp.	cuneifolia	No	Native	<1	0.1
WS-15	Quadrat	2/10/2022	Kennedia	carinata			No	Native	<1	Cr
WS-15	Quadrat	2/10/2022	Lagenophora	huegelii			No	Native	1	0.1
WS-15	Quadrat	2/10/2022	Levenhookia	pusilla			No	Native	<1	0.02
WS-15	Quadrat	2/10/2022	Lomandra		sp.	indet	No	Native	<1	0.4
WS-15	Quadrat	2/10/2022	Luzula	meridionalis			No	Native	<1	0.2
WS-15	Quadrat	2/10/2022	Macrozamia	riedlei			No	Native	3.5	1-1.5
WS-15	Quadrat	2/10/2022	Morelotia	octandra			No	Native	<1	0.3
WS-15	Quadrat	2/10/2022	Netrostylis		sp.	Jarrah Forest (R. Davis 7391)	No	Native	<1	0.3
WS-15	Quadrat	2/10/2022	Opercularia	hispidula			No	Native	<1	0.3
WS-15	Quadrat	2/10/2022	Orianthera	serpyllifolia	subsp.	angustifolia	No	Native	<1	0.1
WS-15	Quadrat	2/10/2022	Persoonia	longifolia			No	Native	0.5	3
WS-15	Quadrat	2/10/2022	Pimelea	ciliata	subsp.	ciliata	No	Native	0.5	0.4
WS-15	Quadrat	2/10/2022	Pteridium	esculentum			No	Native	15	1-2
WS-15	Quadrat	2/10/2022	Pterostylis	crispula			No	Native	<1	0.1
WS-15	Quadrat	2/10/2022	Pterostylis	vittata			No	Native		
WS-15	Quadrat	2/10/2022	Sowerbaea	laxiflora			No	Native	<1	0.3
WS-15	Quadrat	2/10/2022	Stylidium	calcaratum			No	Native	<1	0.1
WS-15	Quadrat	2/10/2022	Styphelia	propinqua			No	Native	1	0.5
WS-15	Quadrat	2/10/2022	Tetrarrhena	laevis			No	Native	<1	0.2
WS-15	Quadrat	2/10/2022	Tetratheca	hirsuta	subsp.	viminea	No	Native	<1	0.2
WS-15	Quadrat	2/10/2022	Thomasia	grandiflora			No	Native		
WS-15	Quadrat	2/10/2022	Trachymene	plosa			No	Native	<1	0.05
WS-15	Quadrat	2/10/2022	Tricoryne	humilis			No	Native	<1	0.1
WS-22	Quadrat	3/10/2022	*Briza	maxima			No	Introduced	10	0.2
WS-22	Quadrat	3/10/2022	*Erigeron	bonariensis			No	Introduced	<1	0.5

Site	Method	Date Observed	Genus	Species	Rank	Infra Name	Significant	Intro./Native	% Cover	Height (m)
WS-22	Quadrat	3/10/2022	*Hypochaeris	glabra			No	Introduced	0.5	0.1
WS-22	Quadrat	3/10/2022	*Lysimachia	arvensis			No	Introduced	<1	0.1
WS-22	Quadrat	3/10/2022	*Plantago	lanceolata			No	Introduced	<1	0.2
WS-22	Quadrat	3/10/2022	*Rubus	anglocandicans			No	Introduced	1	0.5-1
WS-22	Quadrat	3/10/2022	Acacia	pulchella			No	Native	1	0.5-1
WS-22	Quadrat	3/10/2022	Acaena	echinata			No	Native	<1	0.1
WS-22	Quadrat	3/10/2022	Austrostipa	campylachne			No	Native	<1	1
WS-22	Quadrat	3/10/2022	Billardiera	fusiformis			No	Native	1.5	1
WS-22	Quadrat	3/10/2022	Bossiaea	linophylla			No	Native	11	2-4
WS-22	Opportunistic	3/10/2022	Caladenia	flava	subsp.	flava	No	Native	-	-
WS-22	Quadrat	3/10/2022	Chamaescilla	corymbosa			No	Native	<1	0.1
WS-22	Quadrat	3/10/2022	Chorizema	cordatum			No	Native	5	0.5-1
WS-22	Quadrat	3/10/2022	Conostylis	aculeata	subsp.	aculeata	No	Native	1	0.2
WS-22	Quadrat	3/10/2022	Corymbia	calophylla			No	Native	25	15-35
WS-22	Quadrat	3/10/2022	Daucus	glochidiatus			No	Native	<1	0.1
WS-22	Quadrat	3/10/2022	Dianella	revoluta			No	Native	<1	0.5
WS-22	Quadrat	3/10/2022	Diuris	longifolia			No	Native	<1	0.4
WS-22	Quadrat	3/10/2022	Drosera	pallida			No	Native	<1	Cl
WS-22	Quadrat	3/10/2022	Eucalyptus	marginata	subsp.	marginata	No	Native	5	10-25
WS-22	Quadrat	3/10/2022	Eucalyptus	patens			No	Native	40	15-45
WS-22	Quadrat	3/10/2022	Geranium	solanderi			No	Native	<1	0.3
WS-22	Quadrat	3/10/2022	Gompholobium	marginatum			No	Native	<1	0.1
WS-22	Quadrat	3/10/2022	Hardenbergia	comptoniana			No	Native	1	Cl
WS-22	Quadrat	3/10/2022	Hibbertia	amplexicaulis			No	Native	<1	0.3
WS-22	Quadrat	3/10/2022	Hibbertia	commutata			No	Native	<1	0.3
WS-22	Opportunistic	3/10/2022	Kennedia	carinata			No	Native	-	-
WS-22	Quadrat	3/10/2022	Kennedia	prostrata			No	Native	<1	Cr
WS-22	Quadrat	3/10/2022	Lagenophora	huegelii			No	Native	0.5	0.1
WS-22	Quadrat	3/10/2022	Leucopogon	verticillatus			No	Native	1	1-1.5
WS-22	Quadrat	3/10/2022	Luzula	meridionalis			No	Native	<1	0.2
WS-22	Quadrat	3/10/2022	Lysiandra	calycina			No	Native	<1	0.3
WS-22	Quadrat	3/10/2022	Macrozamia	riedlei			No	Native	<1	1

Site	Method	Date Observed	Genus	Species	Rank	Infra Name	Significant	Intro./Native	% Cover	Height (m)
WS-22	Quadrat	3/10/2022	Netrostylis		sp.	Jarrah Forest (R. Davis 7391)	No	Native	1	0.3
WS-22	Quadrat	3/10/2022	Opercularia	hispidula			No	Native	<1	0.3
WS-22	Quadrat	3/10/2022	Oxalis	exilis			No	Native	0.5	0.1
WS-22	Quadrat	3/10/2022	Patersonia	occidentalis			No	Native	1	0.4
WS-22	Quadrat	3/10/2022	Pteridium	esculentum			No	Native	6	0.5-2
WS-22	Quadrat	3/10/2022	Scaevola	calliptera			No	Native	<1	0.1
WS-22	Quadrat	3/10/2022	Stylidium	adnatum			No	Native	<1	0.2
WS-22	Quadrat	3/10/2022	Styphelia	discolor			No	Native	1.5	0.1
WS-22	Quadrat	3/10/2022	Styphelia	pallida			No	Native	<1	0.1
WS-22	Quadrat	3/10/2022	Styphelia	propinqua			No	Native	2	0.5-1
WS-22	Quadrat	3/10/2022	Tetrarrhena	laevis			No	Native	<1	0.2
WS-22	Quadrat	3/10/2022	Trachymene	pilosa			No	Native	<1	0.05
WS-22	Quadrat	3/10/2022	Tremandra	diffusa			No	Native	4	0.2
WS-22	Quadrat	3/10/2022	Xanthorrhoea	preissii			No	Native	6	1-4
WS-23	Quadrat	3/10/2022	*Briza	maxima			No	Introduced	8	0.2
WS-23	Quadrat	3/10/2022	*Briza	minima			No	Introduced	1	0.1
WS-23	Quadrat	3/10/2022	*Galium	murale			No	Introduced	<1	0.05
WS-23	Quadrat	3/10/2022	*Hypochaeris	glabra			No	Introduced	0.5	0.1
WS-23	Quadrat	3/10/2022	*Lysimachia	arvensis			No	Introduced	<1	0.1
WS-23	Quadrat	3/10/2022	Acacia	pulchella			No	Native	1	1-2
WS-23	Quadrat	3/10/2022	Billardiera	fusiformis			No	Native	<1	0.3
WS-23	Quadrat	3/10/2022	Bossiaea	linophylla			No	Native	<1	0.5-3
WS-23	Quadrat	3/10/2022	Burchardia	congesta			No	Native	<1	0.3
WS-23	Quadrat	3/10/2022	Caesia	micrantha			No	Native	<1	0.2
WS-23	Quadrat	3/10/2022	Caladenia	flava	subsp.	flava	No	Native	<1	0.2
WS-23	Quadrat	3/10/2022	Chamaescilla	corymbosa			No	Native	<1	0.1
WS-23	Quadrat	3/10/2022	Clematis	pubescens			No	Native	1	Cl
WS-23	Quadrat	3/10/2022	Conostylis	pusilla			No	Native	<1	0.1
WS-23	Quadrat	3/10/2022	Corymbia	calophylla			No	Native	35	10-40
WS-23	Quadrat	3/10/2022	Daucus	glochidiatus			No	Native	<1	0.05
WS-23	Quadrat	3/10/2022	Desmocladus	fasciculatus			No	Native	8	0.1
WS-23	Quadrat	3/10/2022	Dichopogon	preissii			No	Native	<1	0.2

Site	Method	Date Observed	Genus	Species	Rank	Infra Name	Significant	Intro./Native	% Cover	Height (m)
WS-23	Quadrat	3/10/2022	Eucalyptus	marginata	subsp.	marginata	No	Native	35	10-40
WS-23	Quadrat	3/10/2022	Geranium	solanderi			No	Native	<1	0.2
WS-23	Quadrat	3/10/2022	Hibbertia	amplexicaulis			No	Native	<1	0.3
WS-23	Quadrat	3/10/2022	Hibbertia	commutata			No	Native	<1	0.2
WS-23	Quadrat	3/10/2022	Isotropis	cuneifolia	subsp.	cuneifolia	No	Native	1	0.1
WS-23	Quadrat	3/10/2022	Labichea	punctata			No	Native	<1	0.1
WS-23	Quadrat	3/10/2022	Lagenophora	huegelii			No	Native	0.5	0.1
WS-23	Quadrat	3/10/2022	Leucopogon	capitellatus			No	Native	1	0.2
WS-23	Quadrat	3/10/2022	Macrozamia	riedlei			No	Native	1	1-1.5
WS-23	Quadrat	3/10/2022	Millotia	tenuifolia			No	Native	<1	0.05
WS-23	Quadrat	3/10/2022	Neurachne	alopecuroidea			No	Native	0.5	0.1
WS-23	Quadrat	3/10/2022	Oxalis	exilis			No	Native	<1	0.1
WS-23	Quadrat	3/10/2022	Philotheca	spicata			No	Native	<1	0.3
WS-23	Quadrat	3/10/2022	Pteridium	esculentum			No	Native	10	1-2
WS-23	Quadrat	3/10/2022	Ptilotus	manglesii			No	Native	<1	0.1
WS-23	Quadrat	3/10/2022	Rhodanthe	citrina			No	Native	<1	0.1
WS-23	Quadrat	3/10/2022	Senecio	quadridentatus			No	Native	<1	0.5
WS-23	Quadrat	3/10/2022	Sowerbaea	laxiflora			No	Native	1.5	0.3
WS-23	Quadrat	3/10/2022	Styphelia	propinqua			No	Native	3	0.5-1
WS-23	Quadrat	3/10/2022	Trachymene	pilosa			No	Native	<1	0.1
WS-24	Quadrat	3/10/2022	*Briza	maxima			No	Introduced	11	0.2
WS-24	Quadrat	3/10/2022	*Hypochaeris	glabra			No	Introduced	2	0.1
WS-24	Quadrat	3/10/2022	Austrostipa	campylachne			No	Native	<1	0.2
WS-24	Quadrat	3/10/2022	Bossiaea	linophylla			No	Native	<1	0.5
WS-24	Quadrat	3/10/2022	Caesia	micrantha			No	Native	<1	0.3
WS-24	Quadrat	3/10/2022	Caladenia	flava	subsp.	flava	No	Native	<1	0.2
WS-24	Quadrat	3/10/2022	Chamaescilla	corymbosa			No	Native	2	0.1
WS-24	Quadrat	3/10/2022	Clematis	pubescens			No	Native	1	Cl
WS-24	Quadrat	3/10/2022	Corymbia	calophylla			No	Native	15	15-40
WS-24	Quadrat	3/10/2022	Cyrtostylis	huegelii			No	Native	<1	0.1
WS-24	Quadrat	3/10/2022	Daucus	glochidiatus			No	Native	<1	0.1
WS-24	Quadrat	3/10/2022	Desmocladus	fasciculatus			No	Native	1	0.1

Site	Method	Date Observed	Genus	Species	Rank	Infra Name	Significant	Intro./Native	% Cover	Height (m)
WS-24	Quadrat	3/10/2022	Drosera	erythrorhiza			No	Native	<1	0.05
WS-24	Quadrat	3/10/2022	Eucalyptus	marginata	subsp.	marginata	No	Native	55	15-40
WS-24	Quadrat	3/10/2022	Hardenbergia	comptoniana			No	Native	1	Cl
WS-24	Quadrat	3/10/2022	Hibbertia	amplexicaulis			No	Native	<1	0.2
WS-24	Quadrat	3/10/2022	Kennedia	carinata			No	Native	<1	Cr
WS-24	Quadrat	3/10/2022	Labichea	punctata			No	Native	<1	0.1
WS-24	Quadrat	3/10/2022	Leucopogon	capitellatus			No	Native	<1	0.2
WS-24	Quadrat	3/10/2022	Lomandra		sp.	indet	No	Native	1	0.5
WS-24	Quadrat	3/10/2022	Luzula	meridionalis			No	Native	<1	0.2
WS-24	Quadrat	3/10/2022	Macrozamia	riedlei			No	Native	0.5	0.5-1
WS-24	Quadrat	3/10/2022	Neurachne	alopecuroidea			No	Native	<1	0.1
WS-24	Quadrat	3/10/2022	Opercularia	apiciflora			No	Native	<1	0.2
WS-24	Quadrat	3/10/2022	Opercularia	hispidula			No	Native	<1	0.3
WS-24	Opportunistic	3/10/2022	Oxalis	exilis			No	Native		
WS-24	Quadrat	3/10/2022	Pentalepis	peltigera			No	Native	<1	0.1
WS-24	Quadrat	3/10/2022	Pteridium	esculentum			No	Native	20	1-2
WS-24	Quadrat	3/10/2022	Pyrorchis	nigricans			No	Native	1	0.1
WS-24	Quadrat	3/10/2022	Scaevola	calliptera			No	Native	0.5	0.1
WS-24	Quadrat	3/10/2022	Styphelia	propinqua			No	Native	1	0.5
WS-24	Quadrat	3/10/2022	Thysanotus	patersonii			No	Native	<1	Cl
WS-24	Quadrat	3/10/2022	Xanthosia	candida			No	Native	2	0.1
WS-25	Quadrat	5/10/2022	*Acacia	decurrens			No	Introduced	1.5	5-15
WS-25	Quadrat	5/10/2022	*Acacia	longifolia			No	Introduced	2.5	5
WS-25	Quadrat	5/10/2022	*Acacia	pycnantha			No	Introduced	1	5-10
WS-25	Quadrat	5/10/2022	*Briza	maxima			No	Introduced	8	0.2
WS-25	Quadrat	5/10/2022	*Hypochaeris	glabra			No	Introduced	<1	0.1
WS-25	Quadrat	5/10/2022	Acacia	pulchella			No	Native	1	1-2
WS-25	Quadrat	5/10/2022	Acaena	echinata			No	Native	<1	0.1
WS-25	Quadrat	5/10/2022	Billardiera	fusiformis			No	Native	1	1
WS-25	Quadrat	5/10/2022	Bossiaea	linophylla			No	Native	25	1-4
WS-25	Quadrat	5/10/2022	Cassytha	racemosa	forma	racemosa	No	Native	1	Cl
WS-25	Quadrat	5/10/2022	Chamaescilla	corymbosa			No	Native	1	0.1

Site	Method	Date Observed	Genus	Species	Rank	Infra Name	Significant	Intro./Native	% Cover	Height (m)
WS-25	Quadrat	5/10/2022	Chorizema	cordatum			No	Native	2	0.5-1
WS-25	Quadrat	5/10/2022	Clematis	pubescens			No	Native	1	Cl
WS-25	Quadrat	5/10/2022	Corymbia	calophylla			No	Native	50	15-50
WS-25	Quadrat	5/10/2022	Daucus	glochidiatus			No	Native	<1	0.1
WS-25	Quadrat	5/10/2022	Eucalyptus	marginata	subsp.	marginata	No	Native	15	10-40
WS-25	Quadrat	5/10/2022	Eucalyptus	patens			No	Native	15	10-30
WS-25	Quadrat	5/10/2022	Geranium	solanderi			No	Native	<1	0.3
WS-25	Quadrat	5/10/2022	Hardenbergia	comptoniana			No	Native	1.5	Cl
WS-25	Quadrat	5/10/2022	Hibbertia	commutata			No	Native	<1	0.3
WS-25	Quadrat	5/10/2022	Lagenophora	huegelii			No	Native	<1	0.1
WS-25	Quadrat	5/10/2022	Lepidosperma	leptostachyum			No	Native	1.5	1
WS-25	Quadrat	5/10/2022	Leucopogon	capitellatus			No	Native	1	0.3
WS-25	Quadrat	5/10/2022	Leucopogon	verticillatus			No	Native	<1	0.5-1
WS-25	Quadrat	5/10/2022	Luzula	meridionalis			No	Native	<1	0.3
WS-25	Quadrat	5/10/2022	Lysiandra	calycina			No	Native	2	0.3
WS-25	Quadrat	5/10/2022	Macrozamia	riedlei			No	Native	2	1
WS-25	Quadrat	5/10/2022	Netrostylis		sp.	Jarrah Forest (R. Davis 7391)	No	Native	<1	0.3
WS-25	Quadrat	5/10/2022	Oxalis	exilis			No	Native	0.5	0.1
WS-25	Quadrat	5/10/2022	Pteridium	esculentum			No	Native	10	1-2
WS-25	Quadrat	5/10/2022	Ptilotus	manglesii			No	Native	<1	0.1
WS-25	Quadrat	5/10/2022	Scaevola	calliptera			No	Native	<1	0.1
WS-25	Quadrat	5/10/2022	Sowerbaea	laxiflora			No	Native	5	0.3
WS-25	Quadrat	5/10/2022	Stylidium	adnatum			No	Native	<1	0.3
WS-25	Quadrat	5/10/2022	Styphelia	discolor			No	Native	<1	0.1
WS-25	Quadrat	5/10/2022	Styphelia	propinqua			No	Native	1.5	0.5
WS-25	Quadrat	5/10/2022	Tetrarrhena	laevis			No	Native	1	0.2
WS-25	Quadrat	5/10/2022	Tremandra	diffusa			No	Native	1	0.3
WS-25	Quadrat	5/10/2022	Xanthorrhoea	preissii			No	Native	0.5	1