



Stoneville Residential Development

Satterley Property Group

Conservation Area Management Plan

JBS&G 57355 | 126427

15 May 2024





We acknowledge the Traditional Custodians of Country throughout Australia and their connections to land, sea and community.

We pay respect to Elders past and present and in the spirit of reconciliation, we commit to working together for our shared future.

Caring for Country The Journey of JBS&G
Artist: Patrick Caruso, Eastern Arrernte

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1. Introduction

1.1 Proposed Action background

The Stoneville residential development (the proposed action) is located approximately 29 km north-east of the Perth Central Business District in the Shire of Mundaring (Figure 1.1). The proposed action covers an area of approximately 534.0 ha and is currently zoned as both “Rural” and “Urban” under the Metropolitan Region Scheme (MRS) and “Development” under the Shire of Mundaring Local Planning Scheme (LPS) No. 4.

The proposed action will result in potential impacts to Matters of National Environmental Significant (MNES) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), including:

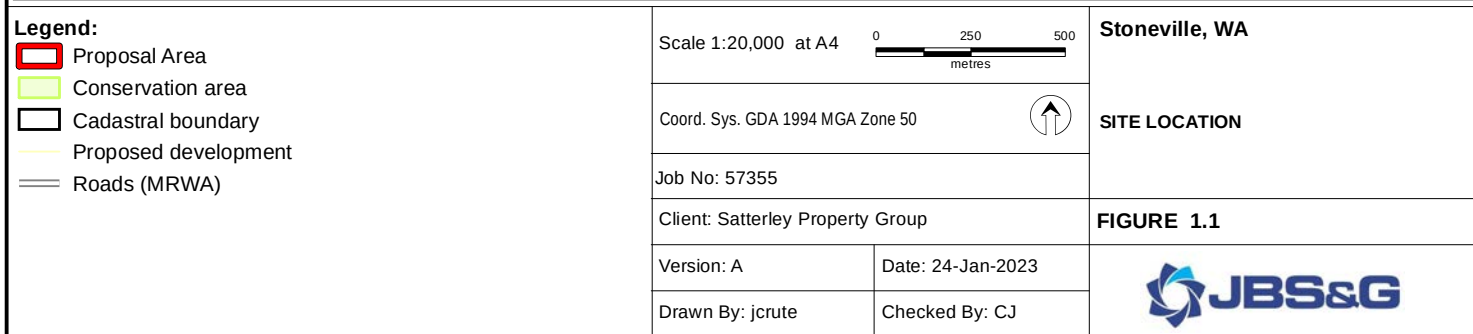
- Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*)- Endangered;
- Baudin's Black Cockatoo (*Calyptorhynchus baudinii*) – Endangered;
- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*)- Vulnerable;
- Chuditch (*Dasyurus geoffroii*)- Vulnerable;
- Carter's Freshwater Mussel (*Westralunio carteri*) – Vulnerable;
- Leafless Rock Wattle (*Acacia aphylla*) – Vulnerable;
- Zig Zag Grevillea (*Grevillea flexuosa*) – Vulnerable; and
- Star Sun-orchid (*Thelymitra stellata*)- Endangered.

A referral (EPBC 2018/8382) under the EPBC Act was submitted to the Department of the Environment and Energy (now Department of Climate Change, Energy, the Environment and Water [DCCEEW]) in 2018. On 5 April 2019 the proposed action was determined to be a controlled action that was to be assessed on Preliminary Documentation.

1.2 Site description

The proposed action includes the retention of a large (approximately 133.0 ha) patch of remnant vegetation across the proposed action area within a 193.2 ha Conservation Area (Figure 5.1). This Conservation Area will contribute to the long-term conservation of the pre-European vegetation complexes and associations as well as providing foraging, roosting and potential breeding habitat for native fauna. The Conservation Area has been strategically located to ensure that the greatest environmental values within the proposed action area are maintained. This includes the highest quality vegetation within the proposed action area (73% of the ‘Very Good – Excellent’, 100% of the ‘Very Good’ and 85% of ‘Good -Very Good’ condition), as well as the presence of the highest quality Black Cockatoo foraging habitat.

Retention of the Conservation Area has been included as a component of the Offset Strategy (JBS&G 2024b) prepared to support the developments’ referral under the EPBC Act.



2. Statutory and policy context

Key statutory and policy documents relevant to the Conservation Area are described in detail in the following sections.

2.1 Environment Protection and Biodiversity Conservation Act 1999

An EPBC Act referral for the proposed action was submitted to the then Department of Environment and Energy in 2018 for impacts to listed Threatened species. The proposed action was subsequently determined to be a controlled action (EPBC 2018/8382), requiring assessment via Preliminary Documentation.

2.2 Planning and Development Act 1995

The proposed action is subject to documentation, assessment and approval process as prescribed by the *Planning and Development Act 1995*. The site is variably zoned Urban and Rural under the MRS and 'Development' (DA4) under provisions of the Shire of Mundaring LSP No 4.

A LSP has been lodged (Structure Plan 34) to describe the proposed development. Supporting the Structure Plan and subsequent subdivision stages are management plans including:

- Bushfire Management Plan (BMP); and
- Local Water Management Strategy (LWMS).

These management plans will operate alongside this Conservation Area Management Plan (CAMP) with interactions identified and reflected in each management plan where appropriate.

2.3 Shire of Mundaring

2.3.1 Shire of Mundaring Local Biodiversity Strategy 2009

The Shire of Mundaring has completed a Local Biodiversity Strategy (2009) which focuses on influencing how local natural areas are conserved, protected or retained in local reserves or private lands, especially where land may have potential for future subdivision and development. The Strategy identifies the Shire of Mundaring's local natural areas, proposes goals and targets for retention and long-term protection of local natural areas, and actions to achieve those targets.

It should be noted that both large patches of remnant vegetation within the Conservation Area have been identified within the Strategy as local natural areas.

2.3.2 Shire of Mundaring Public Open Space Strategy 2001

The Shire of Mundaring's Public Open Space (POS) Strategy (the Strategy) was adopted by Council in May 2001. The Strategy's intent was to coordinate provision of POS within the Shire of Mundaring, recognising that application of standard legislation and policy measures fails to meet the community's needs due to the unique nature of settlement within the Shire of Mundaring.

The objectives of the POS Strategy are to:

- Provide useable POS to meet the active and passive recreation needs of the residential and rural-residential communities within the Shire of Mundaring;
- Reserve land where such is needed to ensure protection of unique or irreplaceable features of the natural environment;
- Promote linkages between reserves to foster movement of native fauna and reduce the risk of pollution of waterways;

- Identify POS areas over landscape and conservation features and watercourses and land for recreation, bridle trails, pedestrian links and buffer areas or designated rural-residential zoned lots with potential for subdivision; and
- Identify existing POS areas in need of upgrading to serve the additional residents generated by nearby subdivision.

The Strategy indicates that when identifying POS to be ceded in subdivisions, preference will be given to land that:

- Is contiguous with existing POS and/or watercourses;
- Has environmental significance; or
- In the opinion of Council has special historical or cultural significance.

The Strategy is comprised mainly of a series of recommendations relating to each of numerous residential and rural-residential cells (called “Locations”) throughout the Shire of Mundaring delineated on copies of maps in the Strategy. For each cell, the Strategy provides a paragraph indicating where POS should be located, the function and purposes it should serve, where payment of cash-in lieu is desirable and where such cash-in-lieu should be used (often somewhere nearby but outside of that particular cell).

Since its adoption, the Strategy has guided the Shire of Mundaring in its assessment of structure plans (referred to as Local Subdivision and Infrastructure Plans under Town Planning Scheme No. 3) and subdivision applications.

It should be noted that the location of the Conservation Area is consistent with the preferred location of POS as per Map 2 of the Strategy.

3. Existing environment

3.1 Topography, geology and soils

Topography across the Conservation Area is generally undulating, with elevation across the wider proposed action area ranging from approximately 242 m Australian Height Datum (AHD) in the south-western portion, to approximately 316 m AHD in the centre of the site.

The Conservation Area lies in the Darling Ranges, with the majority of the development precinct areas being mapped by Churchward and MacArthur (1980) as Dwellingup Phase 2 (Dw2) being:

“Gently undulating lateritic uplands with well drained, shallow to moderately deep gravelly brownish sands, pale brown sands and earthy sands, overlying lateritic duricrust (hardpan)”.

The lateritic hardpan is a layer of gravel with varying degrees of cementation from low to high. These hardpans may be up to 4 m thick (Smurthwaite 1986) and are generally underlain by a clayey pallid zone. While the sandy soils above the hardpan have a high permeability, the hardpan layer generally has a low permeability. Laterite hardpans have been observed at the surface of hilltops.

On hilltops, these hardpans may be exposed at the surface. Further downslope:

- The thickness and cementation of the hardpans decreases; and
- The depth of soil above the hardpan increases.

On valley floors, the action of streams will have eroded the hardpans, leaving behind Yarragil group soils (Yg1 and Yg4) including duplex soils (sand over clay) and earthy soils (loam over clay) which do not have a cemented layer. These soil types occur only in the vicinity of creek lines within the Conservation Area.

Smurthwaite (1986) identifies the Conservation Area as predominantly granite (Gr) and gravel (G₂) geological units and indicates that these geological units are compatible with urbanisation and the construction of roads.

3.2 Hydrology

3.2.1 Surface water and wetlands

There are no geomorphic wetlands mapped within the Conservation Area. To the north-east of the wider development however is a portion of cleared land which exhibits wetland-like characteristics (Emerge 2018).

There are four main streamlines present within the wider development, all of which have had surface water capture dams constructed in the past (Emerge 2018). Clutterbuck Creek flows through the eastern portion of the site, and the main central catchment discharges to this Creek south of the site (Emerge 2018). Clutterbuck Creek is a tributary of Jane Brook and those catchments which discharge northwards eventually discharge to Susannah Brook (Emerge 2018).

In addition to the dams there is a minor culvert which discharges runoff from the site west under Roland Road (Emerge 2018).

Total phosphorus (TP) was observed to be generally below the National Water Quality Management Strategy (NWQMS) trigger value for lowland rivers (which is most relevant as the destination is a lowland river). Total Nitrogen (TN) was above the trigger level values for three sites. Measurements of pH across the site ranges from moderately acidic to neutral. Surface water throughout the site shows elevated levels of salinity (EC); up to five times greater than the upper limit of the acceptable range.

3.2.2 Groundwater

Due to the nature of the soils of the Conservation Area, groundwater close to the surface is anticipated to be limited to:

- Seasonal perched groundwater in the sandy or loamy layers of the valley floors (Yarragil 4 phase soils); and
- Isolated seasonal perched groundwater at limited locations on lateritic hardpan.

Groundwater may occur in the fractured rock material below the soils and pallid zones, however there is no evidence onsite of this occurring (Emerge 2018).

It is likely that there would be seasonal saturation of the shallow clayey soil profile, and that the moisture in this shallow layer would migrate to the lower parts of the site as evidenced by the vegetation that is sustained in the low points (valleys) of the site (Emerge 2018).

3.3 Vegetation and flora

Flora, vegetation and fauna surveys were undertaken for the entire proposed action area by Strategen in 2016 and 2017 (Strategen, 2020). Subsequent to this, a targeted flora survey for conservation significant flora species including Leafless rock wattle (*Acacia aphylla*), Zig Zag Grevillea (*Grevillea flexuosa*) and Star sun orchid (*Thelymitra stellata*) was undertaken by Strategen-JBS&G in August 2019 (Strategen-JBS&G 2020). Both surveys were conducted in accordance with EPA Guidance Statement No. 51 – *Terrestrial flora and vegetation surveys for environmental impact assessment in Western Australia* (EPA 2004). A summary of the results of these surveys across the proposed action area is provided in the following sections.

3.3.1 Vegetation

A total of five native vegetation types (VTs) were defined and mapped in the Conservation Area, which are summarised in Table 3.1 and displayed in Figure 3.1. Areas containing vegetation in a 'Completely Degraded' state have not been counted as unique VT's but have been included for area calculation purposes.

Table 3.1: Vegetation types recorded in the Conservation Area

Vegetation type	Description	Area (ha)
VT1	<i>Eucalyptus marginata</i> , <i>Corymbia calophylla</i> and <i>Banksia grandis</i> mid woodland to mid open forest over <i>Xanthorrhoea preissii</i> , <i>Leucopogon propinquus</i> and <i>Hakea amplexicaulis</i> sparse shrubland over <i>Hibbertia hypericoides</i> subsp. <i>hypericoides</i> , <i>Lomandra sonderi</i> and <i>Phyllanthus calycinus</i> low herbland.	75.2
VT2	<i>Eucalyptus marginata</i> , <i>Corymbia calophylla</i> mid woodland to mid open forest over <i>Persoonia elliptica</i> and <i>Banksia sessilis</i> tall sparse shrubland over <i>Hibbertia hypericoides</i> subsp. <i>hypericoides</i> , <i>Banksia dallanneyi</i> and <i>Desmocladius fascicularis</i> low herbland.	36.0
VT3	<i>Eucalyptus marginata</i> , <i>Corymbia calophylla</i> , <i>Allocasuarina fraseriana</i> mid woodland to mid open forest over <i>Xanthorrhoea preissii</i> and <i>Xanthorrhoea gracilis</i> sparse low shrubland over <i>Grevillea wilsonii</i> , <i>Lomandra sonderi</i> and <i>Phyllanthus calycinus</i> low herbland.	9.4
VT4	<i>Eucalyptus marginata</i> , <i>Corymbia calophylla</i> mid woodland to mid open forest over sparse mixed shrubland.	12.6
VT5	<i>Corymbia calophylla</i> mid woodland over <i>Taxandra lineafolia</i> tall shrubland.	5.1
C	Parkland Cleared and Cleared areas	55.0
Total		193.2

The proposed action area shows signs of having been degraded for a long period of time. The entire proposed action area has been subject to agricultural practices, principally stock grazing, with most patches of remnant vegetation having a degraded or absent understorey. The two larger patches of vegetation in the north and

north-west and which are the focus of this CAMP show the least effects of grazing and retain an understorey. Vegetation condition within the Conservation Area is presented within Table 3.2 and Figure 3.2.

Table 3.2: Area (ha) covered by each vegetation condition category within the Conservation Area

Vegetation condition	Area (ha)
Completely Degraded	54.0
Degraded	18.4
Degraded to Good	1.3
Good	25.8
Good to Very Good	40.3
Very Good	7.7
Very Good to Excellent	45.7
Total	193.2

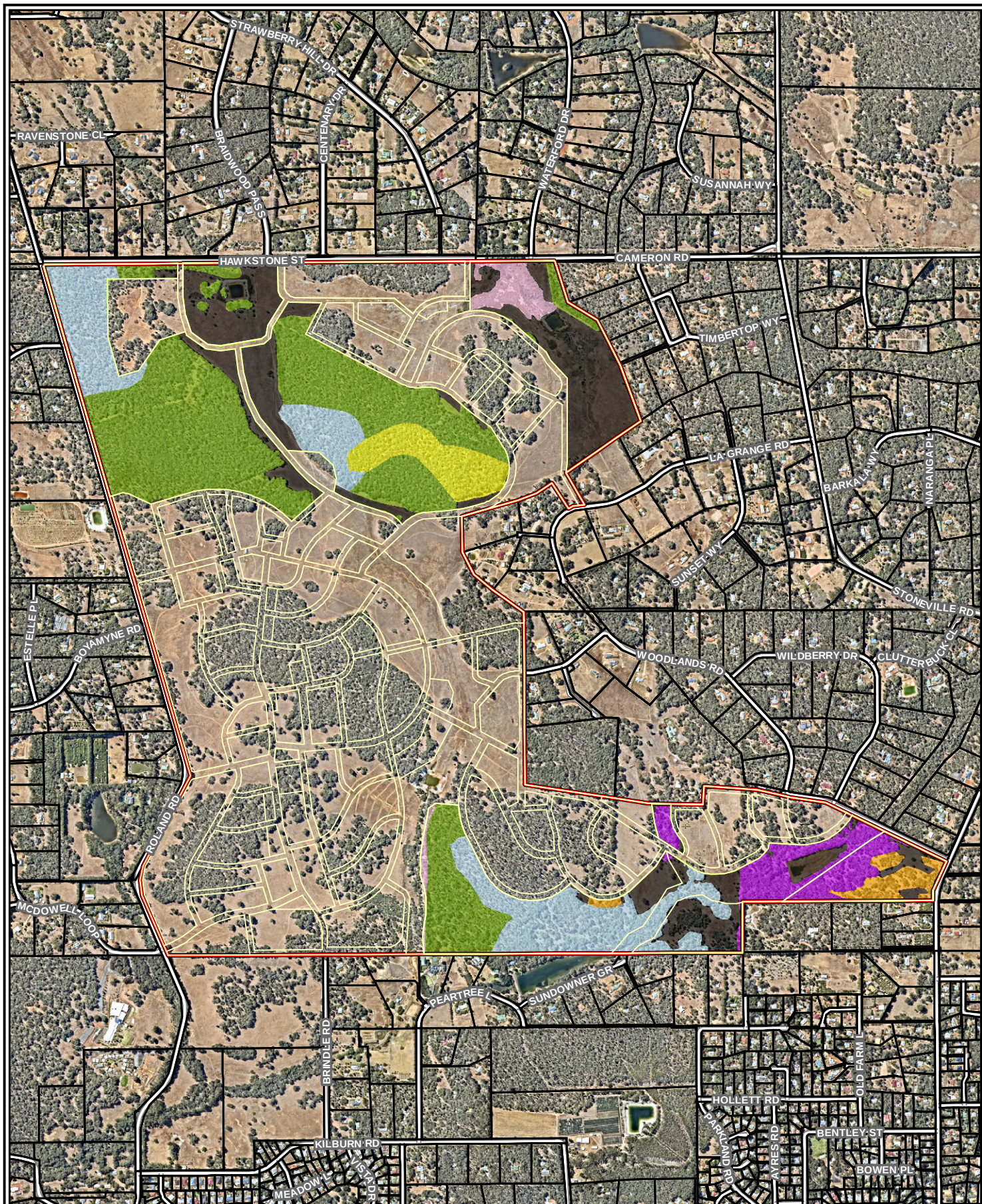
3.3.2 Flora

A total of 89 vascular plant taxa from 67 plant genera and 30 families were recorded from within the proposed action area. The majority of taxa were recorded within the Fabaceae and Proteaceae family (Strategen 2020). Of these, a total of nine introduced (exotic) taxa were recorded within the proposed action area. These are:

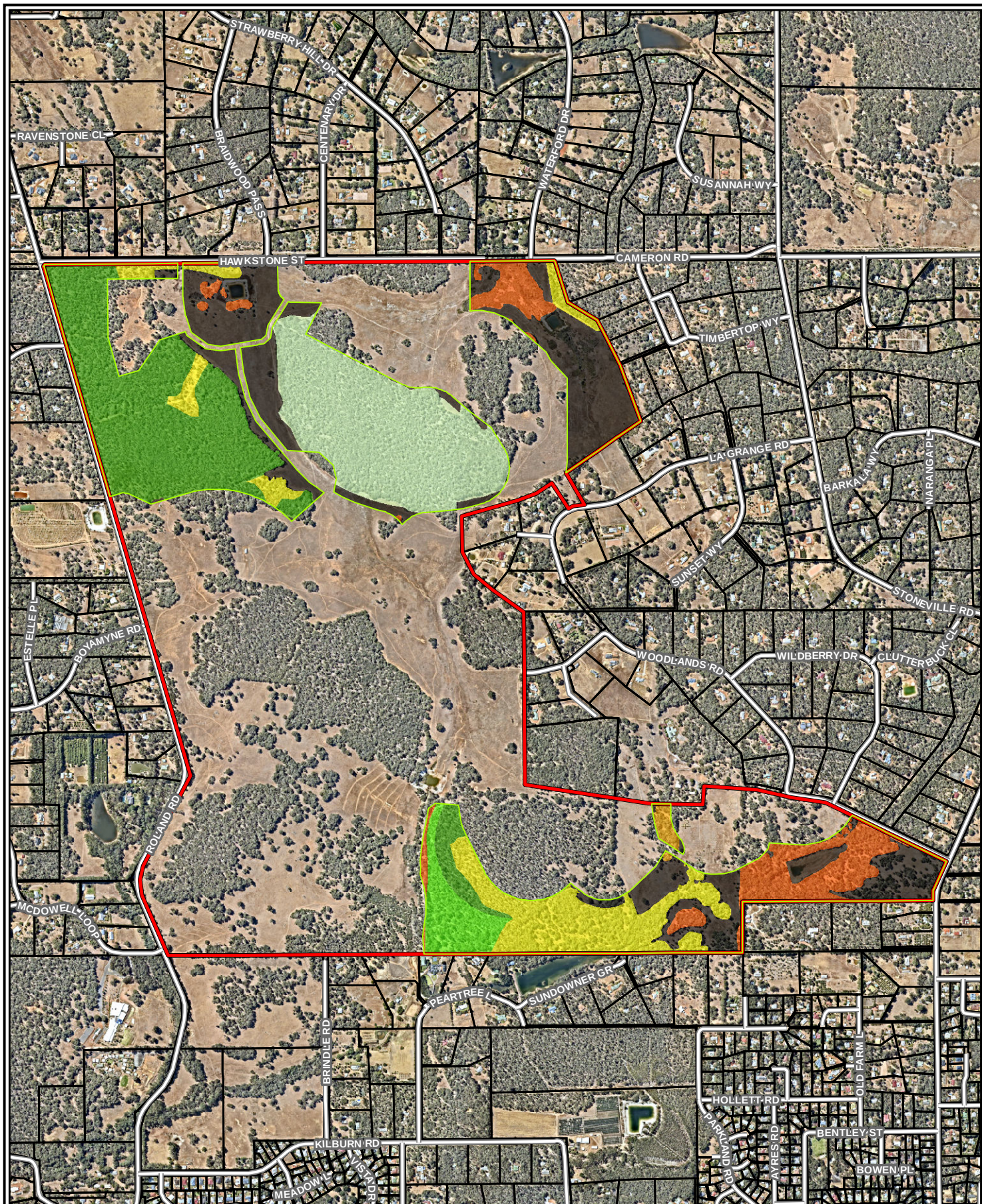
- *Aira caryophyllea*;
- *Briza maxima*;
- *Cynodon dactylon*;
- *Gomphocarpus fruticosus*;
- *Hordeum* sp.;
- *Hypochaeris glabra*;
- *Trifolium campestre*;
- *Ursinia anthemoides*; and
- *Zantedeschia aethiopica*.

It should also be noted that *Zantedeschia aethiopica* is a Declared Plant species in Western Australia pursuant to Section 22 of the *Biosecurity and Agriculture Management Act 2007* (BAM Act) according to the Western Australian Department of Primary Industries and Regional Development (DPIRD 2017). One individual of this species was recorded opportunistically during the survey.

No Threatened or Priority flora species under either the EPBC Act or Biodiversity Conservation Act 2016 (BC Act) were recorded within the proposed action area. No Threatened or Priority Ecological Communities were identified within the proposed action area. The closest Threatened or Priority Ecological Community to the proposed action area is the Central Northern Darling Scarp Granite Shrubland Community, which is listed as Priority 4 by the Department of Biodiversity Conservation and Attractions (DBCA). This community is situated approximately 2.5 km south-west of the proposed action area.



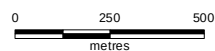
Legend: Proposal Conservation area Cadastral boundary Proposed development Roads (MRWA)		Vegetation types within conservation area Cleared Parkland cleared VT1 VT2 VT3 VT4 VT5		Scale 1:20,000 at A4 0 250 500 metres 		Stoneville, WA	
		Coord. Sys. GDA 1994 MGA Zone 50				VEGETATION TYPES	
		Job No: 57355					
		Client: Satterley Property Group				FIGURE 3.1	
		Version: A		Date: 24-Jan-2023			
		Drawn By: jcrute		Checked By: CJ			



Legend:

- | | |
|--|---|
| Proposal Area | Vegetation condition within conservation area |
| Cadastral boundary | |
| Conservation area | |
| Roads (MRWA) | |
| Very good - excellent | |
| Very good | |
| Good - very good | |
| Good | |
| Degraded to good | |
| Degraded | |
| Completely degraded | |

Scale 1:20,000 at A4



Coord. Sys. GDA 1994 MGA Zone 50



Job No: 57355

Client: Satterley Property Group

Version: A

Date: 24-Jan-2023

Drawn By: jcrute

Checked By: CJ

Stoneville, WA

VEGETATION CONDITION

FIGURE 3.2



3.4 Fauna and habitat

For the purpose of this CAMP, only species identified as relevant to the assessment of the proposed action under the EPBC Act have been specifically considered.

Flora, vegetation and fauna surveys, including a Black Cockatoo habitat assessment was undertaken for the entire proposed action area by Strategen in 2016 and 2017 (Strategen 2020). Following these surveys, a targeted Black Cockatoo hollow assessment was conducted over the proposed action area by Dr Tony Kirkby (2019), with the objective of quantifying the availability of suitable nesting hollows. In addition, a targeted Chuditch survey was conducted across the proposed action area in December 2019 (Bamford 2020). Each of these surveys were conducted by ecologists according to either the *EPBC Act referral guidelines for three threatened Black Cockatoo species* (DSEWPac 2012), or *Survey guidelines for Australia's threatened mammals* (DSEWPac 2011), where relevant.

3.4.1 Chuditch

The targeted Chuditch survey recorded no evidence of Chuditch within the survey area (Bamford 2020). However, the vegetation and conditions of the survey area are conducive to support this species, with Bamford (2020) noting that many features were present across the survey area which could be of value to the species, such as rocky piles, fallen/felled trees, earth burrows, and standing trees with hollows.

It should also be noted that during the survey, Bamford were notified of a road-killed Chuditch found near the junction between McDowell Loop and Roland Road, adjacent to the south-west corner of the proposed action area.

Based on the above, it can be assumed that individuals of the species may be present and dependant on the survey area for at least a part of each year (Bamford 2020).

3.4.2 Black Cockatoos

The proposed action area lies within the modelled distribution of all three species of south-west Black Cockatoos (DSEWPac 2012).

Remnant vegetation within the proposed action area has a canopy of Jarrah (*Eucalyptus marginata*) and Marri (*Corymbia calophylla*) in various proportions. Both of these species are known to be an important dietary component for the Forest Red-tailed Black Cockatoo and Baudin's Black Cockatoo, and to a lesser extent Carnaby's Cockatoo. Consequently, there is estimated to be 296.8 ha of foraging habitat present within the proposed action area (Strategen 2020).

Potential breeding habitat in the form of trees with a DBH > 500 mm was recorded in each quadrat included in the survey. These trees were comprised of either Jarrah (*Eucalyptus marginata*) or Marri (*Corymbia calophylla*). All quadrats support potential breeding habitat, with potential breeding tree numbers per quadrat ranging from 2 to 10. The distribution of potentially significant trees is relatively uniform throughout the Jarrah(*Eucalyptus marginata*) – Marri (*Corymbia calophylla*) forest vegetation type and scattered within the pasture vegetation type.

A total of 27 hollows were identified within the proposed action area to be suitable for use by Black Cockatoos. These were located in either Jarrah (*Eucalyptus marginata*) (two hollows) or Marri (*Corymbia calophylla*) 25 (hollows). Of these, 16 of hollows showed signs of past use such as chewing or wear at the entrance.

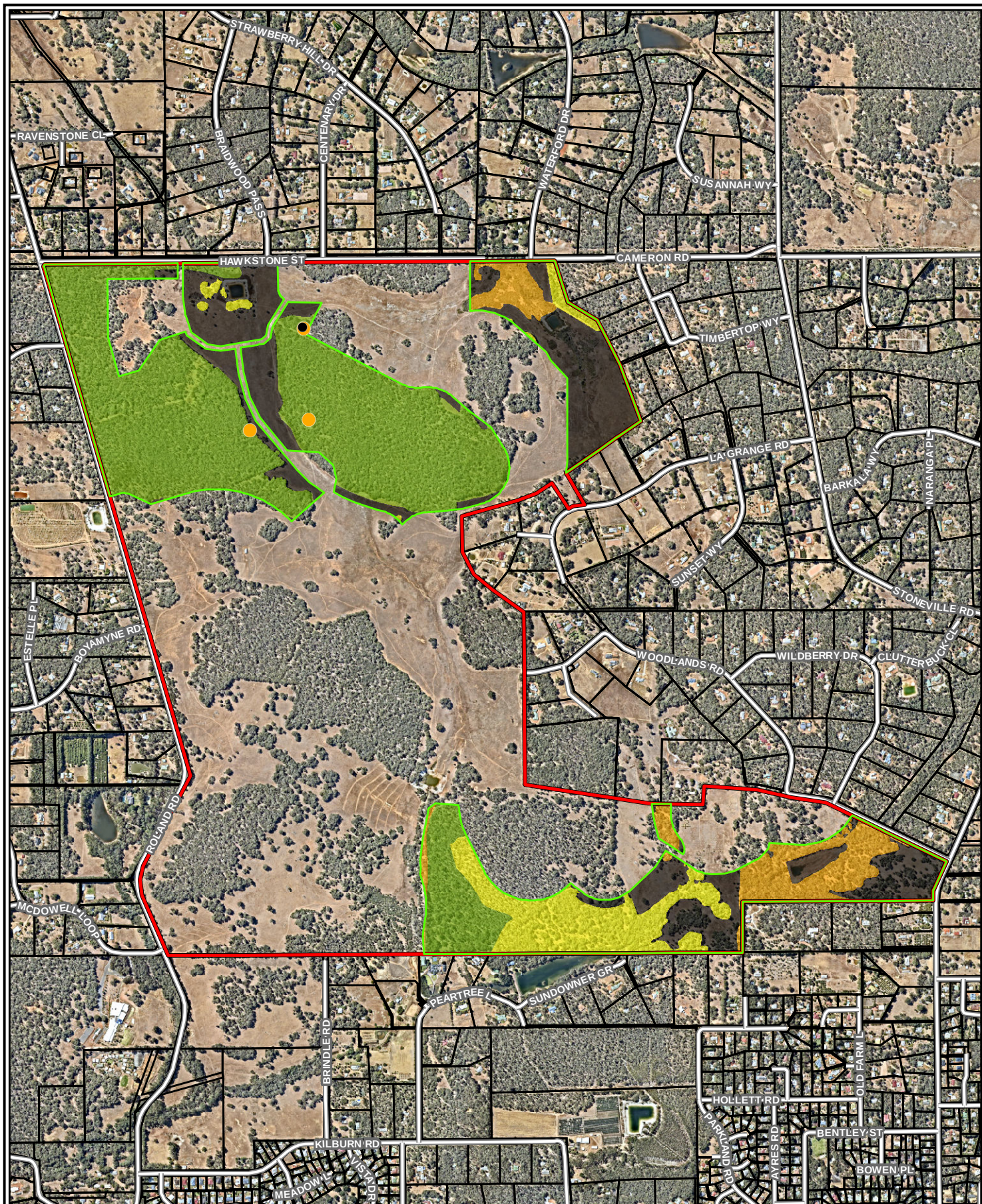
Black Cockatoo foraging habitat quality and the location of trees to be retained considered to be 'likely' and 'possible' breeding habitat based on hollows are shown within Figure 3.3.

It should also be noted that both Carnaby's Black Cockatoos and Forest Red-tailed Black Cockatoos were observed either foraging or calling during surveying.

3.4.3 Habitat Quality Scoring

The results of the Strategen (2020) survey and additional site survey work undertaken by JBS&G in 2023 were used to provide an assessment against the Commonwealths Habitat Quality Score (HQS) tool for Black Cockatoos and Chuditch at the Stoneville site. The full assessment is provided in the Offset Strategy (JBS&G 2024b), with results summarised below:

- 163.8 ha of Carnaby's, Forest Red-tailed and Baudin's Black Cockatoo habitat with a quality score of 6; and
- 163.8 ha of Chuditch habitat with a quality score of 5.



Legend: Proposal Area Conservation area Cadastral boundary Roads (MRWA) Likely Black Cockatoo breeding tree Possible Black Cockatoo breeding tree Black Cockatoo habitat quality within conservation area Excellent Good Moderate Nil		Scale 1:20,000 at A4 0 250 500 metres		Stoneville, WA	
Coord. Sys. GDA 1994 MGA Zone 50				BLACK COCKATOO HABITAT	
Job No: 57355		Client: Satterley Property Group		FIGURE 3.3	
Version: A		Date: 15-May-2024			
Drawn By: jcrute		Checked By: CJ			

3.5 Cultural heritage and social values

3.5.1 Aboriginal heritage

A search of the Department of Planning Lands and Heritage – Aboriginal Heritage Places mapping tool (DPLH 2019) was conducted which identified the following Registered Aboriginal Heritage Sites within the Conservation Area:

- Darling Range (place ID: 3188); registered for mythological, camp, hunting place, meeting place, named place, natural feature, plant resource.

Two additional Aboriginal heritage places were also identified within the Conservation Area, which are:

- Parkerville 03 (place ID: 15731); registered for artefacts/ scatter; and
- Parkerville 05 (place ID: 15733); registered for artefacts/ scatter.

Given the status of Parkerville 03 and 05 is “stored data/ not a site”, these do not qualify for protection under schedule 5 of the *Aboriginal Heritage Act 1972*.

3.5.2 European heritage

A search of the Heritage Council of Western Australia *inherit* database did not identify any European heritage places within or adjacent to the Conservation Area (SHO 2019).

3.6 Contamination

The use of historical aerial photography available from Landgate (from 1965 to 2016) was used to consider the historical land uses within the proposed action area.

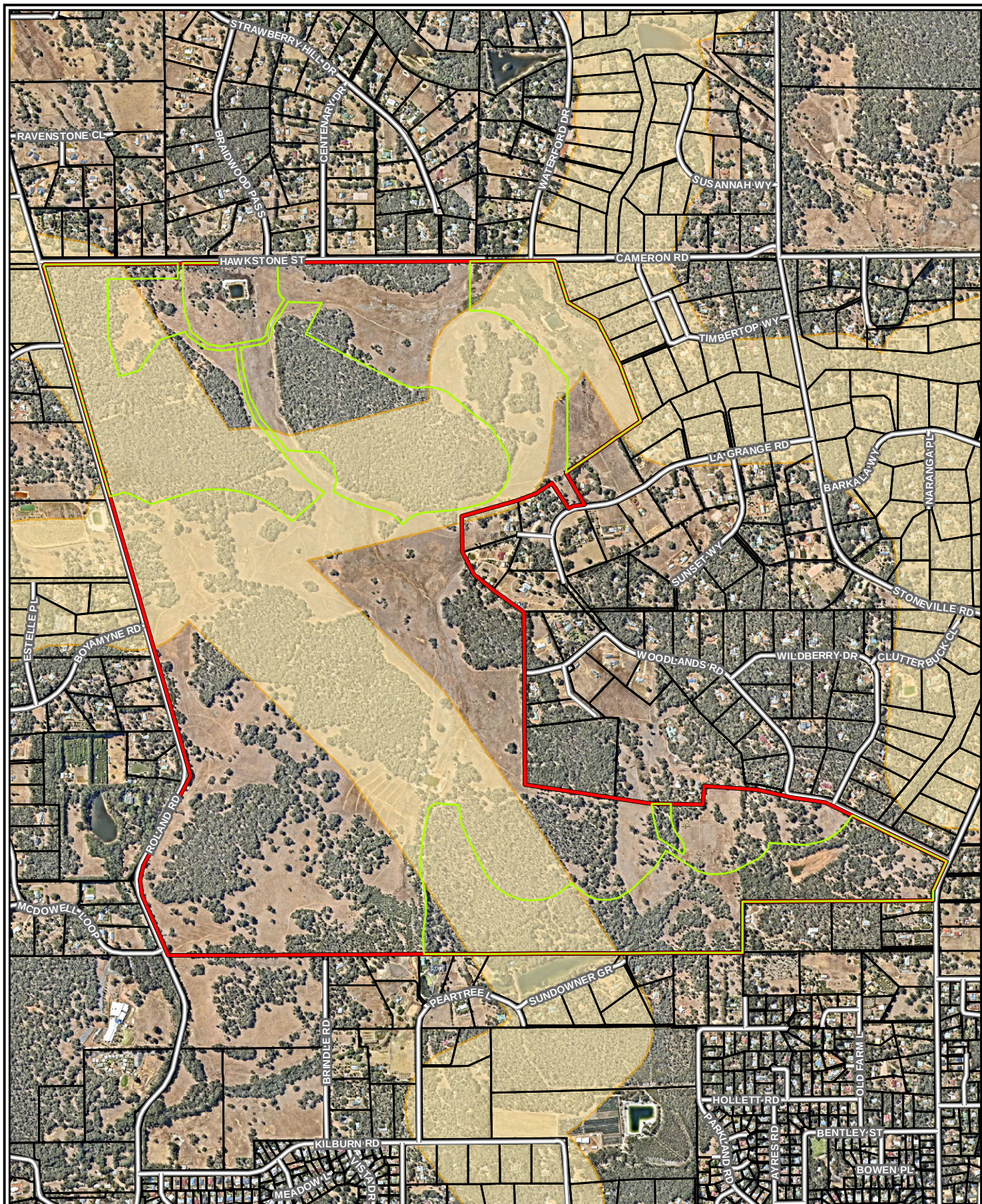
The majority of the proposed action area appears to have been cleared prior to 1965 to facilitate livestock grazing and other agricultural activities. Adjacent land comprises a mix of agricultural and rural-residential areas; with the majority of clearing occurring pre-1965. Remnant pockets of native vegetation occur throughout the surrounding area.

The current and historical land use of extensive agriculture (predominantly grazing) is not identified as a potentially contaminating industry, activity, or land use by DWER contaminated site register. There is the potential that isolated areas of contamination may occur due to current or historical asbestos containing buildings or areas of intensive chemical use/storage (e.g., sheds, sheep dipping facilities), however no such structures are present within the Conservation Area.

3.7 Regional Ecological Linkages

Regional Ecological Linkages are a network of protected Regionally Significant Natural Areas which act as corridors to maintain habitat connectivity for flora and fauna species. A number of these linkages exist within the Shire of Mundaring, with two of these falling across the Conservation Area (Link ID: 123 and Link ID: 125; Figure 3.4). Link 123 runs from east to west and intersects Link 125 which runs north to south through the wider proposed action area.

The retention, enhancement, and conservation of vegetation within the Conservation Area will maintain and protect both of these ecological linkages.



Legend: Proposal Area Conservation area Cadastral boundary Regional ecological linkages Roads (MRWA)	Scale 1:20,000 at A4		0250500 metres	Stoneville, WA
	Coord. Sys. GDA 1994 MGA Zone 50			REGIONAL ECOLOGICAL LINKAGES
	Job No: 57355			
	Client: Satterley Property Group		FIGURE 3.4	
	Version: A	Date: 24-Jan-2023		JBS&G
	Drawn By: jcrute	Checked By: CJ		

3.8 Bushfire risk

The majority of the Conservation Area and wider proposed action area is designated as bushfire prone on the WA map of bushfire prone areas (DFES 2019).

JBS&G assessed the bushfire risk through an on-ground assessment of classified vegetation and exclusions within 150 m of proposed development in accordance with *AS 3959-2009 Construction of Buildings in Bushfire-Prone Areas* (AS 3959; SA 2009). The bushfire assessment identified areas of Class A forest, Class D scrub and Class G grassland within 150 m of proposed development resulting in a 'moderate to extreme' bushfire hazard.

JBS&G subsequently prepared a BMP to accompany the development's Structure Plan. This BMP built upon the 2016 BMP that was prepared and approved to support the lifting of the "Urban Deferred" zone to "Urban" under the MRS. The BMP prepared to support the Structure Plan addresses the requirements of *State Planning Policy 3.7 Planning in Bushfire Prone Areas* (SPP 3.7), namely Policy Measure 6.3.

Management of the Conservation Area will be required to comply with all relevant approved BMPs for the development including management actions that may be implemented to reduce bushfire risk within the Conservation Area.

For the purpose of this CAMP, partial clearing is required to be undertaken within approximately 5.3 ha in the Conservation Area (Figure 5.1). In this case, partial clearing refers to clearing required for maintenance of an Asset Protection Zone (APZ) as per Schedule 1 of the *Guidelines for Planning in Bushfire Prone Areas* (The Guidelines; WAPC 2017; Appendix A). Clearing for these purposes allows for the retention of 15% canopy cover, as well as managed understorey vegetation. Management of this APZ will be to Schedule 1 of the Guidelines and will be ongoing.

4. Threats to Matters of National Environmental Significance

4.1 Threatening Processes

The proposed action area has historically been subject to agricultural practices for over 50 years, principally stock grazing, with most patches of remnant vegetation having a degraded or absent understorey (Strategen 2020) and over 43% of the site extensively cleared. Furthermore, the northern sector of the proposed action area has been quarried for gravel, which resulted in clearing in remnant bushland in the north-west corner. This has resulted in a direct loss of vegetation, compromising habitat values to both Black Cockatoos and Chuditch.

As evidenced by the HQS assessment provided in Section 3.4.3, the projected foliage cover across the site is relatively low. This has resulted in a reduced vegetation condition and structure score in the HQS tool for Black Cockatoos due to the limited coverage of foraging vegetation present and a low Chuditch habitat quality score due to the sparse vegetation and lack of denning opportunities. As mentioned previously, the onsite Conservation Areas have been strategically located to ensure that the greatest environmental values within the proposed action area are maintained including the highest quality vegetation and the presence of the highest quality Black Cockatoo foraging habitat and Chuditch habitat. If this vegetation is not afforded formal protection and the key threatening processes described below are not adequately managed, further degradation to the habitat available for MNES at the site is likely to occur. Table 4.4 includes a risk assessment for each of the existing threatening processes described below.

4.1.1 Land use zoning

The proposed on-site Conservation Area is not currently zoned for conservation purposes, nor any other protection mechanism in place, there is therefore a threat to this vegetation and habitat associated with clearing for land uses permissible under the current zoning of “Urban” under the MRS and “Development” under the Shire of Mundaring LPS No. 4. This is evidenced by similar subdivision that has occurred surrounding the proposed action area. Records show that on the Swan Coastal Plain, approximately 54% of potential Carnaby’s Black Cockatoo habitat (i.e., areas of native vegetation that contain flora species and vegetation types that could support the species’ breeding, feeding and roosting activities) has been cleared since European settlement and there is ongoing and increasing pressure for continued urban development in the Perth and Peel regions, as well as other cities and towns in other parts of the distribution of Carnaby’s Black Cockatoo (DPAW 2013). Habitat loss due to clearing for residential development is also listed as an increasing threat in south-west Western Australia at present to both Baudin’s and Forest Red-tailed Black Cockatoo species, particularly on the Swan Coastal Plain (DEC 2008). Furthermore, the Recovery Plan (DEC 2012) for Chuditch states that in terms of habitat, clearing that creates gaps in otherwise homogenous habitat, or leads to progressive fragmentation of habitat (such as the clearing that has occurred within the proposed action area) is particularly deleterious. Chuditch depend on the presence of den sites, protective cover, and sufficient prey biomass, all of which are typically removed by clearing. Therefore, affording the Conservation Area with formal protection via a Conservation Covenant will preclude the ability for the habitat within to be cleared in the future ensuring it remains available for use by the local Black Cockatoo flocks and Chuditch population.

4.1.2 Unauthorised access

Access within the proposed Conservation Area is not currently controlled which is evidence by informal tracks throughout the site. Fencing along the perimeter of the site is also damaged allowing unmitigated public vehicle and pedestrian access. Such unauthorised access has caused vandalism and direct loss of vegetation on the site which is suitable MNES habitat and can lead to an increased spread of weeds and pathogens such as *Phytophthora* dieback (as discussed below).

4.1.3 Weeds and pathogens

The recovery plans for Black Cockatoos (DPAW 2013 and DEC 2008) identify weed invasion and *Phytophthora* dieback spread as factors which contribute to the degradation and loss of Black Cockatoo habitat. Invasion by exotic weeds (nine introduced taxa were recorded within the proposed action area, one of which is a Declared Plant species in Western Australia, the Arum Lily [*Zantedeschia aethiopica*]) have been recorded across the proposed action area and if left unmanaged will continue to degrade the MNES habitat available. Furthermore, the site is located within the dieback vulnerable zone and there are several potential pathways for dieback to be introduced or spread throughout the site such as unauthorised access and future construction activities adjacent to the onsite Conservation Areas. During the Strategen (2020) surveys, it was noted that there was evidence of *possible* dieback infestation in some of the quadrats recorded. Dieback can lead to increased death of susceptible species, including Eucalypt species which provide quality foraging habitat for Black Cockatoos at Stoneville.

4.1.4 Feral Fauna

Feral fauna, predominately rabbits and foxes, have been recorded within the proposed action area and have the potential to affect retained and planted vegetation and native fauna within the Conservation Area if unmanaged through overgrazing, predation, burrowing, and competition for food and shelter. The Chuditch National Recovery Plan (DEC 2012) highlights that foxes have a negative effect on Chuditch populations within the WA Jarrah (*Eucalyptus marginata*) forest, through predation of young Chuditch, and indirectly through direct competition for food resource. Furthermore, the recovery plan for Carnaby's Black Cockatoo (DPAW 2013) notes grazing by rabbits leads to a lack of successful natural recruitment of suitable habitat species which is evidenced at the proposed action area through the reduced foliage cover.

4.1.5 Potential impacts to Matters of National Environmental Significance as a result of the Development

Further to the above existing threatening processes, activities associated with the proposed action have the potential to impact on MNES. These activities are discussed further below. As impacts to MNES resulting from the proposed action are future risks, an assessment of the potential impacts and risks to the MNES resulting from the proposed action has been undertaken (Table 4.4).

4.1.5.1 Native vegetation clearance

Accidental clearing of fauna habitat may occur as a result of development adjacent to areas that are designated for future conservation, resulting in the loss of potential MNES habitat for species such as Black Cockatoos and Chuditch. As discussed in Section 4.1.1, the recovery plans for Chuditch (DEC 2012) and Black Cockatoos (DPAW 2013 and DEC 2008) note that habitat loss, due to clearing activities, is a significant pressure to MNES, and results in impacts such as progressive fragmentation of fauna habitat, increased predation and competition of essential resources.

As the majority of the proposed action area comprises mature trees of Jarrah (*Eucalyptus marginata*) and Marri (*Corymbia calophylla*) (Strategen 2020), the accidental clearing of one of these trees would result in the loss of significant Black Cockatoo habitat, such as foraging habitat and breeding trees. Additionally, accidental clearing of understorey species would result in loss of potential Black Cockatoo foraging habitat and potential habitat for Chuditch, reducing availability of den sites and increasing exposure and therefore predation of Chuditch (DEC 2012).

4.1.5.2 Ground disturbance and topsoil movements

Further impacts to MNES may occur as a result of ground disturbance activities and topsoil movements, potentially leading to the introduction and/or spread of *Phytophthora dieback* (dieback) and weeds, causing reduced fauna habitat quality and potential loss of suitable habitat for MNES, such as Black Cockatoos and Chuditch (DPAW 2013 and DEC 2008). Humans have spread dieback further and faster than other means of

spread, through activities linked to development such as movement of infested soil and ground disturbance works (DPAW 2023). Weeds and dieback may also be spread through clothing (i.e., boots) and vehicles and machinery (DBCA 2023).

Additionally, soil level changes (i.e., cut and fill operations), proximity excavations, soil compaction and mechanical damage are common causes of root damage and tree decline (Standards Australia 2009). Construction activities and proximity infrastructure/ development have the potential to result in root loss/ root zone impacts, mechanical damage to tree conductive tissue, canopy suppression and soil issues such as, acidity/ alkalinity and/ or salinity leading to tree health decline and therefore reduced potential fauna habitat availability and quality, such as for Black Cockatoo foraging and breeding habitat (DPAW 2013 and DEC 2008).

4.1.5.3 Unauthorised access

Unauthorised access may occur as a result of retained vegetation/ fauna habitat that is not effectively delineated, contributing to degrading processes such as unapproved clearing and unmitigated vehicle and pedestrian access, which may in turn increase the risk of weed and dieback proliferation. Additionally, isolated incidents of surrounding landowners deliberately killing Chuditch have been reported, due to Chuditch previously being seen as pests in agricultural and populated areas, where they were destructive to poultry (DEC 2012).

4.1.5.4 Potential spills of hazardous waste materials (hydrocarbons)

As noted in the recovery plans for Chuditch (DEC 2012) and Black Cockatoos (DPAW 2013 and DEC 2008) key threats to individuals and habitat include degradation, which may occur as a result of chemical, hydrocarbon and/ or other hazardous waste leaks/spills, attributed to improper storage within proximity of remnant vegetation/ fauna habitat. Unregulated waste may have adverse impacts to MNES, such as Black Cockatoos and Chuditch individuals and habitat through the spread and introduction of weeds and dieback, contamination of soils and/ or waterways and by physically endangering individuals.

4.1.5.5 Noise and dust emissions

Development activities have the potential to impact on air quality, and subsequently fauna individuals and habitat, including MNES, such as Chuditch and Black Cockatoos. Dust may be emitted through development activities, such as vehicle and machinery movements and ground disturbance, excavation and demolition activities, and result in smothering of flora, vegetation and fauna habitat reducing habitat quality and availability (EPA 2020). Additionally, studies have noted that Black Cockatoos may be scared off from their habitat due to loud noises within proximity (DEC 2008).

4.1.5.6 Bushfires associated with an increase in human activity

Altered fire regimes are noted as a factor that may impact MNES habitat and individuals, such as Chuditch (DEC 2012) and Black Cockatoos (DPAW 2013 and DEC 2008). Implementation of the proposed action may increase the risk of fire to surrounding remnant vegetation/fauna habitat through operation of equipment and machinery, handling and storage of flammable liquids, inappropriate storage of waste materials (including cigarette butts) and presence of vegetation stockpiles which can act as fuel sources. MNES may also be at risk of bushfires within proximity of residential development due to residences that may present fire hazards (i.e., unattended cooking, lithium-ion batteries, electrical and appliance faults, fireplaces, lit candles cigarettes [DFES]) and potential cases of arson, attributed to unauthorised access to remnant vegetation/ fauna habitat.

As noted in the recovery plan for Chuditch (DEC 2012), fires may have the same impact as clearing due to the destructive nature, which may destroy den logs, protective cover, remove prey biomass and homogenise large area of habitat, resulting in fragmentation and therefore limiting genetic flow. Similarly, fires are considered destructive to Black Cockatoo habitat due to the potential loss of significant foraging habitat and loss or damage to potential breeding habitat should trees containing nest hollows be lost to fire or the nest chambers be damaged by fire (DPAW 2013 and DEC 2008).

4.1.5.7 Generation and storage of waste

Development surrounding remnant vegetation/ fauna habitat for MNES, such as Black Cockatoos and Chuditch may result in increased unregulated waste disposal. Unregulated waste can have adverse impacts on fauna through the introduction of weeds, dieback and pests, contamination of soils and by physically endangering native fauna. For example, improperly disposed food waste within and surrounding remnant fauna habitat may attract species such as foxes and cats which impact Chuditch through predation of young and potential competition of food sources (DEC 2012) as noted in Section 4.1.4. Additionally, cats have been known to prey on Black Cockatoos in breeding hollows (DCCEEW 2016).

4.1.5.8 Risk assessment

A qualitative risk assessment was conducted in accordance with the *Environmental Management Plan Guidelines* (DoE 2014) to assess the risks of the threatening processes described above. Each environmental risk identified has been provided a likelihood and consequence rating using the criteria in Table 4.1 and Table 4.2. These ratings are then combined using Table 4.3 to generate a risk rating of low, medium, high or severe.

Table 4.1: Likelihood

Qualitative Measures for likelihood (How likely is it that this event/issue after control strategies have been put in place)	
Highly likely	Is expected to occur in most circumstances.
Likely	Will probably occur during the life of the project.
Possible	Might occur during the life of the project.
Unlikely	Could occur but considered unlikely or doubtful.
Rare	May occur in exceptional circumstances.

Table 4.2: Consequence

Qualitative Measures for consequence (what will be the consequence/result if this issue does occur rating)	
Minor	Minor incident of environmental damage that can be reversed.
Moderate	Isolated but substantial instances of environmental damage that could be reversed with intensive efforts.
High	Substantial instances of environmental damage that could be reversed with intensive efforts.
Major	Major loss of environmental amenity and real danger of continuing.
Critical	Severe widespread loss of environmental amenity and irrecoverable environmental damage.

Table 4.3: Risk rating

Risk	Consequence				
	Minor	Moderate	High	Major	Critical
Highly likely	Medium	High	High	Severe	Severe
Likely	Low	Medium	High	High	Severe
Possible	Low	Medium	Medium	High	Severe
Unlikely	Low	Low	Medium	High	High
Rare	Low	Low	Low	Medium	High

Table 4.4: Environmental Risk Assessment of Threatening Processes at Stoneville Site

Threatening process	Impacts	Inherent Risk Rating			Management measures	Residual Risk Rating		
		Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
Existing threatening processes								
Land use zoning	Direct loss of Black Cockatoo and Chuditch habitat through clearing for residential development. Refer to Section 4.1.1 for more details.	Highly Likely	High	High	Management measures include: Apply a legally binding mechanism (i.e., conservation covenant) to the Conservation Area to ensure the ongoing protection and management of the site. Refer to Section 5.1 for more details. Contingency actions have been incorporated into the CAMP if monitoring (see Section 6) indicates conservation mechanism targets and completion criteria are not being met. Please see Section 7 for more detail.	Rare	High	Low
Unauthorised access	Unauthorised access has caused vandalism and direct loss of vegetation on the site which is suitable MNES habitat and can lead to an increased spread of weeds and pathogens. Refer to Section 4.1.2 for more details.	Highly likely	Moderate	High	Management measures include: - Installation of permanent perimeter fencing. - Establish formalised pedestrian access tracks and signage in Conservation Area. Refer to Section 5.2.2 for more details. Contingency actions have been incorporated into the CAMP if monitoring (see Section 6) indicates conservation mechanism targets and completion criteria are not being met. Please see Section 7 for more detail.	Possible	Moderate	Low

Threatening process	Impacts	Inherent Risk Rating			Management measures	Residual Risk Rating		
		Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
Weeds and pathogen spread	Weeds and pathogen spread can degrade the MNES habitat over time and can lead to increased death of susceptible species, including Eucalyptus species which provide quality foraging habitat for Black Cockatoos at Stoneville. Refer to Section 4.1.3 for more details.	Highly Likely	Moderate	High	Management measures include: • Ensure vehicles/machinery/ equipment are free of mud and soil. • Restrict vehicle access to work areas – communicated through inductions/ signage and fencing. • Develop a weed control programme (spot spraying, hand weeding etc.). • All plants and other materials used during revegetation is to be free of soil that may contain weeds/ dieback (NIAS accredited nursery). Refer to Section 5.2.3 for more details. Contingency actions have been incorporated into the CAMP if monitoring (see Section 6) indicates conservation mechanism targets and completion criteria are not being met. Please see Section 7 for more detail. for more detail.	Possible	Moderate	Low
Feral fauna	Feral fauna, predominately rabbits and foxes, have been recorded within the Stoneville site and have the potential to affect retained and planted vegetation and native fauna within the Conservation Area if unmanaged through	Highly likely	Moderate	High	Management measures include: • Engage suitably qualified contractor to undertake pest fauna control/ removal programme. • Install educational signage detailing risk of domestic pets to native fauna within Conservation Area. • Install at minimum 69 artificial Black Cockatoo nesting tubes.	Possible	Moderate	Low

Threatening process	Impacts	Inherent Risk Rating			Management measures	Residual Risk Rating		
		Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
	overgrazing, predation, burrowing, and competition for food and shelter. Refer to Section 4.1.4 for more details.				Place felled trees/ logs within Conservation Area to provide habitat for ground dwelling native fauna. Refer to Section 5.2.5 for more detail. Contingency actions have been incorporated into the CAMP if monitoring (see Section 6) indicates conservation mechanism targets and completion criteria are not being met. Please see Section 7 for more detail.			
Climate change	Climate change has the potential to impact the extent and survival, or capacity for regeneration of the vegetation providing habitat for Black Cockatoos and Chuditch.	Possible	High	Medium	Management measures include: - Protection of suitable Black Cockatoo and Chuditch habitat within their distribution range (Refer to Management Action 1 in Section 5.1.2). - Implementation of Bushfire Management Plan to reduce bushfire risk (Refer to Management Action 6 in Section 5.2.6). - Increasing habitat available for Black Cockatoos and Chuditch within their distribution range through revegetation (refer to management Action 7 in Section 5.3.2 for more detail). Contingency actions have been incorporated into the CAMP if monitoring (see Section 6) indicates conservation mechanism targets and	Possible	High	Medium

Threatening process	Impacts	Inherent Risk Rating			Management measures	Residual Risk Rating		
		Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
					completion criteria are not being met. Please see Section 7 for more detail.			
Future threatening processes associated with the proposed action								
Native vegetation clearance	Poor management and/or supervision during construction activities may lead to the loss of remnant and native vegetation outside of clearing boundaries which may lead to the direct loss of habitat available for MNES.	Possible	Moderate	Medium	Management measures include: - Establish access tracks in Conservation Area. - Installation of educational signage on periphery of Conservation Area. - Establish formal fire access in Conservation Area. - Restricted vehicle access. Refer to Section 5.1 and 5.2.2 for more detail.	Rare	Moderate	Low
Ground disturbance and topsoil movement	Spread or introduction of dieback and weeds may occur through use and disturbance of infested soils, leading to reduced flora species and system diversity which can cause a decline in MNES habitat quality. Soil level changes and mechanical damage may also cause tree root damage and decline, impacting MNES habitat, such as loss of breeding trees.	Likely	Moderate	Medium	Management measures include: - Clean vehicles, machinery and equipment prior to entry into Conservation Area. - Restrict vehicle access to works areas. - Monitor weed and pathogen spread and undertake management, if required. - Revegetation material to be free of dieback or weed contaminated soil. - Provision of boot washdown stations. - Stormwater design away from Conservation Area.	Possible	Moderate	Low

Threatening process	Impacts	Inherent Risk Rating			Management measures	Residual Risk Rating		
		Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
					Refer to Section 5.2.3 and Section 5.3.2 for more detail.			
Unauthorised access	Uncontrolled access within remnant native vegetation may result in physical injury or death to fauna individuals, and/ or vandalism or damage, as a result of physical disturbance, waste discharge or soil contamination.	Possible	Moderate	Medium	Management measures include: - Establish access tracks in Conservation Area. - Installation of educational signage on periphery of Conservation Area. - Establish formal fire access in Conservation Area. - Restricted vehicle access. Refer to Section 5.1 and 5.2.2 for more detail.	Rare	Moderate	Low
Potential spills of hazardous waste materials (hydrocarbons)	Improper storage of hazardous waste may result in leaks and spills, and cause physical harm to MNES or degradation of vegetation / fauna habitat through contamination of soils and/or waterways.	Unlikely	Moderate	Low	Management measures include: - Install clear waste disposal practice signage. Refer to Section 5.2.4 for more detail. Additional management measures include: - Maintain a hazardous materials register on site. - Appropriately label containers containing hazardous materials. - Store hazardous materials at least 50m from Conservation Area. - Work areas to be equipped with complete spill kits.	Unlikely	Moderate	Low

Threatening process	Impacts	Inherent Risk Rating			Management measures	Residual Risk Rating		
		Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
					Refer to the CEMP (JBS&G 2024a) for further details.			
Noise and dust emissions	Site activities may impact air quality, such as increased dust which may smother flora, vegetation, reducing quality of MNES habitat. Increased noises have the potential to scare off fauna from their local habitat, reducing available habitat for MNES.	Likely	Minor	Low	Management measures include: - Restrict vehicle access to works areas. Refer to Section 5.2.2 for more detail. Additional management measures include: - Avoid dust generating activities during unfavourable weather conditions. - Implement dust suppression (e.g., wet down of unsealed tracks). - Apply surface treatments (much, ground cover etc.) to stabilise any bare areas prone to wind erosion. - Ensure equipment is appropriately fitted, maintained or substitutes with noise reduction devises. - Refer to the CEMP for further details.	Possible	Minor	Low
Bushfire associated with increased human activity	Site activities have the potential to cause bushfires in remnant native vegetation leading to damage or death to local MNES.	Possible	High	Medium	Management measures include: - Monitor and reduce fire fuel loads via prescribed burning and mechanical removal. - Install fire access tracks in Conservation Area. - Limit areas of revegetation to minimise fuel zone. - Install educational signage.	Unlikely	High	Low

Threatening process	Impacts	Inherent Risk Rating			Management measures	Residual Risk Rating		
		Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
					Provision of waste bins. Refer to Section 5.2.2 for more detail			
Generation and storage of waste	Unregulated disposal and storage of waste in proximity to native vegetation may increase contamination of soils, introduce presence of pests and predation species (i.e., foxes and cats) and physical endanger native fauna.	Unlikely	Moderate	Low	Management measures include: - Install self-closing waste bins. - Install clear waste disposal practice signage. Refer to Section 5.2.4 for more detail. Additional measures include: - Removal of any rubbish that has been dumped or drifted into the Conservation Area. - Refer to the CEMP for further detail.	Unlikely	Moderate	Low
Threats to the success of the Offset Implementation Plan (OIP)								
Revegetation success	There is potential that the proposed revegetation at the Conservation Area will not achieve the desired completion criteria as outlined in Table 5.15 and therefore not provide sufficient offsets as required by the Offset Strategy (JBS&G 2024b).	Possible	Moderate	Medium	Revegetation actions have been developed based on similar revegetation programs within the Swan Coastal Plain and are outlined in Section 6.1.7. These actions include: - Engagement of suitably qualified revegetation contractor. - Delineation and access including exclusion of livestock. - Site preparation and erosion control. - Weed and pathogen control. - Pest Control. - Planting densities and species list.	Unlikely	Moderate	Low

Threatening process	Impacts	Inherent Risk Rating			Management measures	Residual Risk Rating		
		Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
					Contingency actions have been incorporated into the CAMP if monitoring (Section 6) indicates revegetation targets and completion criteria are not being met. Please see Section 7 for more detail.			
Black cockatoo and Chuditch outcomes are not achieved	The following objectives for Black Cockatoos and Chuditch and are at risk of not being achieved through failure of the Management Actions (see Section 5) outlined in this Plan: - To facilitate protection of the Black Cockatoo and Chuditch habitat at the Williams site through implementation of a legally binding mechanism. - Facilitate ongoing maintenance and management of native vegetation within the Conservation Area to prevent degradation of Black Cockatoo and	Possible	Moderate	Medium	The following management actions have been established to ensure key objectives for Black Cockatoos and Chuditch are achieved at the Williams Site: Management Action 1: Protection of the Conservation Area for the purpose of conservation. Management Action 2: Delineation and access. Management Action 3: Weed and pathogen management. Management Action 4: Waste management. Management Action 5: Fauna and pest management. Management Action 6: Bushfire management. Management Action 7: Habitat regeneration through revegetation. Targets and completion criteria have been established against each management action listed above and a monitoring plan developed (see Section 6) to monitor each action performance.			Low

Threatening process	Impacts	Inherent Risk Rating			Management measures	Residual Risk Rating		
		Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
	Chuditch habitat as a result of key threatening processes. - Establish an ecologically diverse and stable vegetation community with similar structure and composition within the revegetation area to that of the surrounding native vegetation including species known to be primary foraging plants for Carnaby's, Forest Red-tailed and Baudin's Black Cockatoos. - Improve condition and structure of native vegetation in revegetation area to achieve a 'Moderate' foraging value for Carnaby's, Baudin's and Forest Red-tailed Black				Contingency actions have been incorporated into the CAMP if monitoring indicates targets and completion criteria are not being met. Please see Section 7 for more detail.			

Threatening process	Impacts	Inherent Risk Rating			Management measures	Residual Risk Rating		
		Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
	Cockatoos in consideration of the HQS tool. Provide additional Chuditch habitat by increasing density of vegetation within revegetation area and providing additional denning opportunities to achieve an increase to at least a 'Low' Chuditch habitat value in consideration of HQS tool.							

5. Management Plan

Management actions have been allocated across three environmental management zones (EMZs):

1. Entire Conservation Area (existing vegetated portion and rehabilitation area combined).
2. Existing vegetated portion of Conservation Area.
3. Revegetation Area.

The recovery plans for Black Cockatoos (DPAW 2013 and DEC 2008) and Chuditch (DEC 2012) include key recovery actions which require the implementation of management strategies to protect MNES habitat from key threatening processes which cause habitat degradation. Such recovery actions include the need to manage forests for the conservation of Forest Red-tailed and Baudin's Black Cockatoos (DEC 2008) and protection and management of important habitat for Carnaby's Black Cockatoo (DPAW 2013). Furthermore, recovery actions for Chuditch include the requirement to retain and improve habitat critical for survival of the species and implementation of baiting of predator species including foxes (DEC 2012). Management measures have been developed for the Conservation Area to ensure the MNES habitat within the Conservation Area is protected and key threatening processes are mitigated to prevent habitat degradation.

Furthermore, the CAMP details placement of artificial hollows and hollow logs within the Conservation Area to enhance habitat availability for both Black Cockatoos and Chuditch respectively. Further enhancement efforts include revegetation which is proposed to be undertaken in an area of at least 5 ha in areas of 'Degraded to Completely Degraded' condition to provide additional habitat suitable for both Black Cockatoos and Chuditch. This aligns with the recovery plans for both Black Cockatoos (DPAW 2013 and DEC 2008) which specify the follow recovery actions:

- Protect and manage important habitat for Carnaby's Black Cockatoos of which includes the implementation of management measures to protect and improve the condition of breed habitat and associated feeding habitat which can be achieved through revegetation activities (DPAW 2013); and
- Retain and improve habitat critical for survival of Chuditch which includes identification of areas of remnant vegetation that can be protected or enhanced through revegetation (DEC 2012).

The revegetation will aim to increase the foliage cover of degraded areas with species suitable for Black Cockatoo foraging and which provided protective cover and denning opportunities for Chuditch. Enhancement of habitat quality through revegetation is highlighted as a key recovery action in the recovery plans for both Black Cockatoos and Chuditch (DEC 2008; DEC 2012 and DPAW 2013) and will contribute to a conservation gain for the local flock of Black cockatoos and Chuditch population impacted by the proposed action. Further details on artificial hollow installation is provided in Section 5.2.5 and revegetation within Section 5.3.2.

The key objectives of this CAMP for the onsite Conservation Area is to:

- Facilitate protection of the Black Cockatoo and Chuditch habitat at the Williams site through implementation of a legally binding mechanism;
- Facilitate ongoing maintenance and management of native vegetation within the Conservation Area to prevent degradation of Black Cockatoo and Chuditch habitat as a result of key threatening processes; and
- Establish an ecologically diverse and stable vegetation community with similar structure and composition within the revegetation area to that of the surrounding native vegetation including species known to be primary foraging plants for Carnaby's, Forest Red-tailed and Baudin's Black Cockatoos;

- Improve condition and structure of native vegetation in revegetation area to achieve a 'Moderate' foraging value for Carnaby's, Baudin's and Forest Red-tailed Black Cockatoos in consideration of the HQS tool; and
- Provide additional Chuditch habitat by increasing density of vegetation within revegetation area and providing additional denning opportunities to achieve an increase to at least a 'Low' Chuditch habitat value in consideration of HQS tool.

Management actions to be undertaken in the Conservation Area to achieve the above objectives for both ongoing management and protection and enhancement of MNES habitat are summarised in Table 5.1. The CAMP is to be implemented within one year from commencement of the action (Year 1).

Table 5.1: Management actions to be applied within the Conservation Area

EMZ	Objective	Management Actions	Relevant Section
Entire CA	Facilitate protection of the Black Cockatoo and Chuditch habitat within the onsite CA through implementation of a legally binding mechanism.	Management Action 1: Protection of the CA for the purpose of conservation.	Section 5.1.2
Existing vegetated portion of CA	Facilitate ongoing maintenance and management of native vegetation within the CA to enhance habitat quality and prevent degradation of Black Cockatoo and Chuditch habitat as a result of key threatening processes.	Management Action 2: Delineation and access.	Section 5.2.2
		Management Action 3: Weed and pathogen management.	Section 5.2.3
		Management Action 4: Waste management.	Section 5.2.4
		Management Action 5: Fauna and pest management.	Section 5.2.5
		Management Action 6: Bushfire management.	Section 5.2.6
Revegetation Area	- Establish an ecologically diverse and stable vegetation community with similar structure and composition within the revegetation area to that of the surrounding native vegetation including species known to be primary foraging plants for Carnaby's, Forest Red-tailed and Baudin's Black Cockatoos. - Improve condition and structure of native vegetation in revegetation area to achieve a 'Moderate' foraging value for Carnaby's, Baudin's and Forest Red-tailed Black Cockatoos in consideration of the HQS tool. - Provide additional Chuditch habitat by increasing density of vegetation within revegetation area and providing additional denning opportunities to achieve an increase to at least a 'Low' Chuditch habitat value in consideration of HQS tool.	Management Action 7: Habitat regeneration through revegetation.	Section 5.3.2

5.1 Entire Conservation Area

5.1.1 Key objective(s)

The key objective relating to the conservation mechanism is to facilitate protection of the Black Cockatoo and Chuditch habitat at the onsite Conservation Area through implementation of a legally binding mechanism.

5.1.2 Management Action 1: Protection of the Conservation Area for the purpose of conservation

5.1.2.1 Overview

To ensure the protection and security in perpetuity of the MNES habitat provided, a Conservation Covenant will be placed of the Conservation The preferred conservation mechanism is a conservation covenant pursuant to Section 305 of the EPBC Act. However, the Proponent can consider alternative mechanisms such as under one of the following legal mechanisms:

- *Soil and Land conservation Act 1945;*
- *The National Trust of Australia (WA) Act 1964;*
- *Transfer of Land Act 1893; or*
- BC Act 2016.

The Proponent will implement the CAMP and will subsequently cede the Conservation Area to the ultimate land manager as per covenant arrangements.

5.1.2.2 Conservation mechanism objectives, targets and completion criteria

The objectives, targets and completion criteria relation to Management Action 1 are provided in Table 5.2 below.

Table 5.2: Conservation mechanism objectives, targets, and completion criteria

Management action objective	Targets		Completion criteria
	Years 1 to 3	Years 3 to 20	
Implement a legally secure conservation mechanism to ensure the ongoing protection and conservation of MNES habitat within the Conservation Area.	• Ultimate land manager decided by the end of Year 1. • Conservation covenant has been applied over the Conservation Area by the end of Year 1.	• Implementation of the provisions of the covenant and handover of the Conservation Area to the ultimate land manager as per covenant provisions by the end of Year 20.	• MNES habitat within the Conservation Area is protected in perpetuity through implementation of a conservation covenant.

5.1.2.3 Conservation mechanism measures

Table 5.3 below outlines the action which will need to be implemented to ensure the completion criteria identified in Table 5.2 are achieved.

Table 5.3: Conservation mechanism management measures

Reference No.	Action	Responsibility	Proposed timing
CAMP 1.	Legal securement of the onsite Conservation Area through application of Conservation Covenant.	Satterley	By the end of Year 1

5.2 Exiting vegetated portion of the Conservation Area

5.2.1 Key Objective(s)

The key objective of the existing vegetation portion of the Conservation Area is to facilitate ongoing maintenance and management of native vegetation to enhance habitat quality and prevent degradation of Black Cockatoo and Chuditch habitat as a result of key threatening processes. In order to achieve this objective, management measures have been designed to avoid and mitigate impacts through implementation of the threat abatement measures and repair the potential threatening processes and risks to the site's Black Cockatoo and Chuditch values. Management measures and implementation of this CAMP will be a provision of the covenant to be applied on the Conservation Area.

5.2.2 Management Action 2: Delineation and access

5.2.2.1 Overview

Delineation of the Conservation Area is important during the construction phase as well as post construction. If the Conservation Area is not effectively delineated, then degrading processes such as unapproved clearing and unmitigated vehicle and pedestrian access may become more prevalent, which in turn may increase the risk of weed and phytophthora proliferation within the Conservation Area. Delineation will occur through the installation of permanent fencing around the perimeter of the Conservation Area. The fencing will have bottom wires high enough for wildlife to move in and out of the Conservation Area.

It is also important to note that the Conservation Area serves as a valuable recreational asset to the local community, and as such, interaction with the Conservation Area should be encouraged, ensuring that the Conservation Area's environmental values are not harmed in the process. To this end, pre-existing access tracks through the Conservation Area are proposed to be formalised and new tracks are proposed to be established based on anticipated human movements post development. The fire access track locations are displayed in Figure 5.1. Suitable fencing and signage will be erected to encourage trail users to follow paths and provide information about the importance of the Conservation Area and wildlife awareness.

5.2.2.2 Delineation and access objectives, targets and completion criteria

The objectives, targets and completion criteria relation to Management Action 2 are provided in Table 5.4 below.

Table 5.4 Delineation and access of existing vegetation objective, targets and completion criteria

Management action objective	Targets			Completion criteria
	Years 1 to 3	Years 3 to 5	Years 5 to 20	
Protect retained MNES habitat by preventing degradation as a result of unauthorised access and/or accidental clearing.	- Permanent conservation style fencing to be installed along perimeter of Conservation Area by the end of Year 1. - Lockable gates to be installed at strategic locations to allow vehicle access by the end of Year 1. - Establish/formalise pedestrian access tracks and fire	- Gates, fences, and access tracks maintained in functional order. - Install educational signage along pedestrian tracks by the end of Year 5.	Gates, fences, and access tracks maintained in functional order.	- Fencing and lockable gates are installed around the perimeter of the Conservation Area with no outstanding repairs or replacement required at the time of handover. - Pedestrian access tracks are formalised throughout the Conservation Area.

Management action objective	Targets			Completion criteria
	Years 1 to 3	Years 3 to 5	Years 5 to 20	
	access tracks by the end of Year 3.			- Educational signage installed on pedestrian access tracks - Fire access track installed.

5.2.2.3 Delineation and access measures

Table 5.5 below outlines the action which will need to be implemented to ensure the completion criteria identified in Table 5.4 are achieved.

Table 5.5: Delineation and access measures and completion criteria

Reference	Action	Responsibility	Proposed timing
CAMP 2.	Permanent conservation style fencing that allows for the movement of fauna by being raised at least 15 centimetres from the ground will be installed around the periphery of the Conservation Area to prevent unauthorised vehicle access. Lockable gates are to be installed at appropriate locations to enable vehicle access when required.	Satterley	By the end of Year 1
CAMP 3.	Establish / formalise pedestrian access tracks through the Conservation Area.	Satterley	By the end of Year 3
CAMP 4.	Install a formal fire access track within the Conservation Area, at a location to be determined in consultation with the Shire of Mundaring and DBCA.	Satterley	By the end of Year 3
CAMP 5.	Install educational signage on pedestrian access tracks detailing the Conservation Area conservation objectives and wildlife awareness.	Satterley	Within 6 months of formalising public access paths.

5.2.3 Management Action 3: Weed and pathogen management

5.2.3.1 Overview

As discussed in Section 4.1.3, a number of weed species have been recorded across the proposed action area and if left unmanaged will continue to degrade the MNES habitat available. Furthermore, during the Strategen (2020) survey, it was noted that there was evidence of *possible* dieback infestation in some of the quadrats recorded. Dieback can lead to increased death of susceptible species, including Eucalypt species which provide quality foraging habitat for Black Cockatoos. As such, appropriate weed and pathogen management measures will be implemented prior to, during, and after construction works to minimise potential spread of weed and dieback infestations to vegetation within the Conservation Area. A baseline weed survey will be undertaken in the Conservation Area to inform the weed management program, this will include the proposed revegetation areas.

Weed control will not be undertaken in those areas with a vegetation condition category of 'Completely Degraded', unless revegetation works are underway in that area (see Section 5.3.2).

Weed management will be implemented using a variety of techniques, including:

- Spot spraying – where hand-spraying apparatus is applied directly to target plant; and
- Hand weeding – physical removal of the weed.

Furthermore, hygiene measures will be employed to prevent the spread of weeds and potential pathogens including clean on entry requirements.

5.2.3.2 Weed and pathogen control objectives, targets and completion criteria

The objectives, targets and completion criteria relation to Management Action 3 are provided in Table 5.6 below.

Table 5.6 Weed and pathogen control objective, targets and completion criteria

Management action objective	Targets			Completion criteria
	Years 1 to 3	Years 3 to 5	Years 5 to 20	
Ensure there is no loss or degradation of MNES habitat within the Conservation Area through the spread and/or introduction of weeds and/pathogens including dieback.	- Baseline weed mapping and weed control program developed by the end of Year 1. - Extend of weed cover /density has not increased by more than <20% of baseline levels by end of Year 3. - Vehicle access is restricted to designated works areas by the end of Year 1. - Boot washdown stations are installed at each pedestrian access point by the end of Year 3. - Stormwater Management Plan is prepared by the end of Year 1 and does not have drainage entering into Conservation Area.	- Extend of weed cover /density has not increased by more than <10% of baseline levels by end of Year 5. <20% WoNS or declared pests recorded during monitoring. - Vehicle access restrictions remain in place and in functional order between Year 3 and Year 5. - Boot washdown stations remain in place and in functional order between Year 3 and Year 5. - Compliance is maintained with Stormwater Management Plan between Year 3 and Year 5.	- Extent of weed cover /density is the same or less than baseline levels by end of Year 10, and then maintained at or below baseline levels until end of Year 20. <10% WoNS or declared pests recorded during monitoring. - Vehicle access restrictions remain in place and in functional order between Year 5 and Year 20. - Boot washdown stations remain in place and in functional order between Year 5 and Year 20. - Compliance is maintained with Stormwater Management Plan between Year 3 and Year 5.	- There has been no increase in weed density/cover within the Conservation Area when compared to baseline levels. - No WoNS or declared pests recorded during monitoring. - Fencing and signage is present and functional, with no additional repairs or replacements outstanding at the time of handover. - Boot washdown stations are present at each pedestrian access point at the time of handover. - No drainage is directed into the Conservation Area.

5.2.3.3 Weed and pathogen control measures

Table 5.7 below outlines the action which will need to be implemented to ensure the completion criteria identified in are Table 5.6 achieved.

Table 5.7: Weed and pathogen management measures and completion criteria

Reference	Action	Responsibility	Proposed timing
CAMP 6.	Prior to entering the Conservation Area, all vehicles, machinery and equipment are to be free of mud and soil.	All site personnel	At all times
CAMP 7.	Vehicle access will be restricted to designated works areas to minimise the spread or introduction of weeds or pathogens. Access restrictions will be communicated through inductions, signage, and fencing.	All site personnel	At all times
CAMP 8.	Undertake a baseline weed survey of the revegetation area to identify weed species present, establish baseline weed densities, and determine where weed management is required.	Satterley/Environmental consultant	By the end of Year 1
CAMP 9.	Develop a weed control program and appoint an experienced contractor to implement the program to manage weeds within the Conservation Area. Weed control techniques may include the following: - spot spraying – where hand-spraying apparatus is applied directly to the target plant; and - hand weeding – physical removal of the weed.	Satterley/Environmental consultant	By the end of Year 1
CAMP 10.	Boot washdown stations will be installed at all formalised pedestrian access points into the Conservation Area.	Satterley	Within 6 months of formalising public access paths.
CAMP 11.	Stormwater management will be designed and constructed to prevent drainage into the Conservation Area.	Satterley	Prior to the commencement of subdivision works.

5.2.4 Management Action 4: Waste management

5.2.4.1 Overview

Increased use of the Conservation Area due to the establishment of adjacent residential development is likely to result in increased unregulated waste disposal within the Conservation Area. Unregulated waste can have adverse impacts on flora and fauna within the Conservation Area as discussed in Generation and storage of waste (above).

5.2.4.2 Waste management objectives, targets and completion criteria

The objectives, targets and completion criteria relation to Management Action 4 are provided in Table 5.8 below.

Table 5.8 Waste management objective, targets and completion criteria

Management action objective	Targets			Completion criteria
	Years 1 to 3	Years 3 to 5	Years 5 to 20	
Prevent adverse impacts to individuals MNES and their habitat such as introduction of weeds, dieback and pests, contamination of soils and physically endangering native fauna	Install public waste bins by the end of Year 3, to coincide with pedestrian access track installation	- Public waste bins are maintained and in functional order between years 3 to 5 - Install educational signage regarding waste management along pedestrian tracks by the end of Year 5	Public waste bins and educational signage regarding waste management are maintained and in functional order between years 5 to 20	- Bins are present and functional at the time of handover with no repairs or replacements outstanding. - Educational signage regarding waste management is present and functional at the time of handover.

5.2.4.3 Waste management measures

Table 5.9 below outlines the action which will need to be implemented to ensure the completion criteria identified in Table 5.8 are achieved.

Table 5.9: Waste management measures

Reference	Action	Responsibility	Proposed timing
CAMP 12.	Install self-closing, public waste bins at convenient locations such as formalised pedestrian access tracks	Satterley/Project Manager	Within 6 months of formalising public access paths.
CAMP 13.	Increase community awareness regarding waste management and environmental sustainability through installation of signage demonstrating clear waste disposal practices.	Satterley/Project Manager	Within 6 months of formalising public access paths.

5.2.5 Management action 5: Fauna and pest management

5.2.5.1 Overview

Feral fauna, predominately rabbits and foxes, have the potential to affect retained and planted vegetation and native fauna within the Conservation Area, through overgrazing, predation, burrowing, and competition for food and shelter. For this reason, a feral fauna program will be developed in consultation with DBCA and a suitably qualified zoologist.

Given this project involves the establishment of residential development adjacent to the Conservation Area, it is anticipated that domestic cats and dogs will also likely pose a threat to native fauna within the Conservation Area. Community education will therefore be required as well as appropriate feral animal controls utilised where required to protect and enhance the retained vegetation (Table 5.11).

Furthermore, the Proponent will fund and coordinate the installation of a minimum of 69 artificial Black Cockatoo hollows (3:1 ratio) within the Conservation Area to provide additional breeding habitat for Black Cockatoos. In accordance with the DBCA's 'Artificial Hollows for Black Cockatoos' fauna note, the Conservation Area is suitable for hollow installation as it:

- consists of a Jarrah (*Eucalyptus marginata*) – Marri (*Corymbia calophylla*) woodland or forest within the known breeding range of all three species of Threatened Black Cockatoos;
- potential breeding habitat was recorded at the site (Strategen 2017) and breeding by Black cockatoos is suspected at the Conservation Area;
- the Conservation Area also consist of species providing foraging value for Black Cockatoos.

Consultation with DBCA and Birdlife Australia will be undertaken to confirm suitability of the Conservation Area as an installation location and to determine other parameters which may be required to be considered i.e. water supplies.

The Conservation Area will be protected in perpetuity through application of a conservation covenant which will ensure long-term security for the hollows including monitoring (discussed in Section 6).

Furthermore, trees with hollows that are felled during the clearing stage of development are to be trimmed and relocated to the Conservation Area where they may provide habitat to native fauna, in particular Chuditch. This will be done to the extent that no degradation to the environment occurs within the Conservation Area, and no impediment is made to revegetation, recreation, or fire management activities.

5.2.5.2 Fauna and pest management objectives, targets and completion criteria

The objectives, targets and completion criteria relation to Management Action 5 are provided in Table 5.10 below.

Table 5.10 Fauna and pest management objectives, targets and completion criteria

Management action objective	Targets			Completion criteria
	Years 1 to 3	Years 3 to 5	Years 5 to 20	
• Increase the Black Cockatoo breeding habitat available within the Conservation Area. • Reduce the presence of feral fauna and domestic animals within the Conservation Area to protect impacts to MNES individuals and damage to the habitat available.	• Felled trees have been relocated to Conservation Area during construction. • Install 69 artificial hollows in the Conservation Area in consultation with DBCA and Birdlife Australia by the end of Year 3. • A baseline survey of pest fauna to be undertaken and pest fauna control program developed by the end of Year 1 • Commence pest control in Year 2.	• Felled trees have been relocated to Conservation Area during construction. • Artificial hollows are monitored and maintained in accordance with <i>DBCA Artificial Hollow Maintenance Guidelines</i> from Year 3 to 5 to assess breeding success. • A 20% reduction in the number of pest fauna recorded in the Conservation Area by the end of Year 5 relative to the number or abundance identified during baseline survey.	• Felled trees have been relocated to Conservation Area during construction. • Artificial hollows are monitored and maintained in accordance with <i>DBCA Artificial Hollow Maintenance Guidelines</i> with successful breeding recorded by the end of Year 20. • A 50% reduction in the number of pest fauna recorded in the Conservation Area by the end of Year 5 relative to the number or abundance.	• Felled trees with hollows have been placed in the Conservation Area where appropriate. • Artificial hollows are present and functional in the Conservation Area with the no outstanding repairs or replacements and monitoring indicates that Black Cockatoos have used them for breeding. • A 70% reduction in the number of pest fauna recorded in the Conservation Area at handover relative to the number or

Management action objective	Targets			Completion criteria
	Years 1 to 3	Years 3 to 5	Years 5 to 20	
		Educational signage regarding domestic cats and dogs is installed by the end of Year 5.	identified during baseline survey. Educational signage regarding domestic cats and dogs are maintained and functional between years 5 to 20.	abundance identified during baseline survey. Educational signage regarding domestic cats and dogs is present and functional at the time of handover.

5.2.5.3 Fauna and pest management measures

Table 5.11 below outlines the action which will need to be implemented to ensure the completion criteria identified in Table 5.10 are achieved.

Table 5.11: Fauna and pest management measures

Reference No.	Action	Responsibility	Proposed timing
CAMP 14.	Engage a suitably qualified subcontractor to undertake a baseline pest survey and develop and implement a pest fauna control / removal programme (including feral bee removal, rabbit and fox control)	Environmental Consultant / Project Manager.	Programme to be established prior to commencement of construction with feral animal control to be ongoing until handover of the Conservation Area.
CAMP 15.	Provide community education signage around throughout the Conservation Area detailing the potential risk that domestic cats and dogs may pose to native fauna within the Conservation Area.	Project Manager.	To be installed during construction.
CAMP 16.	Install at minimum 69 artificial nesting tubes throughout the Conservation Area, to increase the amount of breeding habitat available for Black Cockatoos.	Environmental Consultant / Project Manager.	To be installed prior to handover of the Conservation Area. To be installed prior to handover of the Conservation Area.
CAMP 17.	Hollow design and placement will be undertaken in accordance with the requirements outlined in the DBCA's <i>Artificial Hollows for Black Cockatoos</i> fauna note and in consultation with DBCA and Birdlife.	Environmental Consultant / Project Manager.	
CAMP 18.	Trees with hollows that are felled during the clearing stage of development are to be trimmed and relocated to the Conservation Area where they may provide habitat to native fauna. This will be done to the extent that no degradation to the environment occurs within the Conservation Area, and no	Construction Contractor.	To be done following clearing works.

Reference No.	Action	Responsibility	Proposed timing
	impediment is made to revegetation, recreation, or fire management activities.		

5.2.6 Management Action 6: Bushfire Management

5.2.6.1 Overview

Given the moderate to extreme bushfire hazard associated with the Conservation Area, bushfire risk will be closely managed in regular consultation with the Shire of Mundaring, and at the Shire of Mundaring's discretion. Management actions will be considered on a case-by-case basis with regard to community expectations and with safety of the community as a priority and will be detailed in the BMP prepared for the development. Compliance with the BMP will be managed separate to this CAMP.

As discussed in Section 3.8, partial clearing is required to be undertaken within approximately 5.3 ha in the Conservation Area (Figure 5.1). In this case, partial clearing refers to clearing required for maintenance of an Asset Protection Zone (APZ) as per Schedule 1 of the *Guidelines for Planning in Bushfire Prone Areas* (The Guidelines; WAPC 2017; Appendix A). Clearing for these purposes allows for the retention of 15% canopy cover, as well as managed understorey vegetation. Management of this APZ will be to schedule 1 of the Guidelines and will be ongoing.

5.2.6.2 Bushfire management objectives targets and completion criteria

The objectives, targets and completion criteria relation to Management Action 6 are provided in Table 5.12 below.

Table 5.12 Bushfire management objectives, targets and completion criteria

Management action objective	Targets			Completion criteria
	Years 1 to 3	Years 3 to 5	Years 5 to 20	
Maintain appropriate firebreaks surrounding the Conservation Area to protect retained MNES habitat by avoiding the potential spread of fire from the adjacent development.	Implementation of the BMP including formalising fire access track and partial clearing for maintenance of APZs in accordance with BMP to be undertaken by the end of Year 1.	Ongoing bushfire management and maintenance of APZs to be undertaken in accordance with BMP.	Ongoing bushfire management and maintenance of APZs to be undertaken in accordance with BMP.	Compliance with BMPs including maintenance of APZs.

5.2.6.3 Bushfire management measures

Table 5.13 below outlines the action which will need to be implemented to ensure the completion criteria identified in Table 5.12 are achieved.

Table 5.13 Bushfire management measures

Reference No.	Action	Responsibility	Proposed timing
CAMP 19.	Mechanical reduction of fire fuel loads at the periphery of the Conservation Area in accordance with BMP.	Satterley	Annually

5.3 Revegetation area

5.3.1 Key Objective/s

The key objectives for the revegetation area is:

- Establish an ecologically diverse and stable vegetation community with similar structure and composition within the revegetation area to that of the surrounding native vegetation including species known to be primary foraging plants for Carnaby's, Forest Red-tailed and Baudin's Black Cockatoos;
- Improve condition and structure of native vegetation in revegetation area to achieve a 'Moderate' foraging value for Carnaby's, Baudin's and Forest Red-tailed Black Cockatoos in consideration of the HQS tool; and
- Provide additional Chuditch habitat by increasing density of vegetation within revegetation area and providing additional denning opportunities to achieve an increase to at least a 'Low' Chuditch habitat value in consideration of HQS tool.

5.3.2 Management Action 7: Habitat regeneration through revegetation

5.3.2.1 Overview

Revegetation is proposed to be undertaken in an area of at least 5 ha in areas of 'Degraded to Completely Degraded' condition. These indicative areas (Figure 5.1) have been chosen due to the ease of access provided via fire access tracks, the location within Regional Ecological Linkage ID: 123, and the 'Degraded to Completely Degraded' condition of the vegetation located there.

The Conservation Area covers an area of approximately 193.2 ha, of which 138.3 ha is currently vegetated. While various pieces of infrastructure are required to be located within the areas of the Conservation Area (including fire and pedestrian access tracks), significant opportunity remains for enhancement of the environmental values of the Conservation Area, through revegetation.

All revegetation works will be undertaken in accordance with the Shire of Mundaring Landscape and Revegetation Guidelines (Shire of Mundaring 2015; Appendix B), as well as any bushfire management requirements (see Section 5.2.6).

Revegetation will be undertaken to ensure the completion criteria are achieved over a five-year period. Should any completion criteria not be achieved then the associated contingency measures within Table 7.1 will be implemented.

Note that completion criteria have been designed to ensure a habitat quality increase is achieved in accordance with Offset Strategy prepared (JBS&G 2024b). The revegetation area will need to achieve a site condition increase of one for each Black Cockatoo species as per the vegetation condition and structure indicators outlined in the HQS tool. This reflects at least a 'Moderate' Black Cockatoo habitat value which consists of:

- Carnaby's Black Cockatoo: Banksia and Eucalypt woodlands with >20-30% projected foliage cover and a moderate percentage (30-40%) of tree deaths;
- Baudin's Black Cockatoo: Marri (*Corymbia calophylla*) – Jarrah (*Eucalyptus marginata*) Jarrah Forest and woodlands with >20-30% projected foliage cover; and

- Forest Red-tailed Black Cockatoo: Marri (*Corymbia calophylla*) – Jarrah (*Eucalyptus marginata*) – Karri (*Eucalyptus diversicolor*) Forest and woodlands with >20-30% projected foliage cover.

Furthermore, the revegetation area will need to achieve a site condition increase of one for Chuditch as per the vegetation condition and structure indicators outlined in the HQS tool. This reflects at least a 'Low' Chuditch habitat quality value which consists of:

- Sparse vegetation in mostly flat areas in poor condition. Limited denning opportunities. Some prey species available. Habitat damage by herbivores evident. Moderate density of introduced predator species. Noticeable impacts from fire within site in the last 5-10 years.

It is expected that through the increase of native vegetation foliage cover, protective cover, and denning opportunities for Chuditch will also be increased within the Conservation Area.

The following approach will be undertaken within the revegetation area to ensure achievement of the key objectives:

Revegetation contractor engagement

A suitably qualified revegetation expert will be engaged to undertake revegetation activities within the onsite Conservation Area. Upon appointment of the revegetation contractor, a site visit will be undertaken and refinements to this CAMP, in particular the revegetation methodology will be made, as required.

Site preparation and erosion control

Site preparation will include a combination of techniques, aiming to reduce the presence of weed material at the site prior to revegetation activities commencing.

Where appropriate, scalping may be undertaken in areas devoid of native vegetation and are likely to have a significant weed load in the topsoil. Scalping involves complete removal of the surface soil to a depth of approximately 5-10 cm. Material removed from revegetation areas should be taken off site and disposed of or buried on site to a depth where weed seeds are unlikely to germinate.

Ripping will also be undertaken in areas where deemed suitable to prior to planting to help break up the soil and relieve compaction. Ripping allows for better root penetration and establishment.

Revegetation area delineation and access control

Signage and fencing will be installed on the boundary of the revegetation areas to limit public accessibility. Signage will detail the restoration efforts occurring on site and note the accessibility limitations to the area, whilst fencing will provide physical access restrictions. Limited public accessibility will maximise potential for revegetation success.

Revegetation area weed and pathogen control

A baseline weed survey will be conducted within the entire Conservation Area to identify weed species present, establish baseline weed densities and determine the weed management required (as per Section 5.2.3).

Weed control will commence in winter, prior to revegetation activities commencing. This will be in the form of a broad scale weed spray over vegetation areas (where required) to reduce initial weed loads prior to planting. Weed control will occur up to four times in 12 months, depending on weeds present and severity of infestation (most likely timing: late autumn, midwinter, mid-spring, early summer). Up to twelve months of weed control will be undertaken prior to any revegetation works occurring.

Weed control post planting will be focused on the immediate areas surrounding planted seedlings (e.g., 1 m radius around planted seedlings). This approach will increase the survival of planted seedlings while maintaining the current and future vegetation type of the rehabilitation areas (native trees over grass).

Pending monitoring results, isolated weed control will be undertaken twice a year at the revegetation areas in winter and spring.

A summary of weed control methods within the revegetation area is outlined in Table 5.14.

Table 5.14: Summary of revegetation area weed control methods

Weed control method		Indicative weed types
Chemical control	Initial broad scale spray herbicide application.	For blanket control of most weed species including grass weeds prior to revegetation germination/ seed planting.
	Spot spray herbicide application.	For targeted control of most weed species including grass weeds after revegetation germination/ seedling planting.
	Stem injection, cut and paint.	To control large woody weeds.
Manual control	Hand weeding.	Weeds encountered within and immediately adjacent to tree guards will be removed by hand to ensure no off-target damage with chemical control.

Appropriate management measures will also be implemented prior to, during, and after revegetation works to minimise potential spread of weed and dieback infestations to vegetation within the Conservation Area.

Revegetation planting

Seedling (tubestock) planting will be undertaken in the Conservation Area and is considered the most effective revegetation method to meet the required completion criteria. Planting will occur in early winter, within one month of first rains.

Establishment of a suitable planting list, comprising locally occurring native species and Black Cockatoo foraging habitat will be developed. Native species used will be consistent with those listed within the Shire of Mundaring Landscape and Revegetation Guidelines (2015), with tree species planted to include Jarrah (*Eucalyptus marginata*), Marri (*Corymbia calophylla*) and *Banksia sp.*. The planting list be refined as required upon engagement of a revegetation contractor and pending tubestock availability at the time of planting.

Planting is proposed to be undertaken at a density of at least 12,000-15,000 stems/ha for shrub/groundcover plants and 400-500 stems/ for tree/overstorey species with a target survival rate of 70%.

Seedlings used for planting should be suitably mature, between 6 to 12 months to enable optimal establishment and growth. Tubestock should also not be root bound and planting should be undertaken as follows:

- Optimal location of each species should be chosen at the time of planting to ensure appropriate condition for each species (e.g., topography, shade/sun, soil moisture etc);
- Seedling should be planted so that the stem is vertical, and the base of the plant is slightly below the original soil surface;
- Soil surrounding the seedling root ball should be pressed in firmly to avoid air pockets; and
- A protective guard and at least one stake will be placed around the seedling to protect the vegetation from grazing and wind damage.

It is anticipated that no post-planting watering will be needed as winter rain will provide adequate water to support the tubestock following planting. The timing of planting will ensure that rainfall will provide the

planted seedlings with access to sufficient water during their establishment phase. If during monitoring plant stress is observed, contingency for a wetting agent or additional watering options will be investigated.

Revegetation Area Pest control

Tree guards are to be installed around planted seedlings to provide ongoing protection from grazing animals. No further controls are required during initial revegetation works as pest control will already be undertaken across the Conservation Area (refer to Section 5.2.5). If impacts from animal activities (i.e., evidence of grazing) are recorded during monitoring, contingency measures as described in Section 7 will be implemented.

5.3.2.2 Revegetation objectives, targets and completion criteria

The objectives, targets and completion criteria relation to Management Action 7 are provided in Table 5.15 below.

Table 5.15 Revegetation objective, targets and completion criteria

Management action objective	Targets			Completion criteria
	Years 1 to 3	Years 3 to 5	Years 5 to 20	
- Establish an ecologically diverse and stable vegetation community with similar structure and composition within the revegetation area to that of the surrounding native vegetation including species known to be primary foraging plants for Carnaby's, Forest Red-tailed and Baudin's Black Cockatoos. - Improve condition and structure of native vegetation in revegetation area to achieve a 'Moderate' foraging value for Carnaby's, Baudin's and Forest Red-tailed Black Cockatoos in	- Signage and fencing around perimeter of revegetation is installed by the end of Year 1. - Baseline weed mapping undertaken by the end of Year 1. - Extend of weed cover reduced by <50% of baseline levels by end of Year 3. - Tubestock planting commences by the end of Year 2. - Native vegetation coverage within revegetation area has increased by >10% by the end of Year 3 with dominant tree species planted being Jarrah (<i>Eucalyptus marginata</i>),	- Fences and signs are maintained in functional order. - Extend of Weed cover reduced to <30% of baseline levels by end of Year 5 and <10% of weeds are Weeds of National Environmental Significance (WoNS). - Native vegetation coverage within revegetation area has increased by >30% by the end of Year 5 with dominant tree species planted being Jarrah (<i>Eucalyptus marginata</i>), Marri (<i>Corymbia calophylla</i>) and <i>Banksia sp.</i>.	- Fences and signs are maintained in functional order. - Extent of Weed reduced to <20% of baseline levels by end of Year 10 and no WoNS recorded and then maintained for the remaining period of effect approval. - Native vegetation within revegetation area represents Eucalypt/Banksia woodland by the end of Year 15 and is maintained for the remaining period of effect of the approval. - Native vegetation coverage within revegetation area has increased by >50% by the end of Year 10 and is maintained at 50% or greater for the remaining period of effect of approval.	- Fencing and signage is present and functional, with no additional repairs or replacements outstanding at the time of handover. - Weed levels maintained at <20% of baseline levels. - No WoNS are present within the revegetation area. - Vegetation condition and structure is representative of a Banksia and/or Marri (<i>Corymbia calophylla</i>) – Jarrah (<i>Eucalyptus marginata</i>) Forest and woodlands with >20-30% projected foliage cover. - Revegetation area achieves a quality score of 7 using the Black

consideration of the HQS tool.	Marri (<i>Corymbia calophylla</i>) and <i>Banksia sp.</i> .	Cockatoo HQS tool.
Provide additional Chuditch habitat by increasing density of vegetation within revegetation area and providing additional denning opportunities to achieve an increase to at least a 'Low' Chuditch habitat value in consideration of HQS tool.		- Vegetation condition and structure is representative of a Banksia and/or Marri (<i>Corymbia calophylla</i>) – Jarrah (<i>Eucalyptus marginata</i>) Forest and woodlands with >20-30% projected foliage cover. - Revegetation area achieves a quality score of 7 using the Black Cockatoo HQS tool and a quality score of 6 using the Chuditch HQS tool.

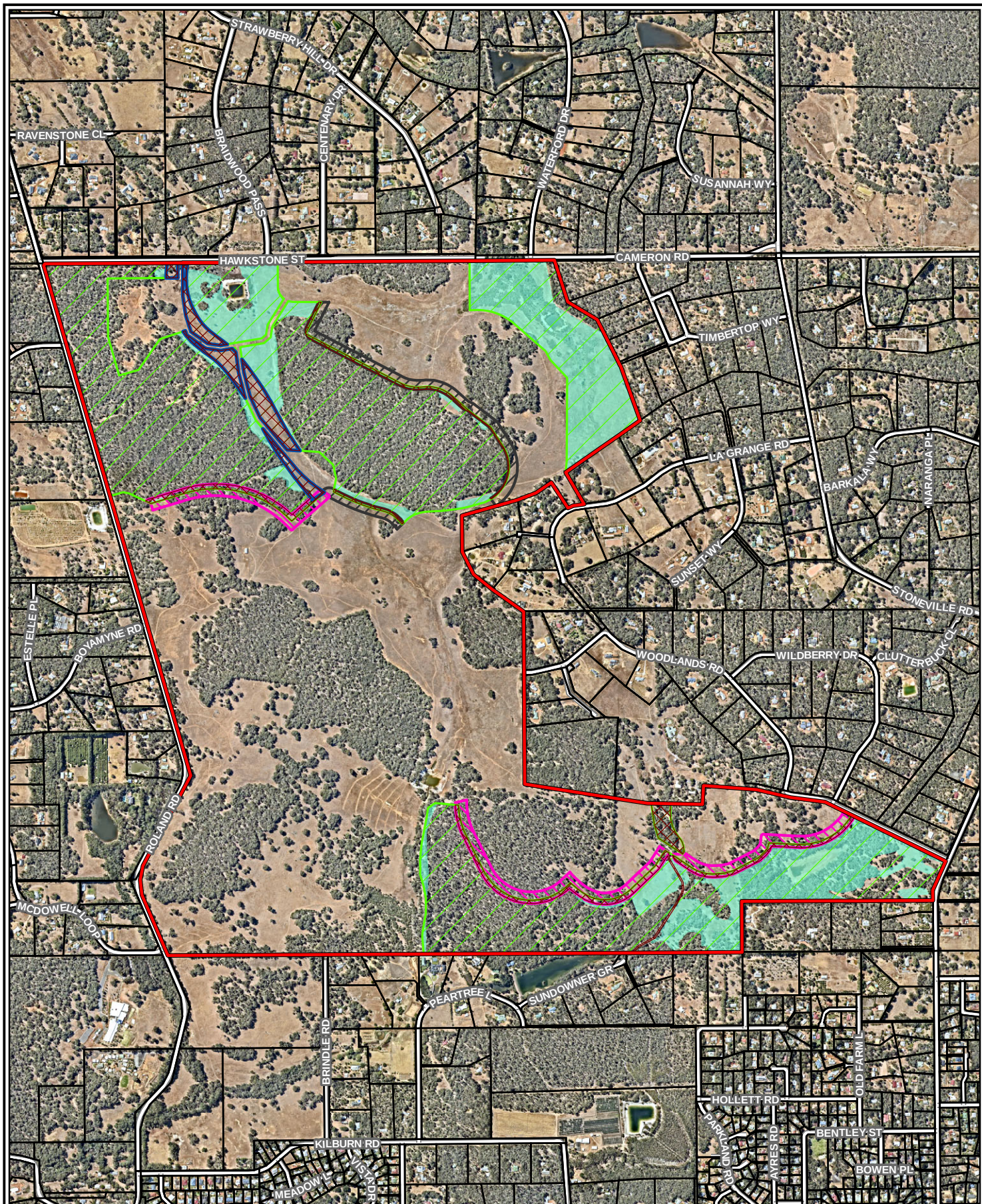
5.3.2.3 Revegetation measures

Table 5.16 below outlines the action which will need to be implemented to ensure the completion criteria identified in Table 5.15 are achieved.

Table 5.16 Revegetation measures

Reference	Action	Responsibility	Proposed timing
CAMP 20.	Engage a suitably qualified revegetation contractor to undertake revegetation within an indicative area covering at minimum 5 ha (Figure 5.1).	Satterley	Prior to revegetation activities commencing on site.
CAMP 21.	Prepare soil surface to promote natural recruitment and ensure seedling survival is maximised as per techniques.	Revegetation contractor	Prior to planting.
CAMP 22.	Installation of signage notifying of revegetation activities.	Revegetation contractor	Prior to revegetation activities commencing onsite.
CAMP 23.	Installation of fencing around the revegetation area.	Revegetation contractor	Prior to revegetation activities commencing onsite.
CAMP 24.	Undertake weed control at the revegetation areas as required for at least one year prior to commencing revegetation activities.	Revegetation contractor	Prior to planting.

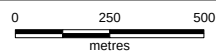
CAMP 25.	Undertake ongoing maintenance and weed control as described across the entire revegetation area.	Revegetation contractor	As required.
CAMP 26.	Ensure all other materials used in revegetation activities are free of dieback and weeds.	Revegetation contractor	At all times.
CAMP 27.	Ensure vehicles and equipment and footwear are free of mud and soil when entering revegetation areas.	Revegetation contractor	At all times.
CAMP 28.	Planting species list to be finalised in consultation with revegetation contractor and must: • Be in accordance with Shire of Mundaring Landscape and Revegetation Guidelines (2015) • Include tree species planted to include <i>Eucalyptus marginata</i>, <i>Corymbia calophylla</i> and <i>Banksia sp.</i>.	Revegetation contractor	Prior to planting.
CAMP 29.	Undertake planting in revegetation areas at a density of at least 12,000-15,000 stems/ha for shrub/groundcover plants and 400-500 stems/ for tree/overstorey species	Revegetation contractor	Following the completion of initial weed control within the revegetation area/s.
CAMP 30.	Install stakes and a protective guard around each seedling to protection the vegetation from grazing from feral and native herbivorous animals (i.e., rabbits and kangaroos) and wind damage.	Revegetation contractor	After seedling planting.



Legend:

- | | |
|---|--------------|
| Proposal Area | 37m wide APZ |
| Conservation area | 46m wide APZ |
| Cadastral boundary | Roads (MRWA) |
| Potential revegetation areas | |
| Central vegetation break (managed as low threat vegetation) | |
| Modify to low threat veg within conservation POS | |

Scale 1:20,000 at A4



Coord. Sys. GDA 1994 MGA Zone 50



Job No: 57355

Client: Satterley Property Group

Version: A

Date: 01-Mar-2023

Drawn By: ianandagoda

Checked By: CJ

Stoneville, WA

INDICATIVE AREAS FOR REVEGETATION, APZ ZONES, FIRE AND PEDESTRIAN ACCESS TRACKS

FIGURE 5.1



6. Monitoring and assessment

Satterley commits to implementing a monitoring program to assess this CAMP and to make timely decisions on corrective actions to ensure the performance criteria and completion criteria outlined are achieved.

Table 6.1 below provides a summary of the monitoring program proposed to be undertaken and addresses monitoring for performance against targets and completion criteria for each of the management actions.

Furthermore, the monitoring program will include monitoring across the entire site to assess use by Black Cockatoos and Chuditch. This will assess performance against the overall outcome of the Williams site to provide a positive environmental outcome through protection of remnant vegetation and revegetation based on a “like for like” principle, targeting the protection, restoration, and creation of habitat for Black Cockatoos and Chuditch.

Monitoring will inform the need to implement contingency actions as defined in Table 7.1. The key criteria to be monitored against are:

- Performance and completion criteria for each management measures as defined in Section 5; and
- Trigger criteria as identified in in Table 7.1.

6.1 Management Action Monitoring

6.1.1 Management Action 1: Protection of the Conservation Area for the purpose of conservation

Annual compliance monitoring will be undertaken to determine the status and success of the CAMP and will be documented in the Annual Compliance Report (ACR) which is anticipated to be required by the EPBC Act approval. Details of the status of the Conservation Covenant will be documented within the ACR.

6.1.2 Management Action 2: Delineation and access

Fencing, signage and formalised access points will be established at the site to prevent habitat loss and degradation. Inspections will therefore be undertaken annually and opportunistically of the Conservation Area to identify any potential issues that may require remedial action regarding access and fencing. During each annual inspection, the following will be checked:

- Condition of fencing, gates and signage;
- State of access tracks; and
- Evidence of unauthorised access.

Opportunistic inspections will be undertaken during works being carried out on site and will note whether any remediation is required to fencing and/or gates.

6.1.3 Management Action 3: Weeds and pathogen control

The introduction/ spread of weed species and pathogens may lead to reduced flora species and system diversity, resulting in a decline in MNES habitat quality. As such weed control will be undertaken in the Conservation Area the extent of which will be informed by ongoing annual monitoring.

A baseline weed survey will be in accordance with DBCA Standard Operating Procedure No. 22.1: *Techniques for mapping weed distribution and cover in bushland and wetlands*. The objective of the survey is to identify weeds present, establish baseline weed densities, and determine where weed management is required.

Weed species will be evaluated using priority weeds lists, including WoNS and species declared under the BAM Act.

Following the baseline weed survey, a report will be prepared detailing:

- Survey methods, timing and sampling effort;
- Weed species recorded, location and cover;
- Assessment of weed species to determine whether they are a WoNS or declared pests (plant species) and their DBCA weed rating; and
- Recommendations for weed management.

In addition to this, the report will contain the following maps:

- Survey area and location of sample sites;
- Weed cover (%); and
- Density and distribution of any WoNS or declared pests.

Following completion of the baseline weed survey, a weed control programme will be developed to inform weed control required on ground to achieve performance targets and completion criteria.

Annual weed monitoring will be undertaken following implementation of weed control, with a report prepared detailing:

- Survey methods, timing and sampling effort;
- Weed species recorded, location and cover;
- Assessment of weed cover against performance targets and completion criteria;
- Evidence of potential dieback infestation which may require remediation; and
- Recommendations for any additional weed management.

In addition to this, the report will contain the following maps:

- Survey area and location of sample sites;
- Weed cover (%); and
- Density and distribution of any WoNS or declared pests.

6.1.4 Management Action 4: Waste management

Waste monitoring will be undertaken within the Conservation Area to assess performance of management actions and as a preventative measure to MNES habitat quality degradation. Monitoring will occur both annually and opportunistically until formal handover of the Conservation Area. Visual observations will inform contingency actions required and will include records of:

- Waste in the Conservation Area;
- Damage to vegetation as a result of waste; and
- Condition of bins.

6.1.5 Management Action 5: Fauna and pest management

A baseline pest / feral fauna surveys will be undertaken by a suitably experienced ecologist to understand the extent and nature of pest / feral fauna within the Conservation Area. Following baseline surveys, surveys should occur annually until the desired level of control is reached, as determined by the relevant performance and completion criteria. Given the evidence of foxes within the area, attention will be given to this species as it poses a threat to Chuditch.

The following pest species monitoring methods may be used:

- Scat and track surveys and analysis to be carried out to identify the presence of pest species. A GPS device will be used to mark locations of relevant scat or tracks found during the survey (or by opportunity); and
- Motion detection cameras.

Where pest species are identified, data is to be relayed to an engaged pest management contractor to implement control techniques.

Artificial hollow monitoring will also be undertaken in accordance with DBCA's *'Artificial Hollows for Black Cockatoos'* fauna note (DBCA, 2023) to determine their effectiveness in relation to Black Cockatoo breeding. Twice annually for 20 years, during peak Black Cockatoo breeding periods (at least 4 weeks apart):

- Carnaby's Black Cockatoo – July to November (with peak between August to September);
- Baudin's Black Cockatoo – October to January; and
- Forest red-tailed Black Cockatoo – every month, with peaks in April to June and August to October.

It is important to monitor and maintain artificial hollows after they have been erected to ensure their effectiveness and so that problems with pest species or maintenance requirements can be identified and resolved. This will ensure the artificial hollow continues to provide opportunities to be used and that birds will be able to successfully raise chicks. Without regular maintenance, artificial hollows are likely to fail to achieve their objective to provide safe nesting opportunities for threatened Black Cockatoos.

6.1.6 Management Action 6: Bushfire management

The BMP prepared to support the proposed action includes details on the APZs required to be implemented within the Conservation Area. At subdivision stage, an audit will be undertaken by a bushfire specialist to confirm that all relevant works from the subdivision stage BMP have been implemented in relation the Conservation Area. The approach for preparation of this BMP compliance and condition clearance report is consistent with Section 4.2 and Appendix 3 of *Guidelines for Planning in Bushfire Prone Areas* (the Guidelines; WAPC 2021) and will be provided to DCCEE as part of the ACR.

6.1.7 Management Action 7: Habitat regeneration through revegetation

Quadrat level monitoring of the revegetation area is required to ensure the relevant performance and completion criteria are achieved. The aim of quadrat level monitoring is to collect data in a consistent way for use in detecting changes in revegetation over time, in order to determine if revegetation is progressing towards meeting the completion criteria. By using the same data collection methods, the data can be analysed year to year to compare the progress of the revegetation.

Monitoring will be carried out annually in Spring with data collected including:

- Density of native flora species;
- List of species present;
- Native flora species richness;
- Weed species percentage;
- Foliage cover plant health (i.e. evidence of water stress, pests, animal grazing); and
- Opportunistic sightings and/or evidence of Black Cockatoo and/or Chuditch presence within revegetation area.

A quality score increase of Black Cockatoo and Chuditch habitat has been claimed in the Offset Strategy (JBS&G 2024b) as a result of revegetation efforts, the data collected during this monitoring will be used to inform HQS tool criteria and to track progress against achieving the claimed quality increase.

6.2 Black Cockatoo and Chuditch monitoring across the Conservation Area

In addition to the monitoring required for each of the respective management actions, Black Cockatoo and Chuditch occurrence monitoring will occur across the Conservation Area annually for a period of 20 years. The purpose of undertaking monitoring is to meet the recovery objectives for both Black Cockatoos and Chuditch. Evidence of each of the respective MNES utilising the site will demonstrate the success of each of the management actions being implemented and subsequently the success of the Conservation Area as an offset.

The recovery plan for Chuditch aims to reduce threats and increase population densities for long-term survival of the species (DEC 2012). The establishment of monitoring sites for Chuditch will enable records of species presence and population abundance within the Conservation Area, and in turn evaluate the effectiveness of feral animal control measures (DEC 2012). The identification of threatening factors and the success of control measures is anticipated to enable effective ongoing management and contingency measures to be applied, ensuring the survival of Chuditch populations that may be present within the Conservation Area.

Further, the recovery plan for Black Cockatoo aims to stop the further decline in distribution and abundance of Black Cockatoos, through the protection and enhancement of habitat critical for survival (DEC 2008 & DPaW 2013). The purpose of monitoring Black Cockatoos is to identify and gain an understanding of population, critical habitat and threats, to indicate the status of the species. Regular monitoring is designed to determine threats and provide an indication of factors significantly impacting the species, and in-turn allow for adaptive management measures and/ or contingency measures to be appropriately and effectively applied. For example, monitoring at the Conservation Area is anticipated to demonstrate the presence of Black Cockatoos, the size and distribution of the population, breeding success or nest hollow competition, and changes to these parameters over time (DEC 2008 & DPaW 2013).

Table 6.1: Summary of monitoring actions for Conservation Area

Parameter	Purpose	Timing / frequency	Monitoring Type	Potential measures	Responsibility	Reporting
Management Action 1: Protection of the Conservation Area for the purpose of conservation						
Conservation mechanism status	To determine status of site acquisition, transfer of the Williams site and provision of funding to DBCA for ongoing management.	Annually, for the life of the approval.	Compliance monitoring	Details on the status of legal protection of the site and ongoing management arrangements will be documented in the ACR required by the EPBC approval.	Satterley/ Environmental Consultant	To be reported on in the ACR.
Management Action 2: Delineation and access						
Condition of access infrastructure including fencing, gates and signage	To ensure that access infrastructure is in good condition and there has been no unauthorised access into the Conservation Area which may result in MNES habitat quality degradation.	Fortnightly for the first 6 months of instalment, then quarterly thereafter during construction.	Site assessments i.e. walk boundary of fencing and record condition.	Visual observation s to determine: • Conditions of fencing and gates; • Condition of access tracks; • Condition of signage; and • Evidence of unauthorised access.	Construction Contractor	To be reported on in the ACR.
Management Action 3: Weed and pathogen management						
Baseline weed mapping	To determine the distribution, abundance and density/cover of weed species to inform weed control programme.	Once, by the end of Year 1.	Baseline survey	Survey will record: • Weed species recorded, location and cover; • Assessment of weed species to determine whether they are	Satterley/ Environmental Consultant	Baseline Survey Report to be prepared and provided in the ACR.

Parameter	Purpose	Timing / frequency	Monitoring Type	Potential measures	Responsibility	Reporting
				a WoNS or declared pests (plant species) and their DBCA weed rating; and - Recommendations for weed management. The report will contain the following maps: - Survey area and location of sample sites; - Weed cover (%); and - Density and distribution of any WoNS or declared pests.		
Annual weed and pathogen monitoring	To minimise the spread, or introduction, of weeds and pathogens within retained vegetation within the Conservation Area and prevent MNES habitat quality degradation.	Annually	Weed monitoring and disease monitoring.	Survey will record: - Weed species recorded, location and cover; - Assessment of weed cover against performance targets and completion criteria; - Evidence of potential dieback	Satterley/ Environmental Consultant	Annual reports to be prepared and provided in the ACR.

Parameter	Purpose	Timing / frequency	Monitoring Type	Potential measures	Responsibility	Reporting
				infestation which may require remediation; and - Recommendations for any additional weed/dieback management. In addition to this, the report will contain the following maps: - Survey area and location of sample sites; - Weed cover (%); and - Density and distribution of any WoNS or declared pests.		
Inspection of vehicles and machinery entering the Conservation Area	To ensure appropriate dieback hygiene measures are being undertaken and prevent MNES habitat quality degradation.	At first entry into Conservation Area.	Site assessment (as required).	Review of hygiene register and inspection logs.	Site personnel	To be reported on in the ACR.
Condition of vehicle access restrictions including fencing, gates and signage and boot washdown stations	To ensure that vehicle access is restricted to designated work bays and boot wash down stations are	Fortnightly for the first 6 months of instalment, then quarterly thereafter during construction.	Site assessments i.e., walk boundary of fencing and record condition.	Visual observations to determine: - Conditions of fencing and gates; - Condition of signage;	Construction Contractor	To be reported on in the ACR.

Parameter	Purpose	Timing / frequency	Monitoring Type	Potential measures	Responsibility	Reporting
	installed to ensure there is no loss or degradation of MNES habitat within the Conservation Area through the spread and/or introduction of weeds and/pathogens including dieback.			- Condition of boat washdown stations; and - Evidence of unauthorised vehicle access.		
Management Action 4: Waste Management						
Assessment of volume of waste within the Conservation Area	To minimise the volume of waste deposited within the Conservation Area and prevent MNES habitat quality degradation.	Annually and opportunistically until formal handover of the Conservation Area.	Site assessment, as part of weed monitoring event.	Visual observations of: - Waste in the Conservation Area; - Damage to vegetation as a result of waste; and - Condition of bins.	Environmental Consultant / Project Manager.	To be reported in the ACR.
Management Action 5: Fauna and Pest Management						
Evidence/ presence of pests/ feral animals and associated signs of damage to native vegetation/ fauna including assessment of Black Cockatoo breeding hollows (including	To determine the presence of pests / feral animals within the Conservation Area and success of controls to achieve targets and completion criteria.	Once, by the end of Year 1	Baseline survey	Survey may include the following methodologies to determine presence/abundance of pests/ feral fauna: Scat and track surveys and analysis to be carried out to	Environmental Consultant / Project Manager.	To be reported in the ACR.
		Annually until formal handover of the Conservation Area.	Annually			

Parameter	Purpose	Timing / frequency	Monitoring Type	Potential measures	Responsibility	Reporting
artificial hollows) for the presence of feral bees.				identify the presence of pest species. A GPS device will be used to mark locations of relevant scat or tracks found during the survey (or by opportunity); and • Motion detection cameras. Survey should also record any observations Records of evidence of predation on Black Cockatoo and/or Chuditch.		
Artificial Hollow monitoring for usage	The artificial Black Cockatoo hollows will be monitored to determine if successful Black Cockatoo breeding is occurring within the hollows.	Twice annually for 20 years during peak Black Cockatoo breeding periods (at least 4 weeks apart): • Carnaby's cockatoo – July to November (with peak between August to September); • Baudin's cockatoo –	Site assessment.	Monitoring of artificial hollows will be in accordance with DBCAs <i>'Artificial hollows for all Black Cockatoos'</i> fauna note and should consider and record: • The condition of the tree, hollow fixings and general hollow condition; • Condition and connection of	Environmental consultant	To be reported in the ACR.

Parameter	Purpose	Timing / frequency	Monitoring Type	Potential measures	Responsibility	Reporting
		October to January; and Forest red-tailed Black Cockatoo – every month, with peaks in April to June and August to October.		sacrificial chewing posts, ladder and substrate/nesting material inside hollow; any use by Black Cockatoos and nature of activity (adult birds, chewing, eggs, chicks etc.) - Details of use by non-target species (native or pest); - Identify any problems with pest species or maintenance requirements; and - Maintenance actions undertaken to resolve any problems.		
Artificial Hollow monitoring for maintenance requirements	Periodic checks will be undertaken to ensure the artificial hollows are adequately maintained.	Every two years.	Site assessment	To inform maintenance requirements	Environmental consultant	To be reported in the ACR

Parameter	Purpose	Timing / frequency	Monitoring Type	Potential measures	Responsibility	Reporting
Management Action 6: Bushfire Management						
BMP compliance monitoring	Bushfire compliance and condition clearance report to be prepared to assess compliance against BMP.	At relevant subdivision stages	Compliance monitoring	To assess compliance with BMP	Bushfire consultant	To be reported in the ACR.
Management Action 7: Habitat regeneration through revegetation						
Revegetation performance	To monitor establishment of vegetation in revegetation area and compare progress to targets and completion criteria.	Annually in Spring following initial planting works.	Quadrat floristics	Within floristic monitoring quadrats, data to inform the following items will be recorded: • Density of native flora species; • List of species present; • Native flora species richness; • Weed species percentage; • Foliage cover plant health (i.e. evidence of water stress, pests, animal grazing); and • Opportunistic sightings and/or evidence of Black Cockatoo and/or	Revegetation contractor	To be reporting in the ACR.

Parameter	Purpose	Timing / frequency	Monitoring Type	Potential measures	Responsibility	Reporting
				Chuditch presence within revegetation area.		
Black Cockatoo and Chuditch occurrence monitoring across entire site						
Chuditch monitoring	To monitor for the presence of Chuditch on the site and efficacy of CAMP management measures implemented to maintain and enhance Chuditch habitat.	Annually, for 20 years	Baited motion sensitive cameras and site assessment during deployment/maintenance.	The following will be recorded: • Evidence of tracks; • Evidence of scats; • Den sightings; and • Visual observations either in the field or via camera deployment.	Satterley/ Environmental Consultant	Monitoring report to be prepared and provided in the ACR.
Black Cockatoo monitoring	To monitor for the presence of Black Cockatoos on the site and efficacy of CAMP management measures implemented to maintain and enhance Black Cockatoo habitat.	Annually, for 20 years	Black Cockatoo assessment.	The following will be recorded: • Direct observations of Black Cockatoos; • Secondary evidence including chewed nuts, feathers and/or Black Cockatoo call; and • Evidence of breeding on site.	Satterley/ Environmental Consultant	Monitoring report to be prepared and provided in the ACR.

7. Contingency actions

Contingency actions will be initiated if monitoring indicates that management actions have not been successful or effective. Table 7.1 identifies the contingency actions to be initiated if the objectives for the CAMP are not being met. The contingency actions can be triggered at any time during the program following monitoring. Monitoring and contingency actions will continue to be implemented until such time as the completion are met and/or upon agreement with DCCEEW.

Table 7.1: Contingency actions for Conservation Area

Trigger	Action	Responsibility
Management Action 1: Protection of the Conservation Area for the purpose of conservation		
A conservation covenant has not been placed over the Conservation Area within 12 months of commencement of the action.	1. Determine the reasons covenant has not been applied. 2. Apply an alternative covenant including under one of the following legal mechanisms: – <i>Soil and Land conservation Act 1945;</i> – <i>The National Trust of Australia (WA) Act 1964;</i> – <i>Transfer of Land Act 1893;</i> - or – <i>Biodiversity Conservation Act 2016.</i>	Satterley/ Environmental Consultant
Management Action 2: Delineation and access		
Damage has been reported to access infrastructure including fencing, signage or gates.	Take necessary steps to repair infrastructure.	Satterley/ Environmental Consultant
Unauthorised vehicle reported within the Conservation Area	Determine how access was gained and if possible, the likely time of access. Implement remedy, which could include repairing broken infrastructure or the installation of additional signage.	Satterley/ Environmental Consultant
Management Action 3: Weed and pathogen management		
Weed cover is not meeting targets and/or completion criteria.	1. Map the revised extent of the specific weed species. 2. Identify activities that may have potentially increased density/cover of weed species. 3. Review and revise (if required) weed control program (may involve seeking advice from relevant authorities) according to findings from point 2. 4. Implement revised weed control and education measures.	Environmental consultant / Revegetation contractor

Trigger	Action	Responsibility
Weed monitoring identifies “Declared Pest” and/or WoNS within the Conservation Area (e.g., <i>Zantedeschia aethiopica</i>).	Undertake weed control as required, with the objective of eradicating all identified Declared Pests.	Environmental consultant / Revegetation contractor
Vehicles which have not been inspected for mud and soil access the Conservation Area.	The vehicle must be stopped and inspected for mud and soil. If vehicle is deemed to be clean it can continue to be used on the work site. If a build-up of mud is detected, then it must be removed off site for cleaning.	Site personnel.
Decline in vegetation health indicating presence of Dieback is observed during annual monitoring events.	Consider potential causes and engage with a Dieback Contractor to map dieback presence across the Conservation Area and determine appropriate management programme (e.g., sampling, folia spray, stem injection).	Environmental consultant/ Dieback contractor
Management Action 4: Waste Management		
Monitoring indicates that the level of waste within the Conservation Area has increased from levels recorded in the first year of monitoring.	Undertake waste removal from the Conservation Area as required.	Environmental Consultant / Project Manager
Management Action 5: Fauna and Pest Management		
Native fauna deaths from predation observed during monitoring in areas of retained vegetation.	1. Investigate cause. 2. Undertake intervention or remediation works if required (move bins, fencing, trapping, baiting or hive removal).	Environmental Consultant / Project Manager.
Approximately 20% of the monitoring sites show evidence of damage by animals (i.e., herbivory).	3. Monitor success of works.	
Black Cockatoo breeding hollows, including artificial hollows within the Conservation Area contain feral bees.		
Maintenance checks of artificial hollows identify the need for maintenance actions to be undertaken, including: - replacement of sacrificial chewing posts (frequently); - top-up or replacement of nesting substrate to ensure it reaches the ladder and chewing posts (occasionally); - replacement of nest bases (occasionally); - repair or replacement of attachment points (infrequently); and/or	Undertake required maintenance actions with similar specialist skills and equipment as used in installation. Maintenance actions should be completed prior to the breeding season.	Environmental consultant

Trigger	Action	Responsibility
repair of any cracks to wooden hollows (infrequently).		
Management Action 6: Bushfire Management		
Bushfire risk will be managed in close consultation with both the Shire of Mundaring and DBCA as per the BMP.		
Fire incident	- Respond to fire in accordance with relevant Department of Fire and Emergency - Services (DFES) and/or the Shire of Mundaring's fire response procedures. - Investigate cause of fire. - Implement any remedial actions, if practicable, to prevent future fire incidents, seeking advice of DFES if necessary. - Monitor success of remedy.	Satterley/site personnel
Management Action 7: Habitat regeneration through revegetation		
Inadequate native vegetation cover and/or dominant tree species to achieve targets and/or completion criteria in revegetation area.	- Identify cause. - Implement approach to remedy, which could include: - Undertaking additional infill planting; - Application of additives such as Seasol, water granules, soil breaker, water retainer, wetting agent or fertiliser tablets as deemed necessary by Revegetation Contractor; - Supplementary watering; - Removing damaged plants and replanting; - Providing alternate species suitable to the site and provenance requirements; and - Further weed control if required post infill planting. Monitor success of contingency actions.	Environmental consultant / Revegetation contractor
Weed cover is not meeting targets and/or completion criteria in revegetation area.	- Map the revised extent of the specific weed species within the revegetation area. - Identify activities that may have potentially increased density/cover of weed species. - Review and revise (if required) weed control program (may involve seeking advice from	Environmental consultant / Revegetation contractor

Trigger	Action	Responsibility
	relevant authorities) according to findings from point 2.	
	4. Implement revised weed control and education measures.	
Black Cockatoo and Chuditch occurrence within Conservation Area		
There is no evidence/reduced frequency of Black Cockatoo foraging and/or breeding evidence within 5 years during the nominated 20-year timeframe.	1. Identify and implement methods to encourage use of the site by Black Cockatoos in consultation with DCCEEW (i.e., enhancement of additional habitat, creation of additional water supplies etc). 2. Monitor success of remedy.	Satterley/ Environmental Consultant
Chuditch are not observed within the Conservation Area within 5 years during the nominated 20-year timeframe.	1. Develop a Chuditch translocation program in consultation with DCCEEW and DBCA. 2. Monitor success of remedy.	Satterley/ Environmental Consultant

8. Implementation and Reporting

The onsite Conservation Area will be managed in perpetuity under a conservation covenant arrangement. The Proponent will implement the CAMP actions and subsequently cede the Conservation Area upon completion criteria being achieved as per covenant arrangements.

8.1 Annual Compliance Report

Satterley will provide to DCCEEW an ACR annually, in accordance with the requirements outlines in conditions of the EPBC approval. The ACR will provide details on the progress made towards achieving performance and completion criteria and will provide all monitoring reports.

8.2 Roles and responsibilities

All contractors and staff are required to operate in accordance with this CAMP. Key personnel and responsibilities are described in the following sections.

8.2.1 Project manager

The primary responsibilities of the project manager include:

- Act as primary liaison between the construction contractor, Environmental Consultant, and Shire of Mundaring.
- Ensure all construction contracts contain relevant environmental management provisions.
- Review all relevant reports provided by the construction contractor.
- Report to DAWE in accordance with the requirements of this CAMP.

8.2.2 Construction contractor

The primary responsibilities of the construction contractor include:

- Overall accountability to ensure construction activities do not adversely affect retained vegetation and fauna habitat within the Conservation Area.
- Ensure all site personnel are aware of the requirements of the CAMP and related management plans, in particular dieback management.
- Undertake regular monitoring of the integrity of delineation infrastructure during construction.

8.2.3 Environmental consultant

The primary responsibilities of the environmental consultant will include:

- Act as primary liaison between the revegetation contractor and project manager.
- Ensure the construction contractor is aware of the vegetation and habitat to be retained within the Conservation Area.
- Undertaking required monitoring within the Conservation Area and implementation of any associated corrective actions.

8.2.4 Revegetation contractor

The primary responsibilities of the revegetation contractor include:

- Implementation of all proposed revegetation works, including associated monitoring and maintenance, within the Conservation Area.

9. Limitations

Scope of services

This report ("the report") has been prepared by JBS&G in accordance with the scope of services set out in the contract, or as otherwise agreed, between the Client and JBS&G. In some circumstances, a range of factors such as time, budget, access and/or site disturbance constraints may have limited the scope of services. This report is strictly limited to the matters stated in it and is not to be read as extending, by implication, to any other matter in connection with the matters addressed in it.

Reliance on data

In preparing the report, JBS&G has relied upon data and other information provided by the Client and other individuals and organisations, most of which are referred to in the report ("the data"). Except as otherwise expressly stated in the report, JBS&G has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report ("conclusions") are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. JBS&G has also not attempted to determine whether any material matter has been omitted from the data. JBS&G will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to JBS&G. The making of any assumption does not imply that JBS&G has made any enquiry to verify the correctness of that assumption.

The report is based on conditions encountered and information received at the time of preparation of this report or the time that site investigations were carried out. JBS&G disclaims responsibility for any changes that may have occurred after this time. This report and any legal issues arising from it are governed by and construed in accordance with the law of Western Australia as at the date of this report.

Environmental conclusions

Within the limitations imposed by the scope of services, the preparation of this report has been undertaken and performed in a professional manner, in accordance with generally accepted environmental consulting practices. No other warranty, whether express or implied, is made.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose.

JBS&G accepts no liability for use or interpretation by any person or body other than the client who commissioned the works. This report should not be reproduced without prior approval by the client, or amended in any way without prior approval by JBS&G, and should not be relied upon by other parties, who should make their own enquiries.

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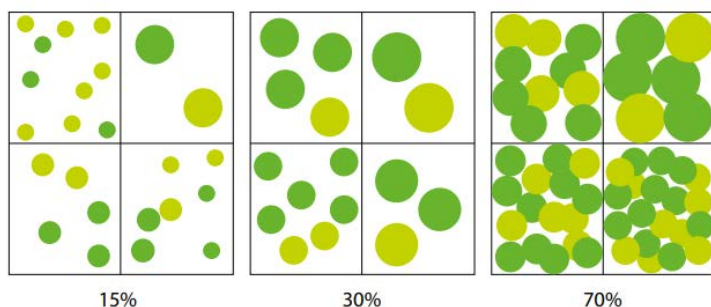
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Appendix A Schedule 1: Standards for Asset Protection Zones

Schedule 1: Standards for Asset Protection Zones

- **Fences:** within the APZ are constructed from non-combustible materials (e.g., iron, brick, limestone, metal post and wire). It is recommended that solid or slatted non-combustible perimeter fences are used.
- **Objects:** within 10 metres of a building, combustible objects must not be located close to the vulnerable parts of the building i.e., windows and doors.
- **Fine Fuel load:** combustible dead vegetation matter less than 6 millimetres in thickness reduced to and maintained at an average of two tonnes per hectare.
- **Trees (> 5 metres in height):** trunks at maturity should be a minimum distance of 6 metres from all elevations of the building, branches at maturity should not touch or overhang the building, lower branches should be removed to a height of 2 metres above the ground and or surface vegetation, canopy cover should be less than 15% with tree canopies at maturity well spread to at least 5 metres apart as to not form a continuous canopy.



- **Shrubs (0.5 metres to 5 metres in height):** should not be located under trees or within 3 metres of buildings, should not be planted in clumps greater than 5m² in area, clumps of shrubs should be separated from each other and any exposed window or door by at least 10 metres. Shrubs greater than 5 metres in height are to be treated as trees.
- **Ground covers (<0.5 metres in height):** can be planted under trees but must be properly maintained to remove dead plant material and any parts within 2 metres of a structure, but 3 metres from windows or doors if greater than 100 millimetres in height. Ground covers greater than 0.5 metres in height are to be treated as shrubs.
- **Grass:** should be managed to maintain a height of 100 millimetres or less.

Appendix B Shire of Mundaring Landscape and Revegetation Guidelines

LANDSCAPE & REVEGETATION GUIDELINES



*A guide to assist residents,
developers and landscape
architects to prepare and
implement landscape and
revegetation plans*

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1. Introduction

Shire of Mundaring is committed to maintaining and improving environmental values, even as developments occur and land uses change.

One of the opportunities to enhance the natural environment and amenity is through landscaping or revegetation required by the Shire as a condition of development.

Endemic species (plants that are native to the local area) are adapted to local conditions and apart from the first few summers, do not generally require ongoing watering and maintenance. Local native plants also maintain habitat for native animals.

These guidelines provide information to assist residents, developers and landscape architects in preparing and implementing landscape and/or revegetation plans.

2. Landscape & Revegetation Requirements

2.1 Community vision and expectation

Our community consistently raises the natural environment as one of the things they value most about living within the Shire of Mundaring. The Shire's Strategic Community Plan is informed by community consultation and seeks to preserve and enhance the natural environment. Sensitive landscaping and revegetation will assist in maintaining our habitat values and natural assets.

2.2 Statutory requirements

Watercourses and remnant native vegetation are usually protected by State Government legislation, as well as the local planning framework.

The Shire's Local Planning Scheme No.4 (LPS4) includes requirements for landscaping and revegetation. LPS4 is a statutory (legal) document which controls the use and development of land within the Shire by requiring landowners to submit planning applications for approval prior to development.

LPS4 states that building materials, design, colours and textures should complement the visual amenity of the locality. Therefore, landscaping elements should use building materials that match or fit in with the natural environment - such as using terraced, laterite walls rather than a single, tall limestone wall. Particular heights or finishes may be specified as a condition of approval.

For developments such as grouped dwellings (units) the Shire will generally require landscaping treatment for common property and areas visible to the public, such as the verge and effluent disposal areas. This helps maintain visual amenity and environmental quality for the area.

2.3 Complying with your plan

Landscape and revegetation plans are often assessed and approved by the Shire as conditions of planning approval. Landscaped areas are expected to be established and then maintained to a high horticultural and visual standard. Failing to comply with a condition of planning approval is an offence under LPS4 and the Planning and Development Act 2005. The Shire may take legal action where there is non-compliance with conditions.

2.4 Firebreak notice requirements

Most of the Shire is bushfire-prone and landscaping has to be planned carefully to maintain low fuel zones around houses.

Landscape and revegetation plans need to be consistent with the Shire's firebreak and fuel load notice, or any approved Bushfire Management Plans or Fire Management Statement for the property. A copy of the current notice can be obtained from the Shire website or Administration and Civic Centre.

Elements to consider in firewise gardens include:

- Defined garden beds with areas of paths, paving or lawn to keep fuel loads low in Asset Protection Zones around houses or habitable buildings.
- Choosing plants that will not produce large amounts of dead leaves, twigs or stringy bark that will build up on the ground.
- Using non-flammable mulches like gravel, crushed brick or stone
- Do not plant any trees where they will end up overhanging buildings. Keep a gap of at least three times the mature height of tall shrubs away from the house or habitable building.
- Plant shrubs and trees far enough away from any building that they will still be at least 3m away wall when mature. Avoid planting shrubs in groups close to houses or habitable buildings (especially near windows).



Managing fuel loads around buildings is an essential element in reducing the overall risk of bushfire damage or destruction. Unfortunately, in severe or catastrophic weather conditions, fires become ‘weather driven’ and low fuel areas are much less effective at slowing or stopping the spread of fire.

Monitor weather conditions and warnings through the warmer months and make a bushfire plan - be safe and leave early if you can.

3. Landscaping or Revegetation?

Landscaping and revegetation works achieve different goals, and therefore have different requirements and objectives.

3.1 Landscaping

Definition –

improving the aesthetic appearance of an area by changing its contours, adding ornamental features, or planting trees and shrubs.

Landscape plans –

are generally applied within urban (residential) or commercial areas for the purpose of improving the aesthetic value of an area and/or for functional outcomes (e.g. screening). The Shire has a preference for the use of local native species and waterwise species in most situations.

Landscape plans can be required by the Shire:

- As a condition for planning approval (e.g. to provide screening, improve visual amenity, provide shade and windbreaks, for car parks and for verge treatment in commercial and industrial areas.
- As a condition for subdivision (e.g. street tree planting, verge landscaping, public open space design).

What should a landscape plan look like?

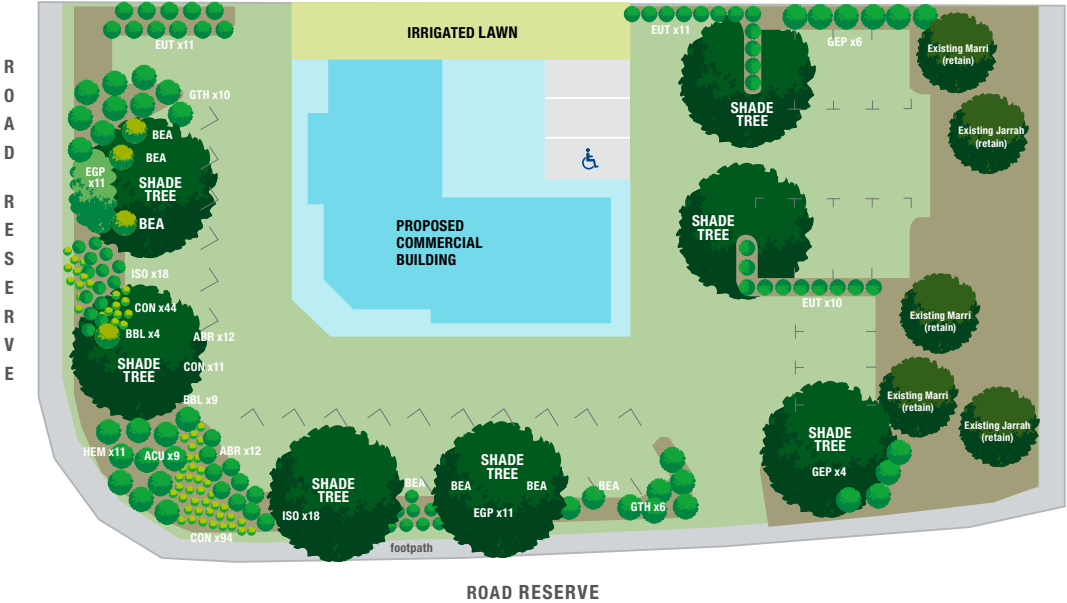
A well-drawn landscape plan assists Shire officers with the development approval process. The following features should be included in the plan:

- Area(s) of existing vegetation or landscaping to be retained or removed
- Areas to be landscaped
- North point and regular scale eg 1:100, 1:250, 1:500 etc.
- List of species to be planted (Shire preference is for local native species)
- Number of plants of each species
- Height of plants at maturity
- Location of buildings and structures
- Other features such as paths, driveways, etc.
- Any additional details about the planting plan and techniques.
- Weed management where necessary.



EXAMPLE LANDSCAPE PLAN

↑
N
SCALE 1:100



ORIGIN	CODE	SPECIES	COMMON NAME	QUANTITY	DIMENSIONS	POT SIZE
WA	ACU	Adenanthos Cuneatus	Coral Carpet	9	0.3 x 1.4	All tube stock or 140mm pot
WA	ABR	Anigozanthos Flavidus	Big Red	20	1 x 1	
WA	AYG	Anigozanthos Flavidus	Yellow Gem	6	1 x 1	
WA	BBL	Banksia Blechnifolia		13	0.4 x 1.2	
WA	BEA	Beaufortia Squarrosa	Sandplain Bottlebrush	7	1 x 1	
WA	BRC	Brachysema Ceisianum	Swan River Pea	3	1 x 1.5	
WA	CON	Conostylis Candicans	Grey Cottonheads	159	0.4 x 0.4	
WA	DAL	Dampiera Altissima	Tail Dampiera	8	0.3 x 0.8	
WA	EGP	Eremophila Giabra Prostata	Kalbarri Carpet	11	0.3 x 1.5	
WA	EUT	Eutaxia Obovata	Bacon and Eggs	32	1 x 1	
WA	GEP	Grevillea Fililoba	Ellendale Pool	10	1.2 x 1.8	
WA	GGG	Grevillea Obtusifolia	Gin Gin Gem	1	0.1 x 3	
WA	GTH	Grevillea Thelemanniana	Spidernet Grevillea	16	0.3 x 1.5	
WA	HEM	Hemiandra Pungens	Snake Bush	11	0.1 x 1.6	
WA	ISO	Isolepsis Nodosa	Knotted Club Rush	36	0.8 x 0.8	
WA	shade tree	Eucalyptus Victrix	Little Ghost Gum	7	8 x 4	45 L bag



3.2 Revegetation

Definition –

the process of restoring the landscape back to its original state prior to the disturbance. This can be achieved by removing weeds and planting local native species, aided by natural regeneration if there are existing native plants nearby.

Revegetation plans –

are generally applied within rural zones or in urban areas where a natural environmental feature exists (e.g. a watercourse).

Revegetation plans can be required by the Shire:

- To restore bushland or a natural feature within a subdivision or as part of a development application
- To restore or revegetate a watercourse and create an adequate buffer
- To reinstate and revegetate disturbed or damaged verges (e.g. from works associated with service installation along verges for subdivision)

- To create wildlife corridors and tree preservation zones
- To improve water quality, habitat and prevent erosion issues
- To increase the species richness and biodiversity through the use of local native species from the Perth Hills region (local provenance seed)
- To allow natural regeneration where appropriate.

What should a revegetation plan look like?

A well-drawn revegetation plan assists Shire officers with the development approval process. The following features should be included in the plan:

- Area(s) of existing vegetation.
- Area(s) to be revegetated.
- Area(s) requiring special management e.g. weed control, earthworks.
- North point and regular scale e.g. 1:100, 1:250, 1:500 etc.
- Features such as creek lines or granite outcrops.
- Total area to be planted.
- List of species to be planted – must be local native species.
- Number of each species to be planted and height at maturity.
- Details regarding additional management techniques to be employed, e.g. “Tree guards will be installed and then removed once plants are established.”
- Details about planting methods, timeline of works and weed control.
- Information on soil types and conditions, for example any areas of erosion, salinity or waterlogged areas.

Note: You may need to order your plants or seed early with suppliers to ensure availability for the planting season.

Revegetation techniques

There are three main ways to revegetate an area:

- natural regeneration;
- direct seeding; and
- replanting.

When planning your revegetation project, it may be beneficial to meet with the Shire's Environmental Service officers to determine which technique or combination of techniques will give the best results. You may need to plan to work in stages, or use different techniques on different parts of the site.

Following the Bradley method of bush regeneration, look after the best areas first. Remove weeds and protect the areas that are in the most natural state, and then restore adjacent areas. As weeds are removed they can be replaced with direct seeding or replanting where natural regeneration is unlikely.

Regeneration

This involves the natural regrowth of vegetation using the existing seed bank in the soil. It guarantees that vegetation will be a representation of what was previously growing at the site. Where possible, natural regeneration is preferred to replanting.

Regeneration, however, is only appropriate for some areas, where topsoil is intact and contains enough native seed in the soil. It is not appropriate for areas that have been subjected to long term disturbance. When relying on this technique, regeneration surveys must be conducted to assess species richness and diversity. If either is lacking then natural regeneration must be supplemented with direct seeding or replanting.



Direct seeding

This involves the sowing of seeds, either by hand or machine, directly to a revegetation area. Direct seeding is considered more cost and labour efficient than planting (excluding the time required for collection). It allows for a higher plant density, which provides shelter for seedlings and reduces the potential for weed intrusion. Direct seeding also results in a more natural mix of trees, shrubs and ground covers than can be achieved through planting seedlings. Weed management can be challenging where direct seeding is applied due to the sporadic nature of the seedlings as they germinate.

Recommended sowing rates to ensure successful revegetation vary from 400 to 1000 grams of seed per hectare. There can be differences in the germination rate between species, so the following guide is recommended.

Species type	Recommended per hectare
Eucalypt species	50-100 grams per species
Acacia and large seeded species	50-100 grams per species
Other species	25-50 grams per species

Seeds can either be bought from commercial providers or collected by hand. If you are planning to collect your own seed contact the Department of Biodiversity, Conservation and Attractions (Parks and Wildlife) to obtain a seed collector’s permit.

Generally, efforts should be made to obtain seeds from close to the revegetation site (local provenance). Eastern states ‘native’ species should be avoided - they may be Australian but they can become weeds in WA.

In dieback-affected areas, using less susceptible plant species will improve survival rates.



Replanting

This involves the direct planting of endemic (native to the area) seedlings or tube stock. The following densities are recommended as a general guide when replanting is used as the sole revegetation technique, but may need to be adjusted to suit local conditions.

Category	Height	Density
Groundcovers & climbers	<0.5m	1 per 2sqm
Small shrubs	<1.0m	1 per 5sqm
Medium shrubs	1-3m	1 per 8sqm
Tall shrubs	>3m	1 per 10sqm
Trees	>8m	1 per 10sqm
Sedges and rushes	1-2m	4-6 per 1sqm
Grasses	0.5-2m	1 per 1sqm

Tube stock can be sourced from nurseries but be careful to check that they are appropriate local species. Rural landowners may have access to some native seedlings or assistance as part of Landcare or catchment protection programs.

Dieback Management

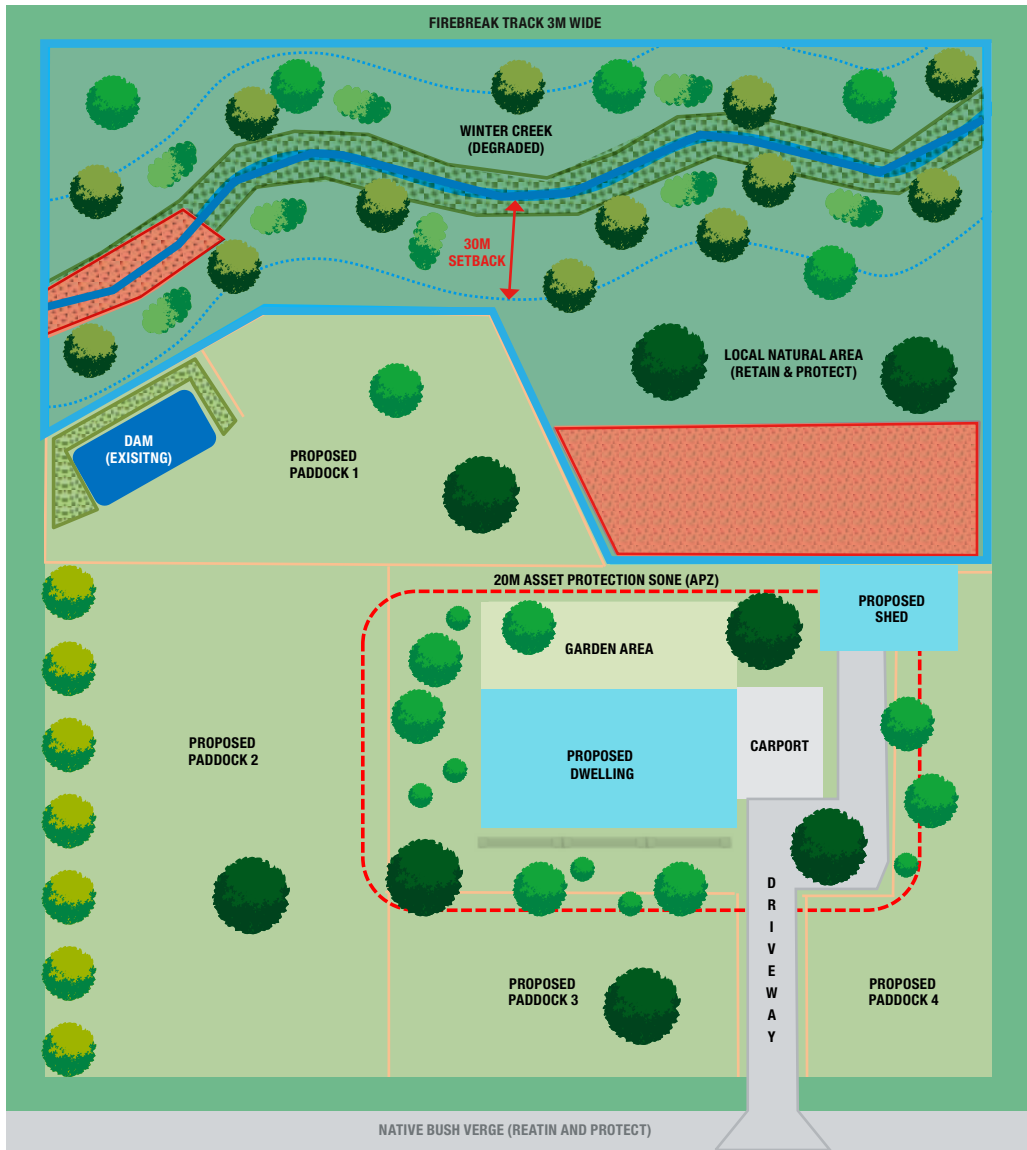
Revegetation activities have the potential to introduce and spread *Phytophthora* Dieback. The following practices are recommended to minimise the risk:

- Seedlings – source seedlings from NIASA (Nursery Industry Accreditation Scheme Australia) nurseries where possible to ensure best hygiene practices.
- Mulching - mulch prepared in accordance with Australian Standard AS 4454-2012, and stored appropriately, will be dieback-free.
- Equipment - vehicles, tools, footwear, equipment and machinery should be clean and free of all mud and soil when entering and exiting the site.

For more information on preventing and managing dieback, see the publication, *Managing Phytophthora Dieback in Bushland*.

EXAMPLE REVEGETATION PLAN

↑
N
SCALE 1:100



Code	Common Name	Species name	Quantity	Dimensions HxW	Pot Size
Existing native vegetation to retain & protect					
	Retain in line with Bushfire Guidelines criteria for Asset Protection Zone (APZ) requirements.	Retain existing native trees (Marri, Jarrah, grass trees, etc)			
	Local Natural Area (LNA) - protect and retain	Bushland varies from very good to degraded condition.			
Windbreak / screen plantings					
	'Kings Park Special' Bottlebrush	Callistemon citrinus	7	4m x 3m	Semi-mature 45L (min) – windbreak / screen
Creek & dam revegetation plantings					
	Mix of native sedge and rush species	Mix of: Baumea juncea, B.articulata, Juncus kraussii, J. pallidus, Lepidosperma tetraquetrum	2 per 1m2 (bare areas only)	varies	tubestock
	Mix of local native wetland groundcovers and shrubs	Mix of: Kennedia coccinea, Acacia alata, A. urophylla, Hypocalymma angustifolium, Trymalium odoratissimum, Banksia littoralis or similar.	Bare areas only (approx. 150 plants)	varies	tubestock
	Swamp Paperbark Blackbutt	Melaleuca raphiophylla Eucalyptus patens	9 5	10m x 8m 20m x 10m	140mm pot 140mm pot
Weed control					
	Blackberry (vine)	Remove, control and manage as described in Shire's weeds booklet. Implement weed control prior to planting in June/July.			
	Eastern Sates wattles (acacia species)				
	Watsonia (bulbs)				
	Tagasaste				

3.3 Site preparation, implementation and maintenance

As part of implementing a landscape or revegetation plan you will need to ensure the site is prepared. This will increase the survival rates of plants and reduce future problems, weed control and maintenance issues.

Site preparation

The following activities are recommended as a minimum for site preparation

Activity	Reason
Weed control	Weed control prevents smothering of native seedlings and assists with ongoing site management. It is important to consider the type of weeds being controlled, site features (existing vegetation, watercourses) and eradication or control methods.
Plant protection	Tree guards or fencing may be required to prevent trampling or grazing of the new plants. Staking of semi-mature trees may also be necessary.
Ripping/hoeing the soil	Ripping prior to planting or applying direct seed helps break up the soil, relieves compaction and allows for better root penetration and establishment. Do not rip in areas prone to erosion, e.g. along steep slopes or creeks.
Irrigation	If you are planning to irrigate the area, make sure the irrigation system is installed correctly.
Mulch	Mulch can help retain moisture in the soil, suppress weeds and keep soil temperature lower, reducing the stress on seedlings as they establish. Consider firewise rock mulches close to houses. Avoid or limit mulch in regeneration sites. Apply mulch to landscaped areas to a depth of 10cm - 15cm
Fertilisers/soil top dressing	Assess the condition of the site to see if fertilising or soil top dressing is required for the successful establishment of the plants.



Implementing a plan

Native plants are best planted after the first winter rains and after the site has been properly prepared for planting. If you are planning to order your plants through a nursery, you will need to order them in advance to allow appropriate time for seed collection and propagation of seedlings. If collecting seed/propagating plants yourself, make sure you allow sufficient time. Suggested times to undertake the main activities required for planting are described below:

Activity	Suggested Time
Order plants (if applicable)	October – November
Collect and propagate local seeds (if applicable - permit may be required)	Seasonally dependant (usually November-February)
Site preparation	March-April
Apply direct seed	May-June
Planting	May-July
Follow-up weed control	October - November
Watering and monitoring	November - February

Planting techniques

1. Dig a hole several times deeper than the size of the pot and loosen any compacted soil around the planting site. Note: For works on the verge check with council requirements first and call 'Dial Before You Dig'.
2. Back fill the hole with the soil that was removed from it, placing the plant so that it sits in a slight depression; this will help contain any water in the shallow dish around the plant.
3. Water in the plant well to eliminate any air pockets and to keep the plant well hydrated. You may choose to place slow release fertiliser around the plant to stimulate growth.
4. Place tree guards around the plant or stake the plant where necessary.
5. Protect young seedlings from frost during the cold season; you can do this by placing a cover (e.g. ice-cream container or pot) over the plant during the evening and removing it in the morning.

Ongoing management

Once an area is regenerating or has been planted, some ongoing management will be required to ensure high survival rates. This may include watering of seedlings during dry periods for the first year or two, ongoing weed control, pruning where necessary, installing tree guards to prevent damage from wildlife, and replacing plants that have died.

Ongoing maintenance of a landscaped or revegetated site is a requirement under the Scheme.

Bond requirements

The Shire may accept a bond for landscape or revegetation works in certain circumstances. Contact the Shire for more details about bond requirements.



4. What species should I use?

A species list can be found in section 4.5. It includes a legend indicating the plants' suitability for different purposes (e.g. bird attractant) and soil types.

4.1 Landscape species

Plant selection for landscape plans should consist primarily of local endemic or low water-use, non-weedy species. When considering plant selection, it is important to understand the Shire's intention for requiring the landscape works and selecting plants that will fulfil the condition for Planning Approval or subdivision approval. For example, if the condition specifies screening, choose plants that grow quickly and to a suitable height at maturity so they will screen the area sufficiently. For verge or street frontage landscape treatments, choose plants that comply with sightlines and road setback requirements and that are local native waterwise species.

4.2 Revegetation species

For revegetation, the Shire will only accept local native species, that is, species found in Mundaring and nearby districts. Species found outside of the Shire may not tolerate the specific climatic conditions or soil types of the Perth Hills region. Exotic species may invade native bushland and create a weed problem.

The soil types across the shire vary considerably and this is reflected in the different plant communities (vegetation complexes) observed throughout the region. There are seventeen vegetation complexes mapped across the Shire of Mundaring. When selecting plants for a revegetation project it is important to consider the vegetation complex of the area and choose species that are represented in this complex; this will maximise survival rates and ensure plant suitability for the site. Refer to section 4.3 to find out the vegetation complex for the subject property and to help determine which species are suitable.

If you would like to use species not listed in this booklet, please contact environmental officers at the Shire to ensure the species are suitable. Some nurseries in the Mundaring district specialise in growing local native species and are a good place to source endemic plants.

4.3 Vegetation complexes and soil types

The Shire has public maps available which allow you to view the soil type(s) and vegetation complex(es) present on your property. These maps can be viewed via the Shire's website (www.mundaring.wa.gov.au) by clicking on the Online Maps link.

You can also phone the Shire's Planning and Environment Service for advice.

Below is a detailed description of the seventeen vegetation complexes mapped within the shire. They have been grouped under the predominant vegetation types for the Swan Coastal Plain and Northern Jarrah Forest.

SWAN COASTAL PLAIN



Foothills (Ridge Hill Shelf)

- Forreestfield complex

The gentle slopes of the foothills are predominantly quartz sands, clays and silts, with intrusions of gravel, which may be at the surface or at depth. Creeklines are clays and sandy clays. Natural vegetation is woodlands of jarrah and marri on gravel, and banksias, sheoaks and woody pear on sand. The well-drained, relatively fertile soils of the foothills have been selectively cleared for agriculture. Approximately 13% of the original foothills vegetation remains.





Pinjarra Plain

- Guildford complex
- Swan complex

The Pinjarra Plain is a flat plain that rises gently to the east. The alluvial soils are predominantly clays and silts. In some areas there are deposits of ironstones (bog iron ore) and limestone. There are complex drainage systems, with areas of seasonal inundation, waterlogging and creek formation. Selective clearing for agriculture has occurred on the eastern side, where fertile soil exists. Natural vegetation is typical of wetlands, with sheoak and paperbark or marri and flooded gum woodlands. Poorly drained flats give rise to shrublands, herblands and sedgelands. Approximately 16% of the original Pinjarra Plain vegetation remains.



Bassendean Dunes

- Southern River Complex

The Bassendean Dunes are predominately comprised of pale grey-yellow sand (infertile, often acidic, and lacking in organic matter). The natural vegetation is banksia woodland with woollybush, or woodlands or paperbarks, flooded gum, marri and banksia in swamps. The Southern River complex supports vegetation associated with the Bassendean Dunes, but also contains pockets characteristic of the Pinjarra Plain. Approximately 48% of the original Bassendean Dunes vegetation remains.

NORTHERN JARRAH FOREST



Darling Plateau/Scarp - Uplands

- Cooke complex
- Dwellingup 2 complex
- Dwellingup 4 complex
- Yalanbee 5 complex
- Yalanbee 6 complex

The gently undulating surface of the uplands are characterised by clay-gravels, sands and occasional granite rock outcropping. Natural vegetation on laterite (gravel) is woodland or forest of jarrah and marri with banksia and snottygobble, while on granite outcrops it is woodland, shrubland or herbs. Until recently much of the lateritic surfaces have been uncleared, being national parks, state forest and water catchment areas. Approximately 71% of the original Darling Plateau uplands vegetation remains.

- Darling Scarp complex

The steeply sloping surface of the Darling Scarp is characterised by loams, gravels, clay-gravel, sands, quartzite sands and exposed granites. Clay-gravel soils are compacted hard in summer and moist in winter, and are prone to erosion on steep slopes. Natural vegetation on shallow soils is shrublands, and on deeper soils is woodland of jarrah, marri, wandoo and flooded gum. The gentler slopes have been preferentially cleared for agriculture, smallholdings and granite mines. Approximately 57% of the original Darling Scarp vegetation remains.



Darling Plateau - Depressions & Swamps

- [Goonaping complex](#)
- [Swamp complex](#)

Sandy soils are associated with the drier shallow depressions at the head of drainage lines, while peaty sands are associated with the wetter areas. A variety of vegetation complexes have been formed on this soil type in response to changes in topography, soils, soil depth and drainage. Approximately 99% of the original Darling Plateau depression/ swamp vegetation remains.



Darling Plateau - Valleys

- [Coolakin complex](#)
- [Helena 2 complex](#)
- [Murray 2 complex](#)
- [Pindalup complex](#)
- [Yarragil 1 complex](#)

The drainage lines are associated with red, yellow and orange earthy sands, gravelly sands and exposed granites. A variety of vegetation complexes have been identified on this soil type in response to changes in topography, soils, soil depth and drainage. Natural vegetation in valleys is forest of jarrah, marri and flooded gum with banksia. Past clearing on the Plateau has focused on the valleys where soils are most suitable for agriculture. Approximately 68% of the original Darling Plateau valley vegetation remains.

4.4 Check list for choosing plant species

- ☐ Determine if it is a landscape or revegetation plan.
- ☐ If a revegetation plan, choose plant species that match the vegetation complex/type for the area (see section 4.3). Use the species list in this booklet or similar.
- ☐ If a landscape plan, choose plants that fulfil the required purpose (e.g. screening). Use the species list in this booklet or similar.
- ☐ Draw a site plan indicating the plant types, quantity and locations on the site plan.
- ☐ Include a legend or key on the site plan.
- ☐ Submit the landscape/revegetation plan to the Shire via email, post, and fax or in person.

Contact the Shire's Environmental Service Team on 9290 6666 if you have any questions about your plan.

4.5 Species List

The following species list is divided into the following sections:

Grasses	27
Sedges/rushes	30
Groundcovers/climbers	34
Small shrubs	37
Medium shrubs 1 to 3m	49
Tall shrubs 3m and taller	63
Trees 8m and taller	72

Key for Symbols



Darling Plateau/Scarp -
uplands

- Cooke complex
- Dwellingup 2 complex
- Dwellingup 4 complex
- Yalanbee 5 complex
- Yalanbee 6 complex
- Darling Scarp complex



Darling Plateau –
depressions/swamps

- Goonaping complex
- Swamp complex



Darling Plateau - valleys

- Coolakin complex
- Helena 5 complex
- Murray 2 complex
- Pindalup complex
- Yarragil 1 complex



Foothills

- Forrestfield complex



Pinjarra Plain

- Guildford complex
- Swan complex



Bassendean dunes

- Southern River complex



Bird attractant



Dieback resistant



screening



More firewise



Watercourses



Ornamentals

GRASSES



Amphipogon amphipogonoides

Little Amphipogon

A tufted perennial, grass-like herb to 0.4m high. The flowers are grey and cream/purple between Sep to Jan and rarely in April. Suited to laterite and yellow clay with lateritic gravel, sand along swamps. Similar to *Amphipogon turbinatus*.



Austrostipa elegantissima

Feather Speargrass

A tufted perennial that can reach up to 2m tall. Silver/grey flowers from Aug-Jan and is widespread from coastal sand dunes to dry inland areas.



Cymbopogon oblectus

Native Lemon Grass

A perennial grass-like herb that can grow to 1m. Green-purple flowers from Aug to Jan. The blue-green leaves have a lemon scent when crushed.



Lomandra sericea

Silky Mat Rush

Dioecious (male and female individuals) rhizomatous perennial herb growing to 40cm high with clumps to 30cm wide. Purple/purple-yellow flowers appear in Aug to Oct. Grows in sand, laterite and lateritic gravel. *Many other local varieties of *Lomandra species* exist.



Microlaena stipoides

Weeping Grass

Perennial spreading, winter active grass with a rhizome (runner). Low growing tufts to 20cm high. Green-purple flowers from Aug-Nov. It is often found along creeks where it can form a natural lawn.



Neurachne alopecuroides

Foxtail Mulga Grass

Perennial low spreading tuft that is a favourite of the kangaroos. It can grow to 50cm high and has green-grey flowers between Jul to Nov. Common and widespread. It is great for native gardens and revegetation projects.



Rytidosperma caespitosum

Common Wallaby Grass

A tufted perennial with flowering stems from 20-90cm high. Flowers from Oct to Jan and is common and widespread. Great for revegetation as it grows well in dry areas. Formerly *Austrodanthonia caespitosa*.



Themeda triandra

Kangaroo Grass

A tufted perennial that can grow to 2m tall, often in rocky areas. A widespread native grass that grows around rocky outcrops and in sand, clay, alluvium, lateritic gravel, granite, basalt, claypans, creeks, and savannas. Red-brown/purple flowers from Dec-Feb.

SEDGES/RUSHES River and wetland plants



Baumea articulata

Jointed Twig-rush

Rhizomatous, robust perennial, grass-like or herb (sedge). Grows to 2.5m high in wet, black sand, waterlogged soils in seasonal swamps and lakes. Flowers are red/brown and appear between Jan to Dec (mainly Sep to Dec).



Baumea juncea

Bare Twig-rush

Rhizomatous, colonising perennial, grass-like or herb (sedge). Grows to 1.2m in dark grey sand and waterlogged soils. Flowers are brown and appear between Oct to Dec or Jan to Mar.



Baumea preissii

Broad Twig Sedge

Rhizomatous, robust, colonising perennial, grass-like or herb (sedge). Grows to 2m high in silty sand and waterlogged soils in swamps, bordering lakes and watercourses. Flowers are purple-brown and appear between Jul to Dec.



Baumea rubiginosa

River Twig Sedge

Rhizomatous, robust perennial, grass-like or herb (sedge). Grows to 4m high and 2m wide in streams and swamps. Flowers are brown and appear in Aug to Dec or Jan to Mar.



Chorizandra enodis

Black Bristle-rush

Monoecious, rhizomatous, tufted perennial, grass-like or herb (sedge), forming loose clumps. Grows to 1m high and 1m wide in grey clayey sand, lateritic gravel and red clay in swamps and seepages. Flowers are purple-brown-black and appear in Jul to Nov.



Eleocharis acuta

Common Spike-rush

Rhizomatous, perennial, grass-like herb (rush). Grows to 0.7m high in brown sandy clay peat in swamps and clay pans. Flowers are brown and appear in Sep to Dec.



Ficinia nodosa

Knotted Club Rush

Erect, caespitose rhizomatous, perennial herb (rush). Grows to 1m high and 0.8m wide in bare white calcareous sand, dark sandy clay, granite and limestone. Grows on coastal dunes, flats, seasonally-wet swamplands and shores of salt lakes. Flowers are brown/cream and appear in Oct to Dec or Jan. Formerly *Isolepis nodosa*.



Juncus kraussii

Sea Rush

Rhizomatous, perennial herb (rush). Grows to 1.2m high in white or grey sand, clay and alluvium. Grows in swamps, brackish estuaries and saline flats. Flowers are brown/red and appear in Oct to Dec or Jan.



Juncus pallidus

Pale Rush

Rhizomatous, robust perennial herb (rush). Grows to 2m high in clay along swamps and watercourses. Flowers are green and appear in Oct to Dec.



Juncus subsecundus

Finger Rush

Colonial perennial herb (rush). Grows to 1m high in clay material along swamps. Flowers appear in Oct to Dec or Jan.



Lepidosperma squamatum

Unknown

Rhizomatous, tufted perennial, grass-like herb (sedge). Grows to 1m high in calcareous, peaty or lateritic sand, sandy clay and gravel. Occurs on dunes and in swamps. Flowers are brown and appear in Mar to Nov.



Lepidosperma tetraquetrum

Pithy Sword-sedge

Rhizomatous, robust, tufted perennial, grass-like herb (sedge) growing 2-3m high with clumps to 2.5 m wide. Brown inflorescence appears Nov to Dec or Jan to Mar. Grows in black peaty sand along gullies, swamps & streams. Similar to *Lepidosperma longitudinale*.

GROUNDCOVERS/CLIMBERS

Prostrate (up to 50cm) or climber



Billardiera fusiformis

Australian Bluebell

Sturdy climber growing to 1m high. Blue/white/pink flowers appear Nov to Dec or Jan to Feb. Grows in coastal areas and disturbed water crossing sites. Similar to *Billardiera floribunda* and *Billardiera variifolia*.



Carpobrotus virescens

Coastal Pigface

A prostrate, succulent perennial, up to 0.3m high and 3m wide. Flowers are purple-pink/white, and appear from Jun to Jan. Suited to white, grey or brown sand on coastal limestone cliffs and dunes.



Clematis pubescens

Common Clematis

A strong, woody shrub or climber which grows to 5m high. Flowers are white-cream and appear in May to Nov. Suited to dark brown sandy clay or loam. Found along coastal cliffs and dunes, hills, valleys and river banks.



Dampiera linearis

Common Dampiera

Erect perennial herb which grows to 0.6m high. Blue flowers between Jul to Dec. Suited to sand, clay and laterite soils along plains and seasonally wet flats.



Hardenbergia comptoniana

Native Wisteria

A vigorous climber with blue-purple flowers appearing Jul to -Oct. Prefers sandy soils and is a good screening plant in the garden if grown on a fence or trellis.



Hemiandra pungens

Snakebush

Prostrate to ascending shrub up to 1m high depending on variety. White/blue-purple/pink flowers are seen during the summer months. Suited to a variety of soils and does well on embankments and rock outcrops.



Kennedia coccinea

Coral Vine

Climber with orange, pink or red flowers from Aug to Nov. Often found in sandy soils.



Kennedia prostrata

Running Postman

A prostrate or twining shrub with distinctive crinkly leaves. Red flowers appear from Aug to Nov. Usually grows in sandy, gravelly soils.



Scaevola calliptera

Royal Robe

Prostrate to ascending perennial herb that grows to 0.4m high. Blue-purple flowers appear Sep to Dec or Jan. Grows on sand, often with lateritic gravel on lateritic ridges or sandplains. *Other varieties of local *Scaevola* species also exist.

SMALL SHRUBS Up to 1 metre



Acacia drummondii

Drummond's Wattle

Shrub up to 1m with yellow flowers, Jun to Oct. Prefers sand, laterite and gravelly soils. Found in granite outcrops, gullies, low-lying areas, low ridges and hillsides.



Acacia pulchella

Prickly Moses

Small shrub growing from 1m up to 2m high with yellow flowers appearing Jun to Oct. Occurs in sandy soils and clay loam over laterite. Found in Jarrah woodlands, swamps, and near watercourses. Does well as a revegetation species.



Adenanthos barbiger

Hairy Jugflower

A lignotuberous (woody tubers underground) shrub growing to 1m. Red flowers can occur from Feb or Jul to Dec. Found in Jarrah forest in lateritic gravel or sandy clay.



Anigozanthos manglesii

Mangles Kangaroo Paw

The floral emblem of Western Australia, this perennial herb grows to 1m tall. The red and green flowers appear between Aug to Oct. Prefers dry sandy soils thriving in heath or woodland.



Anigozanthos viridis

Green Kangaroo Paw

Perennial herb that can grow to 85cm. The bright green flowers appear Aug to Oct. Found in low-lying and wet areas in clay, loam or sandy soils. Similar to *Anigozanthos humilis*.



Banksia dallanneyi

Couch Honeypot

A shrub up to 1m high. The cream-yellow-brown-pink-green flowers occur May to Oct. Prefers sand or sandy loam, laterite, granite, limestone, or quartzite soil (formerly *Dryandra lindleyana*).

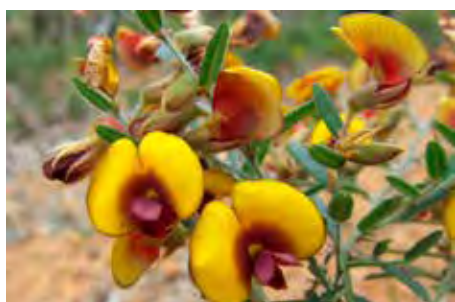




Boronia ovata

Heart-leaved Boronia

Diffuse shrub growing to 0.5m high. Pink flowers appear in Aug to Nov. Grows in gravelly and sandy lateritic soils. *Many other local varieties of *Boronia species* exist.



Bossiaea eriocarpa

Common Brown Pea

Erect or straggly spreading shrub growing to 1m high. Flowers are yellow, red and brown and appear Jul to Nov. Prefers sandy soils.



Chorizema cordatum

Heart-leaf Flame Pea

Erect, straggling or climbing shrub growing up to 1.5m high. Yellow, orange and red/pink flowers appear in Jul to Dec. Grows in grey-brown sandy gravel, red-brown sandy loam or clay, over granite or laterite. Grows near rock outcrops, on hills, along streams and watercourses, and in winter-wet flats.



Chorizema dicksonii

Yellow-eyed Flame Pea

An erect or spreading shrub growing to 1m high. Red/orange flowers appear Aug to Dec. Grows in sandy gravelly soils, clay, loam on hillsides and undulating places.



Conostylis aculeata

Prickly Conostylis

Rhizomatous, tufted perennial, grass-like herb growing to 0.5m high. The yellow flowers appear Aug to Nov. Suitable to a range of soil types. Similar varieties include *Conostylis candicans* & *Conostylis setigera*.



Dianella revoluta

Blueberry Lily

Rhizomatous, perennial herb growing to 1m high. Blue-purple-violet flowers appear in Aug to Dec or Jan or Apr. Grows in a variety of soils such as laterite, granite or limestone.



Eremophila glabra

Tar Bush

Prostrate to erect shrub growing from 0.1m to 3m high. Green-yellow-orange-red-brown flowers appear in Mar to Dec. Grows on sand to clay soils, sometimes saline, stony loam or limestone. Prefers winter-wet depressions, sandplains and dunes.



Gastrolobium capitatum

Bacon and Eggs

A low bushy shrub to 1m with orange-yellow flowers between Jun to Sep. Grows in sandy loamy soils, laterite, rocky outcrops, swamps and plains. *Many local varieties of *Gastrolobium* species exist. *Note: this species is poisonous when consumed.*



Gompholobium tomentosum

Hairy Yellow Pea

An erect shrub that grows to 1m high. Yellow pea flowers between Jul to Jan. Grows well in sandy soils. *Many other local varieties of *Gompholobium* species exist, such as *G. knightianum*, *G. marginatum*, *G. pressii*.



Grevillea pilulifera

Woolly-flowered Grevillea

Much-branched, erect or spreading shrub, to 1m with white flowers in Apr to Dec. Grows in lateritic or granite gravels along hillsides and ridges.



Grevillea synapheae

Catkin Grevillea

A prostate to erect shrub growing to 1m. White/cream/yellow flowers appearing Jul to Oct. Grows in sand, gravel, loam, laterite or granite in low heathland or along rises.



Grevillea wilsonii

Wilson's Grevillea

An erect, compact to spreading shrub that grows to 1m. Red flowers from Jan to Nov. Prefers sand, sandy loam, and lateritic gravel.



Haemodorum laxum

Bloodroot

Bulbaceous, perennial herb growing to 1.4m high. Black/brown/green-brown flowers appear in Oct to Nov. Grows in grey or yellow sand, clay, gravel or laterite. Prefers dry or seasonally damp situations. *Other local varieties of *Haemodorum species* exist, such as *H. spicatum* and *H. simplex*.



Hibbertia hypericoides

Yellow Buttercup

A twiggy spreading shrub growing to 1m with yellow flowers Apr to Dec. Suitable to a variety of habitats. *Many other local varieties of *Hibbertia species* exist.



Hovea trisperma

Common Hovea

Straggling plant reaching 0.7m high with purple/blue flowers May to Nov. Found in the Jarrah forest or heathland in sandy, laterite, gravel or clay loam. *Many other local varieties of *Hovea species* exist.



Hypocalymma robustum

Swan River Myrtle

An erect spreading shrub to 1m high. Flowers are deep pink to pink-red from Jun to Nov. Common in sand or gravel soils along undulating terrain and ridges.



Laxmannia squarrosa

Paper Lily

Tufted perennial herb growing to 0.1m high. White flowers appear in Sep to Nov. Grows in lateritic sand and gravel.



Lechenaultia biloba

Blue Leschenaultia

A small diffuse ascending shrub to 1m with blue flowers from Jul to Dec. Grows in lateritic or granitic soils on hills, outcrops and flats. Similar to *Lechenaultia floribunda*.



Lobelia anceps

Angled Lobelia

Prostrate to ascending perennial herb growing to 1.2m high. Blue/blue-purple/white flowers appear in Sep to Dec or Jan to May. Prefers dark brown-black sandy loam, grey sand, wet brown peaty sand, ironstone gravel, granite or limestone. Grows on flat to sloping landscapes, hillsides, near wetlands, watercourses or along river banks.



Melaleuca seriata

Pink Pom Pom

Small shrub growing to 1m high. Pink-purple-red flowers appear Aug to Dec. Grows in white, grey or yellow sand over laterite or clay, clay loam. Prefers growing in ridges sandplains and winter-wet depressions.



Orthrosanthus laxus

Morning Iris

Rhizomatous, perennial herb growing to 0.5m high. Blue flowers appear in Aug to Nov.



Patersonia occidentalis

Purple Flag

Rhizomatous, tufted perennial herb growing to 1m high. Purple flowers appear in Aug to Dec or Jan. Grows in grey-brown sand or sandy clay, red-brown clayey loam, gravel, laterite, ironstone, granite and limestone. Grows in winter-wet areas or on dunes and granite outcrops.



Petrophile biloba

Granite Petrophile

Erect and open shrub growing to 2m high. Pink & white flowers appear in Jun to Oct. Grows in loam, sand, laterite and shallow granitic soils. Grows on hillsides and granite outcrops.



Philotheca spicata

Salt and Pepper

Slender and erect shrub growing to 1m. Flowers are pink/purple/white and appear Jun to Nov. Grows in a variety of soils.



Phyllanthus calycinus

False Boronia

An erect shrub growing to 1.2m high. The cream/white/pink flowers appear Jun to Jan. Grows in sandy soils.



Pimelea ciliata

White Banjine

Erect shrub growing to 1m high. White/pink flowers appear in Aug to Dec. Grows in sand, clay, loam, laterite or granite. Prefers undulating plains, breakaways, outcrops and winter-wet depressions. *Other local varieties of *Pimelea species* exist.



Scaevola pilosa

Hairy Fanflower

Perennial herb growing to 0.7m high. Blue-purple flowers appear in Sep to Dec. Grows in sandy loam or laterite. *Other varieties of local *Scaevola species* also exist.



Thomasia glutinosa

Sticky Thomasia

Multi-stemmed shrub growing up to 0.8m high. Pink-purple flowers appear in Sep to Dec. Grows in gravelly soils, laterite or granite. Similar to *Thomasia purpurea* and *T. foliosa*.

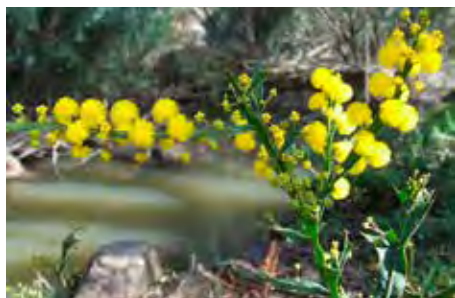


Thysanotus multiflorus

Many Flowered Fringed Lily

A perennial herb that grows to 0.5m high. Purple flowers appear in Aug to Dec or Jan. Grows on sand, laterite and granite. *Other varieties of local *Thysanotus species* also exist.

MEDIUM SHRUBS 1 to 3 metre



Acacia alata

Winged Wattle

Grows up to 2m in a variety of soils - near water, rocky hills, breakaways, salt pans and clay flats. Has white/cream/yellow flowers from Apr-Dec.



Acacia celastrifolia

Glowing Wattle

A bushy shrub or tree growing up to 3m. Yellow flowers occur Apr to Aug and frequently grows on lateritic soils.



Acacia dentifera

Toothed Wattle

An erect, loose shrub growing to 3m tall. Yellow flowers appear from Aug to Nov. Prefers laterite or granite gravelly soils.



Acacia extensa

Wiry Wattle

An erect, slender shrub 2-3m. Yellow flowers appear in Aug to Oct. Often grows on sandy or lateritic soils. Found in damp areas, along watercourses, and near swamps.



Acacia lateritcola

Unknown

An erect branching or slender shrub to 1.5m. Yellow/ cream flowers from May to Oct. Prefers lateritic soils.



Acacia sessilis

Unknown

A straggling pungent shrub, growing to 1.5m with yellow flowers in Jul to Oct. Grows in sand or gravelly clay.



Acacia urophylla

Tail-leaved Acacia

Erect, slender and open shrub growing 1-3m high. The yellow/cream-white flowers appear May to Oct. Often in lateritic soils found along creeks and rivers.



Adenanthos obovatus

Unknown

Erect shrub growing to 2m with red/orange flowers occurring May to Dec. Grows well in sand, gravel or loam in sand dunes, swamps, winter-wet depressions and hillsides.



Allocasuarina humilis

Dwarf Sheoak

An erect spreading shrub growing to 2m. The red/orange-brown flowers are seen between May to Nov. Grows well in sand, sandy clay and gravel.



Astartea scoparia

Astartea

Shrub growing to 1.8m high with white/pink flowers. Grows in loam and sand. Similar to *Astartea fascicularis*.



Beaufortia purpurea

Swamp Bottlebrush

Erect or spreading shrub to 1.5m high. Red-purple flowers between Oct to Feb. Found on rocky slopes, in dry soil.



Beaufortia squarrosa

Sand Bottlebrush

Shrub growing up to 2m high. Red/orange/yellow flowers between Jan to May or Aug to Dec. Prefers sandy soils and winter-wet depressions.



Billardiera heterophylla

Australian Bluebell

A woody rounded shrub growing up to 1.5m. The blue/white/pink flowers appear Dec to Feb. Found along coastal areas and inland salt lakes. Best suited to sandy and saline soils.



Bossiaea ornata

Broad-leaved Brown Pea

An erect, spreading shrub to 1.5m high. Grows on sandy and lateritic soils in the Jarrah forest. Flowers yellow/brown are seen Sept to Nov.



Bossiaea pulchella

Unknown

Multi-branched shrub 0.4-1.5m high. Flowers range from yellow/orange and brown red and appear between Aug to Sep. Suited to laterite and granitic soils.



Calothamnus hirsutus

Hairy Claw flower

Often a spreading shrub growing to 1.5m high. Red flowers appear in Sept to Dec. Grows in yellow/grey sand, clay, sandy clay, loam, gravel, weathering sandstone or granite. Prefers growing on ridges or in winter-wet depressions. Similar to *Calothamnus lateralis*.



Calothamnus quadrifidus

One-sided Bottlebrush

An erect, compact or spreading shrub 1-3m. The red/white-yellow flowers appear from Jun to Dec. Suited to a wide variety of soils and habitats.



Calothamnus sanguineus

Silky-leaved Blood flower

An erect to open spreading shrub reaching 2m high. Red flowers Mar to Nov. Prefers sandy lateritic soils found on sandplains, limestone ridges and rocky outcrops.



Darwinia citriodora

Lemon-scented Darwinia

An erect or prostrate shrub to 1.5m. Commonly found on granite outcrops. Yellow-green/red flowers appear in Aug to Oct.



Daviesia cordata

Bookleaf Pea

An erect, slender shrub growing up to 2m. The yellow/orange and red/brown flowers appear Jul to Jan. Suited to lateritic or granitic soils and found along undulating plains, hills, and ridges. *Other local varieties of *Daviesia species* exist, such as *D. divaricata* and *D. incrassata*.



Grevillea bipinnatifida

Fuschia Grevillea

A spreading shrub that grows to 1.5m in sand, lateritic, and loamy clay soils. The orange-red flowers appear from Mar-Jan. *Other local varieties of *Grevillea species* exist, such as *Grevillea obtusifolia*.



Grevillea endlicheriana

Spindly Grevillea

A shrub growing 1-3m with pink/red flowers in Jul to Nov. Grows in sand over granite or gravelly loam over laterite.



Hakea lissocarpa

Honey Bush

Erect and sprawling shrub to 1.5m. Pungent flowers either, white/cream or pink appearing in May to Sept. Prefers sandy loam, granitic soils or laterite soils.



Hakea prostrata

Harsh Hakea

Spreading shrub that grows from 1-3m. Cream/white flowers from Jul to Oct. Found in a variety of habitats such as granite outcrops to coastal dunes, but prefers sand over loam or gravel.



Hakea ruscifolia

Candle Hakea

A lignotuberous shrub to 3m. White flowers appear Dec to Apr or Jun. Suited to sandy soils and gravelly clay.



Hakea trifurcata

Two-leaf Hakea

A rounded or open shrub to 3m high and 3.5m wide. The white/cream-pink flowers occur Apr to Oct. Prefers sand over limestone or laterite, loam, gravel.



Hakea undulata

Wavy-leaved Hakea

Often straggly, an erect shrub growing to 2m high. The white flowers appear Jul to Oct. Grows well in gravel, clay or sand.



Hovea pungens

Devil's Pins

An erect, pungent shrub growing up to 1.8m high. The purple pea flowers appear from Jun to Sep. Suitable to a variety of soil types.



Hypocalymma angustifolium

White Myrtle

An erect, multi-stemmed shrub to 1.5m high. Flowers are white-cream-pink from Jun to Oct. Prefers sandy, gravel or clay soils in wet conditions.



Isopogon dubius

Pincushion Coneflower

A compact and bushy shrub to 1.5m. Flowers are pink/pink-red between Aug to Dec. Grows in sand, sandy loam, clayey soils, lateritic sandy gravel.



Kunzea recurva

Purple Kunzea

Erect or ascending shrub that can grow to 2m. Pink/purple flowers from Aug to Dec. Grows well in a variety of soils including winter-wet depressions and rocky slopes.



Leptospermum erubescens

Roadside Teatree

Shrub growing to 1-3m with white/pink flowers from Jul to Nov. Grows in sandy soils, often with gravel.



Macrozamia riedlei

Zamia Palm

Tree (cycad) up to 3m. Usually trunkless with glossy, flat or openly keeled, narrow leaflets. Flowers occur Sep to Oct. Prefers lateritic soils in the Jarrah forest. Similar to *Macrozamia fraseri*.



Melaleuca lateritia

Robin Redbreast Bush

Erect, compact shrub to 2.5m high. Red-orange flowers appear Sept to Apr. Grows in clay, granite, sandy loam and swampy areas. *Other local varieties of *Melaleuca species* exist, such as *Melaleuca scabra* & *M. thymoides*.



Melaleuca radula

Graceful Honeymyrtle

Shrub up to 3m high. Pink-purple/white flowers appear Jul to Nov. Prefers gravelly soils over laterite and is often associated with granite rock or watercourses.



Pericalymma ellipticum

Swamp Teatree

Erect shrub to 3m high. White-pink flowers between Oct to Jan. Grows in leached sand with some clay and laterite soils.



Scholtzia involucrata

Spiked Scholtzia

Erect, spreading shrub reaching 1.5m high. The pink-white flowers are seen either Jan to May or Aug to Dec. Found in sandplains and ridges.



Trymalium ledifolium

Unknown

A shrub growing up to 2.5m. The white-cream flowers occur Jun to Nov. Suited to a variety of soils along ridges, outcrops, dunes.



Verticordia densiflora

Compacted Featherflower

An erect to spreading shrub up to 2m. The dense clusters of pink/purple/white/cream/yellow flowers are seen between Sep to Feb. Will grow in a variety of soils and winter-wet depressions. *Many other local varieties of *Verticordia species* exist, such as *V. acerosa* and *V. huegelii*.



Verticordia plumosa

Plumed Featherflower

A shrub growing from 0.2-1.5m high. The pink/purple flowers appear between Jul to Feb. Found in sand, clay, gravel, and seasonally wet places and along road verges.



Xanthorrhoea gracilis

Graceful Grass Tree

Tufted perennial tree-like monocot growing to 2m high, with no trunk. Flowers are cream/white from Oct to Jan. Grows in lateritic loam, gravel and sand.

TALL SHRUBS 3m and taller



Acacia saligna

Orange Wattle

A dense, often weeping shrub or tree to 6m. Adaptable to a variety of habitats with yellow flowers
Jul to Nov.



Adenanthos cygnorum

Common Woollybush

Shrub to 4m high with white-cream-pink-green flowers appearing from Jul to Jan. Suited to a variety of soils such as sand, clay, gravel and laterite.



Adenanthos sericeus

Woolly Bush

A mostly upright spreading shrub, occasionally reaching 5m high. The red/red-orange flowers are seen throughout the year. Suited to sand and granite, along coastal sand hills and outcrops.





Banksia menziesii

Firewood Banksia

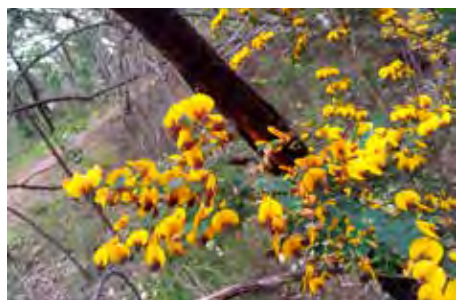
Tree or shrub growing to 7m high. Pink/red/yellow flowers appear Feb to Oct. Suited to white, grey or yellow sand.



Banksia sessilis

Parrot Bush

Prickly shrub or tree growing to 5m high. Cream-yellow flowers appear Apr to Nov. Prefers growing in white, grey or yellow sand, limestone, laterite and granite.



Bossiaea aquifolium

Water Bush

A shrub or tree growing 3m high. The orange/yellow and red/brown flowers appear from Jul to Nov. Suited to clay loam, laterite or granite soils.



Callistemon phoeniceus

Lesser Bottlebrush

Tall to small tree or shrub, growing up to 6m high. Often grows along watercourses in sandy and laterite soils. Red flowers occur from Sep to Jan.



Calothamnus rupestris

Mouse Ears

Erect, compact or spreading shrub or tree growing to 4m high. Pink-red flowers appear in Jul to Dec. Grows in gravelly skeletal soils on granite outcrops, rocks and hillsides.



Eremaea pauciflora

Orange flowered Eremaea

A spreading shrub that can occasionally reach up to 4m high. Bright orange/red/yellow flowers from Jul to Jan. Suitable to a variety of soil types and locations.



Eucalyptus drummondii

Drummond's Gum

Mallee or tree with smooth bark growing to 8m high. White-cream flowers appear Jan to Feb or Apr to Dec. Prefers growing in gritty loam, gravel, clay over laterite or granite. Grows on sand plains, hills and road verges.



Grevillea olivacea

Olive Grevillea

Erect shrub growing to 4.5m high. Red/red-pink flowers appear in Jun to Sep. Prefers growing on white or grey sand on coastal dunes or limestone rocks.



Hakea laurina

Pin-cushion Hakea

Shrub or tree growing to 6m high. Red flowers appear in Apr to Aug. Grows in sand and sandy clay.



Hakea petiolaris

Sea Urchin Hakea

Erect shrub or tree growing to 6m high. Pink & cream flowers appear in Mar to Jul. Prefers growing in loam or on granite outcrops.



Hakea varia

Variable-leaved Hakea

Erect or spreading shrub growing to 4m high and 3m wide. White-cream/yellow flowers appear in Jul to Nov. Prefers growing in white, grey or red loamy sand, clay loam or laterite. Grows in seasonally-wet flats.



Jacksonia sternbergiana

Green Stinkwood

Erect, weeping shrub or tree growing to 5m high. Yellow-orange flowers appear in Jan to Dec. Prefers sandy soils and grows along rivers & creeks, near swamps, flats and dunes. Similar to *Jacksonia furcellata*.



Kunzea glabrescens

Spear Wood

Shrub growing to 4m high. Yellow flowers appear in Oct to Nov. Grows in clay or sandy soils, on the edges of swamps, lakes, rivers and moist depressions. *Other local varieties of *Kunzea species* exist, such as *Kunzea ericifolia*.



Melaleuca cuticularis

Saltwater Paperbark

Tree or shrub growing to 7m. The white/cream flowers appear Aug to Nov. Will grow in salt conditions and prefers sandy or clay soils that are moist. *Other local varieties of *Melaleuca species* exist, such as *Melaleuca uncinata*.



Melaleuca huegelii

Chenille Honeymyrtle

Shrub or tree growing to 5m high. Pink/white/pink-purple flowers appear in Sep to Dec or Jan. Prefers growing in sand, on limestone cliffs, coastal plains and dunes.



Melaleuca incana

Grey Honeymyrtle

Shrub or tree growing to 5m high. White-cream-yellow flowers appear in May to Nov. Prefers growing in red-grey-brown sand, sandy clay over ironstone, in seasonally wet flats and depressions or swamps.



Melaleuca teretifolia

Banbar

Shrub or tree growing to 5m high. White/cream/pink flowers appear in Oct to Dec or Jan or Mar. Grows in sandy soils or clay. Prefers winter-wet depressions and swamps.



Melaleuca viminea

Mohan

Shrub or tree growing to 5m high. White-cream flowers appear in Jul to Nov. Grows in sandy or clayey soils, near creeks or wet depressions, along watercourses, rocky coastal areas or flats.



Taxandria linearifolia

Swamp Peppermint

Small tree or shrub growing to 5m high. White flowers appear occasionally in Mar to May or Sep to Dec. Prefers growing in loam, clay or sand, gravel, quartzite, laterite. Grows along swamps and watercourses.



Trymalium odoratissimum

Karri Hazel

Shrub growing to 5m high. Leaves a smooth and glossy green on the upper surface and hairy underneath. White clusters of fragrant flowers appear from Aug to Sep. Grows along watercourses and near damp areas, as well as forest understorey.



Viminaria juncea

Swishbush

Erect, often weeping shrub growing to 4m high. Yellow flowers appear in Oct to Dec or Jan. Grows in sandy & clayey soils, near lakes & swamps, river banks and winter-wet depressions.



Xanthorrhoea preissii

Grass Tree

Perennial tree-like shrub growing to 5m high and with trunk over 3m. White-cream flowers appear in Jun or Aug to Dec. Prefers growing in grey to black sands, grey-brown loam, brown gravelly sandy clay, laterite or granite. Grows on ranges, coastal plain or near watercourses.

TREES 8m and taller



Allocasuarina fraseriana

Sheoak

A dioecious tree (male and female individuals) reaching 15m in height, with reddish-brown fibrous bark. This sheoak will grow in a variety of habitats from sandy dunes to Jarrah forest. The red/brown flowers appear May to Oct.



Allocasuarina huegeliana

Rock Sheoak

A dioecious tree (male and female individuals) growing to 10m high. The red/brown flowers appear between May to Jan. Often associated with granite soils and mostly confined to the Darling Scarp.



Banksia attenuata

Candle Banksia

A tree/shrub with epicormic buds, growing up to 10m high. The bright yellow flowers are produced in Oct to Feb. Found growing in sandy soils or sand over laterite.



Banksia grandis

Bull Banksia

A tree growing up to 10m high with epicormic buds. The yellow-green flowers appear between Sept to Jan. Found in coastal areas in sandy soils and wooded habitats near the scarp.



Banksia littoralis

Swamp Banksia

Tree/shrub growing to 12m high, with epicormic buds. The bright yellow/orange flowers appear from Mar to Aug. Found in low-lying, seasonally damp areas, along watercourses.



Casuarina obesa

Swamp Sheoak

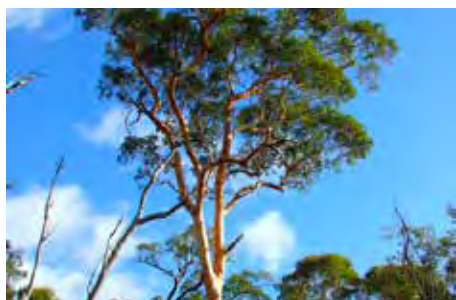
A dioecious tree (male and female individuals) growing to 10m high, that can flower all year round. Often grows in brackish or saline situations, along rivers, creeks, and salt lakes.



Corymbia calophylla

Marri

Tall tree reaching up to 40m. Grows in a variety of habitats and all soil types. Distinguishable by the large “honky nut” seed pods. The white flowers appear Dec to May and is used by Black Cockatoos for feeding and nesting.



Eucalyptus accedens

Powderbark Wandoo

Growing up to 15m high with smooth, pink/white bark. The white/cream/yellow flowers are seen between Dec to Apr. Prefers lateritic gravelly soils and clay loam. *Other local varieties of *Eucalyptus* species exist, such as *Eucalyptus lane-poolei* & *E. megacarpa*.



Eucalyptus laeliae

Darling Range Ghost Gum

Growing up to 20m high with a smooth powdery bark. The white flowers appear Dec to Feb. Can be found in sandy clay or loam soils on hills and granite outcrops.





Eucalyptus marginata

Jarrah

A tall eucalyptus that grows to 30m and has a rough bark. The white/cream/pink flowers appear from Jun to Jan. Will grow in a variety of soils including sand, clay or gravel.



Eucalyptus patens

Swan River Blackbutt

A tree reaching up to 25m in height with rough, longitudinally furrowed bark. Grows well in gravel, sandy clay, loam and depressions and valleys. The white/cream flowers appear Jul to Aug or Nov to Feb.



Eucalyptus rudis

Flooded Gum

A salt tolerant tree with rough bark, growing up to 20m high. The white flowers appear Jul to Sep. Prefers wetlands and stream banks with sandy or loam soils.





Eucalyptus wandoo

Wandoo

Grows to 25m with a smooth bark that is sometimes powdery. The white/cream flowers appear Dec to May and will grow in most soil types and on rocky uneven terrain.



Melaleuca preissiana

Moonah

A tree/shrub growing to 9m in sandy and swampy conditions. The yellow/cream/white flowers appear Nov to Feb.



Melaleuca raphiophylla

Swamp Paperbark

A tree/shrub growing to 10m in swamps and salt marshes. The white/cream flowers appear Jul-Jan. Suited to sand, clay or limestone soils.



Nuytsia floribunda

Christmas Tree

A parasitic tree or shrub growing to 10m in height. With rough grey-brown bark and yellow-orange flowers appearing around Christmas (Oct to Dec). Will grow in a variety of well-drained soil conditions with a nearby host.



Paraserianthes lophantha

Albizia

A tree/shrub growing to 10m high. The yellow/green flowers appear Apr to Oct. Grows in sandy or granite soils in winter-wet depressions, near creeks or swamps. Formerly *Albizia lophantha*.

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Melaleuca radula
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Scholtzia involucrata
Trymalium ledifolium
Verticordia densiflora
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Xanthorrhoea gracilis

Common Name

Graceful Honeymyrtle
Swamp Teatree
Spiked Scholtzia
Unknown
Compacted Featherflower
Plumed Featherflower
Graceful Grass Tree

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Common Woollybush
Woolly Bush
Firewood Banksia
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Water Bush
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**WILDFLOWER SOCIETY
OF WA (INC.)**

EASTERN HILLS BRANCH

Our native plants are adapted for tough conditions and they provide habitat for our birds and wildlife.

You can learn more about local native plants and caring for the natural environment through talks, workshops and publications from the Wildflower Society of WA or Shire of Mundaring.

Wildflower Society of WA - Eastern Hills Branch
PO Box 111, Glen Forrest WA 6071
www.wildflowersocietywa.org.au

Shire of Mundaring - 9290 6666
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www.mundaring.wa.gov.au

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6	R. Mason/ O. Johnston	D Walsh	D Walsh	D Walsh	11/03/2024
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