



## CLEARING PERMIT

*Granted under section 51E of the Environmental Protection Act 1986*

### ADVICE NOTE

The funds referred to in condition 3 of this permit are intended for contributing towards the purchase of 3.25 hectares of native vegetation containing similar environmental values to the application area, being; habitat for Carnaby's cockatoo (*Calyptorhynchus latirostris*), Baudin's cockatoo (*Calyptorhynchus baudinii*) and forest red-tailed black cockatoo (*Calyptorhynchus baudinii*).

### PERMIT DETAILS

Area Permit Number : 8922/1  
File Number : DWERT5833  
Duration of Permit : From 12 January 2021 to 12 January 2023

### PERMIT HOLDER

Department of Education

### LAND ON WHICH CLEARING IS TO BE DONE

Lot 9010 on Deposited Plan 414089

### AUTHORISED ACTIVITY

The Permit Holder shall not clear more than 0.944 hectares of native vegetation within the area cross-hatched yellow in Figure 1 of Schedule 1.

### CONDITIONS

#### 1. Avoid, minimise and reduce the impacts and extent of clearing

In determining the amount of native vegetation to be cleared authorised under this Permit, the Permit Holder must have regard to the following principles, set out in order of preference:

- (a) avoid the clearing of native vegetation;
- (b) minimise the amount of native vegetation to be cleared; and
- (c) reduce the impact of clearing on any environmental value.

#### 2. Weed and dieback management

When undertaking any clearing authorised under this permit, the permit holder must take the following measures to minimise the risk of introduction and spread of *weeds* and *dieback*:

- (a) clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;
- (b) ensure that no known *dieback* or *weed*-affected soil, *mulch*, *fill*, or other material is brought into the area to be cleared; and
- (c) restrict the movement of machines and other vehicles to the limits of the areas to be cleared.

#### 3. Monetary contributions to a fund maintained for the purpose of establishing or maintaining vegetation (offset)

Prior to undertaking any clearing authorised under this Permit and no later than 12 January 2022, the Permit Holder shall provide documentary evidence to the *CEO* that funding of \$55,690.15 has been transferred to the Department of Water and Environmental Regulation to purchase land for the purpose of establishing or maintaining native vegetation.

#### 4. Records must be kept

The Permit Holder must maintain the following records for activities done pursuant to this Permit:

- (a) in relation to the clearing of native vegetation authorised under this Permit:
  - (i) the location where the clearing occurred, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings;
  - (ii) the date that the area was cleared;
  - (iii) the size of the area cleared (in hectares);
- (b) actions taken to avoid, minimise and reduce the impacts and extent of clearing in accordance with condition 1 of this Permit;
- (c) actions taken to minimise the risk of the introduction and spread of *dieback* and *weeds* in accordance with condition 2 of this Permit;

#### 5. Reporting

The Permit Holder must produce the records required under condition 4 of this Permit when required by the *CEO*.

### DEFINITIONS

The following meanings are given to terms used in this Permit:

**CEO:** means the Chief Executive Officer of the Department responsible for the administration of the clearing provisions under the *Environmental Protection Act 1986*;

**dieback** means the effect of *Phytophthora* species on native vegetation;

**fill** means material used to increase the ground level, or fill a hollow;

**mulch** means the use of organic matter, wood chips or rocks to slow the movement of water across the soil surface and to reduce evaporation;

**weed/s** means any plant -

- (a) that is a declared pest under section 22 of the *Biosecurity and Agriculture Management Act 2007*;  
or
- (b) published in a Department of Biodiversity, Conservation and Attractions Regional Weed Rankings Summary, regardless of ranking; or
- (c) not indigenous to the area concerned.

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### END OF CONDITIONS



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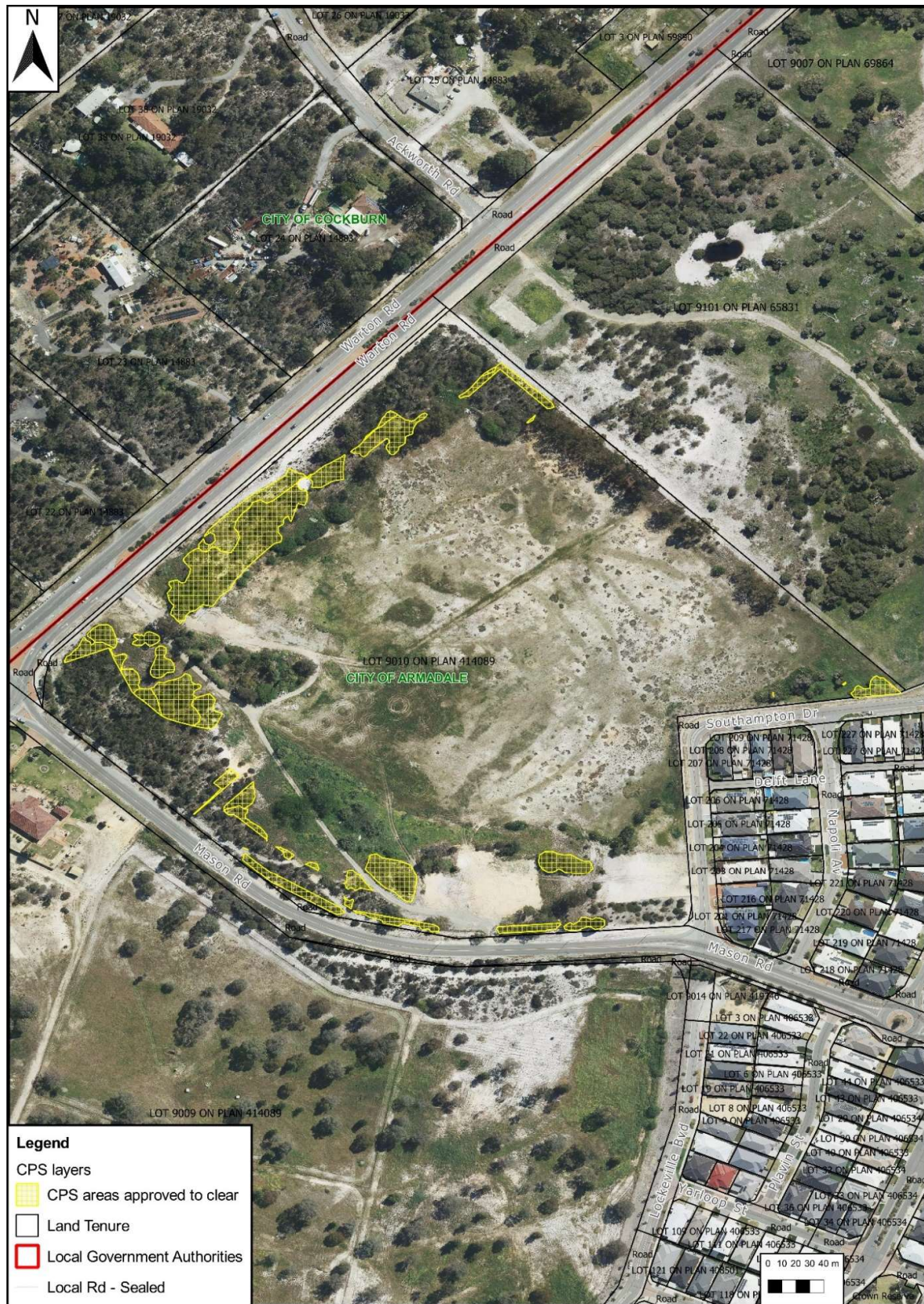
Meenu Vitarana  
A/MANAGER  
NATIVE VEGETATION REGULATION

*Officer delegated under Section 20  
of the Environmental Protection Act 1986*

18 December 2020

# SCHEDULE 1

The boundary of the area authorised to be cleared is shown in the maps below (Figures 1)



**Figure 1: Map of the boundary of the area within which clearing may occur**



## 1. Application details and outcome

### 1.1. Permit application details

<b>Permit number:</b>	CPS 8922/1
<b>Permit type:</b>	Area permit
<b>Applicant name:</b>	Department of Education
<b>Application received:</b>	22 May 2020
<b>Application area:</b>	0.944 hectares (ha) of native vegetation
<b>Purpose of clearing:</b>	School construction
<b>Method of clearing:</b>	Mechanical clearing
<b>Property:</b>	Lot 9010 on Plan 414089
<b>Location (LGA area/s):</b>	City of Armadale
<b>Localities (suburb/s):</b>	Piara Waters

### 1.2. Description of clearing activities

The vegetation applied to be cleared consists of 0.944 hectares of native vegetation distributed across a number of patches within Lot 9010 on Plan 414089 (see Figure 1, Section 1.5). The application is to clear native vegetation to facilitate development and construction of a high school site, including an oval, sporting fields and carparks (Coterra, 2020a).

The following modifications were made to the application area during the assessment:

- The application area was increased from an original area of 1.225 hectares to 1.29 hectares during the assessment process, as it was identified during the assessment that clearing of an additional area of native vegetation was required to facilitate the proposed development (Coterra, 2020b).
- The application area was reduced from 1.29 hectares to 0.944 hectares to exclude areas of proposed clearing that were identified to be exempt from a clearing permit as they were to facilitate construction of buildings and structures (Coterra, 2020c).

### 1.3. Decision on application and key considerations

<b>Decision:</b>	Granted
<b>Decision date:</b>	18 December 2020
<b>Decision area:</b>	0.944 hectares (ha) of native vegetation as depicted in Section 1.5 below.

#### 1.4. Reasons for decision

This clearing permit application was made in accordance with section 51E of the *Environmental Protection Act 1986* (EP Act) and was received by the Department of Water and Environmental Regulation (DWER) on 22 May 2020. DWER advertised the application for public comment and no submissions were received.

In undertaking their assessment, and in accordance with section 51O of the EP Act, the Delegated Officer had regard for the site characteristics, relevant datasets, the findings of flora and fauna surveys, the clearing principles set out in Schedule 5 of the EP Act, relevant planning instruments, the applicant's minimisation and mitigation measures, and any other matters considered relevant to the assessment. The assessment identified that the proposed clearing will result in the following:

- the loss of 0.84 hectares of moderate to good quality foraging habitat for *Calyptorhynchus latirostris* (Carnaby's black cockatoo), *Calyptorhynchus banksii naso* (forest red-tailed black cockatoo) and *Calyptorhynchus baudinii* (Baudin's black cockatoo).

After consideration of the available information, as well as the applicant's minimisation and mitigation measures, the Delegated Officer determined that the applicant has suitably demonstrated avoidance and minimisation measures, and that a proposed offset adequately counterbalances the impacts to black cockatoo foraging habitat (see Section 4). The Delegated Officer decided to grant a clearing permit subject to the following conditions:

- avoid, minimise to reduce the impacts and extent of clearing;
- take hygiene steps to minimise the risk of the introduction and spread of weeds;
- contribute to the DWER offsets fund to purchase land for the purpose of maintaining native vegetation for black cockatoo foraging habitat (refer to Section 4 and Appendix D for further details).

## 1.5. Site Map

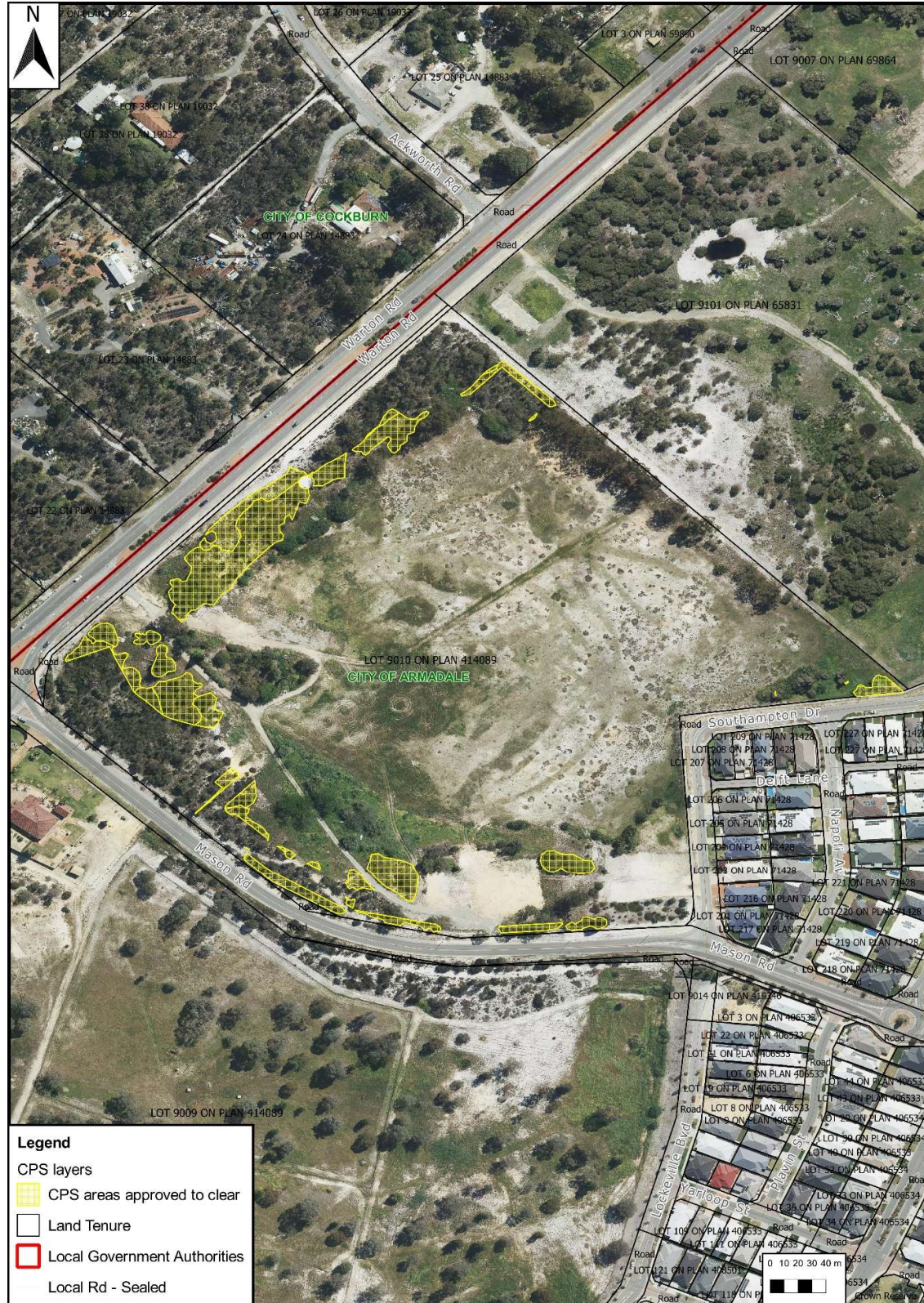


Figure 1. Map of the application area. The areas cross-hatched yellow indicate the areas authorised to be cleared under the granted clearing permit.

## 2. Legislative context

The clearing of native vegetation in Western Australia is regulated under the EP Act and the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* (Clearing Regulations).

In addition to the matters considered in accordance with section 51O of the EP Act (see Section 1.3), the Delegated Officer has also had regard to the objects and principles under section 4A of the EP Act, particularly:

1. the precautionary principle;
2. the principle of intergenerational equity;
3. the principle of the conservation of biological diversity and ecological integrity; and
4. the polluter pays principle.

Other legislation of relevance for this assessment include:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)
- *Planning and Development Act 2005* (WA) (P&D Act)
- *Metropolitan Water Supply, Sewerage, and Drainage Act 1909* (WA)

Relevant policies considered during the assessment were:

- *Environmental Offsets Policy* (2011)

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (December 2013)
- *Procedure: Native vegetation clearing permits* (DWER, October 2019)
- *Environmental Offsets Guidelines* (August 2014)
- Technical guidance – *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016)
- Technical guidance – *Terrestrial Fauna Surveys for Environmental Impact Assessment* (EPA, 2016)

## 3. Detailed assessment of application

### 3.1. Avoidance and mitigation measures

Information was submitted by the applicant, demonstrating that the following avoidance and mitigation measures are being considered as part of the Development Application process. These measures include:

- Several areas of vegetation along the north western and south western boundaries of Lot 9010 adjacent to the application area were able to be retained either temporarily (until later stages of the school infrastructure is developed) or permanently (Coterra, 2020a);
- A Vegetation Management Plan is being prepared to identify measures to protect areas of retained vegetation during construction works;
- Future landscaping onsite will include planting with local native species; and
- Following clearing, soils onsite will be stabilised through construction, landscaping or placement of mulch or hydro-mulch to minimise land degradation.

Following a preliminary assessment, DWER sent a letter to the applicant requesting further information, including further evidence of avoidance and mitigation measures. In response to this the applicant advised the following (Coterra, 2020b):

- The need for a High School site in this general location was identified by the Department of Education. Following consideration of a range of location options, this particular site was selected as it was predominantly cleared, therefore any impacts to native vegetation would be reduced in comparison to a vegetated land parcel.
- The design of the site focuses on provision of the school buildings at the southern and eastern ends of the lot, away from the main areas of native vegetation.
- One of the areas where vegetation was able to be retained include the drainage swales to the northern end of the site, which were located and designed to minimise impact to the existing vegetation through minimising earthworks and physical distance associated with this infrastructure. Over half of this retained vegetation is in 'Good' condition;

- A Vegetation Management Plan was prepared to accompany the DA application, which identified the following measures to protect retained vegetation during construction:
  - Delineation of retained vegetation through installation and maintenance of temporary fencing around retained vegetation areas, site inductions to include information about vegetation protection areas, digital mapping of retained vegetation areas to be provided to the site contractors, and ensuring the maximum slope of batters to retained areas is 1:2 to minimise the chance of erosion/soil movement impacting vegetation.
  - Management of potential weed and dieback spread through ensuring that vehicles entering the site are clean on entry and that construction materials are sourced from a dieback free source/area and contain no weeds.
  - Minimise the potential for dust generation to occur (which could settle on vegetation) by stabilising any stockpiled soils, having a water cart present onsite, restricting vehicles speeds to 25 km/hr and using tarpaulins when transporting material to and from the site.

The applicant also advised that on-site landscaping will include species that provide black cockatoo foraging habitat (Cottera, 2020d).

Given the above, it is considered that the applicant has adequately considered avoidance and minimisation measures.

### **3.2. Assessment of environmental impacts**

In assessing the application in accordance with section 51O of the EP Act, the Delegated Officer has examined the application and site characteristics (Appendix A) and considered whether the clearing poses a risk to environmental values. The assessment against the Clearing Principles is contained in Appendix B.

This assessment identified that the clearing may pose a risk to the environmental value(s) of biological values (flora and fauna) and land and water resources, and that these required further consideration. The detailed consideration and assessment of the clearing impacts against the specific environmental values is provided below. Where the assessment found that the clearing presents an unacceptable risk to environmental values, conditions aimed at controlling and/or ameliorating the impacts have been imposed under sections 51H and 51I of the EP Act. These are also identified below.

#### **3.2.1. Environmental value: biological values (fauna) – Clearing Principles (a) and (b)**

**Assessment:** The proposed clearing area occurs within the known distribution range of Baudin's black cockatoo, Carnaby's cockatoo and the forest red-tailed black cockatoo (hereafter referred to as "black cockatoos"), although not within their predicted breeding ranges (Commonwealth of Australia, 2012 and Department of Environment and Conservation, 2008). A black cockatoo habitat assessment (Harewood, 2018) identified two potential black cockatoo habitat trees (i.e. trees with a diameter at breast height greater than 500 millimetres), both *Eucalyptus tottiana* (Coastal Blackbutt) within the proposed clearing area. However, no hollows were identified in these trees (Harewood, 2018). Given the above, the proposed clearing area is considered unlikely to provide significant black cockatoo breeding habitat. The proposed clearing area may also be used by black cockatoos for roosting, however given the presence of better quality vegetation close to the area, it is not considered to be significant roosting habitat.

The proposed clearing area is located approximately 1.2 kilometres from a known black cockatoo roost site. During the non-breeding period, black cockatoos will forage at least 6 kilometres from a communal night roosting site (Commonwealth of Australia, 2012). Evidence of black cockatoo foraging from either red-tailed black cockatoo or Carnaby's cockatoo was noted in the black cockatoo assessment, which included Lot 9010 on Plan 414089 as well as other properties to the south and north; however it was not specified whether or not evidence of foraging was observed within the proposed clearing area (Harewood, 2018). Vegetation types EmBaLW, BaEtLW, EmBaLW(-B) and BaEtLW(-B) mapped within the proposed clearing area (Focused Vision Consulting, 2020a), comprising a total area of approximately 0.84 hectares, represent a foraging resource for black cockatoos as they contain preferred species for foraging by black cockatoos, *Banksia attenuata*, *Banksia menziesii*, *Eucalyptus tottiana*, *Eucalyptus marginata*, *Banksia illicifolia*, *Allocasuarina fraseriana*, *Jacksonia furcellata* and *Xanthorrhoea preissii* (Valentine and Stock, 2008, Department of Environment and Conservation, 2008 and 2011, and Commonwealth of Australia, 2012). A Black Cockatoo Foraging Habitat Assessment (Focused Vision Consulting, 2020b) determined that, based on species composition and density of Carnaby's cockatoo preferred foraging species, vegetation condition and contextual information, the above listed vegetation units represent foraging habitat of 'moderate to high' or better



quality. Given the above, the proposed clearing area is considered to provide significant foraging habitat for black cockatoos, particularly Carnaby's cockatoo.

Other priority species *Lerista lineata* (Perth Lined Lerista) and *Isoodon fusciventer* (Quenda), may utilise vegetation within the application area for habitat. However, given vegetation within the application area is fragmented and predominantly in a Degraded to Good condition (Keighery, 1994) or lower, and that better quality habitat is present to the west and south-west of the application area, the application area is not considered to provide significant habitat for these species.

**Conclusion:** Based on the above assessment, the proposed clearing will result in impacts to 0.84 hectares of moderate to good quality foraging habitat for Carnaby's cockatoo, forest red-tailed black cockatoo and Baudin's cockatoo.

**Conditions:** Prior to undertaking any clearing authorised under this Permit, the Permit Holder will be required to transfer \$55,690.15 to DWER to purchase land for the purpose of maintaining native vegetation for black cockatoo foraging habitat (refer to Section 4 and Appendix D for further details).

### **3.2.2. Environmental value: biological values (flora) – Clearing Principles (a) to (d)**

**Assessment:** Although vegetation within the application area is fragmented and predominantly in a Degraded to Good condition (Keighery, 1994) or lower, based upon known flora records within the local area, habitat types in the local area, soil mapping, vegetation mapping, information from Florabase (WA Herbarium, 1998-) and other sources (refer to Flora analysis table in Appendix A) and surveys conducted by Focused Vision Consulting (2020a) and Bennett Environmental Consulting (2011), the application area is considered likely to provide suitable habitat for threatened flora species *Caladenia huegelii* (Grand Spider Orchid) within vegetation mapped as EmBaLW or BaEtLW, and may provide suitable habitat for four other threatened flora species (*Caladenia huegelii* (Grand Spider Orchid), *Austrostipa jacobiana*, *Diuris purdiei* (Purdie's Donkey Orchid), *Drakaea elastica* (Glossy-leaved Hammer Orchid) and *Drakaea micrantha* (Dwarf Hammer Orchid). The application area may also provide suitable habitat for priority flora, particularly *Byblis gigantea* (P3), *Jacksonia gracillima* (P3), *Stenanthemum sublineare* (P2), *Styphelia filifolia* (P3) and *Tripterococcus sp. Brachylobus* (A.S. George 14234) (P4).

One priority flora species, *Jacksonia gracillima* (P3), was possibly recorded within vegetation unit EmBaLW by Focused Vision Consulting in March 2020 (Focused Vision Consulting, 2020a), although not within the proposed clearing area. However, targeted surveys conducted by Focused Vision Consulting in July 2020 (timed to detect the presence of *Drakaea elastica*) and September 2020 (sufficient to detect the presence of other species listed above) did not record the presence of any of the species listed above (Focused Vision Consulting, 2020c). As such, it is considered unlikely that the application area contains any threatened or priority flora species.

Vegetation types EmBaLW and BaEtLW mapped within the application area, comprising 0.163 hectares of the application area, are considered to contain vegetation with characteristics representative of the "Banksia woodlands of the Swan Coastal Plain" EPBC Act listed Threatened Ecological Community (Banksia Woodlands TEC), and the Priority 3 Ecological Community listed by the WA Minister for Environment (Focused Vision Consulting, 2020a). Of this area, 0.024 hectares is in Good condition, 0.137 hectares is in Degraded to Good condition and 0.002 hectares is in Degraded to Completely Degraded condition. However, all patches of Banksia woodlands vegetation that intersected the proposed clearing area did not meet the condition and area requirements to be considered as the Banksia Woodlands TEC (Threatened Species Scientific Committee, 2016), and are therefore not considered a Matter of National Significance under the EPBC Act (Focused Vision Consulting, 2020a).

**Conclusion:** Based on the above assessment, the Delegated Officer has considered that the proposed clearing is acceptable in relation to this environmental value.

### **3.2.3. Environmental value: land and water resources – Clearing Principles (f), (g), (i) and (j)**

**Assessment:** A small area (0.01 hectares) of vegetation identified as "Open low woodland of *Melaleuca preissiana*" (Focused Vision Consulting 2020a) within the eastern portion of the proposed clearing area intersects a mapped Multiple Use dampland wetland (UFI 14155). While this vegetation type is consistent with wetland riparian areas, noting the Degraded nature and the small extent of this vegetation, as well as the wetland management category of Multiple Use, clearing of vegetation associated with this wetland is unlikely to have significant ecological or water quality impacts.

While the groundwater table within the application area is relatively shallow, due to the small extent of the proposed clearing it is considered unlikely to result in an increase to groundwater levels that would impact the onsite wetland,

nearby Conservation and Resource enhancement wetlands, and Ramsar wetlands within the local area. Given the small extent of the clearing, that the proposed clearing is unlikely to significantly disturb groundwater or soils at depth, and proposed land degradation mitigation measures and retention of some of the adjacent vegetation, the clearing is also considered unlikely to result in nutrient export or acid sulfate soil related impacts to groundwater or nearby wetlands (DWER 2020b).

Given the small extent of the clearing and proposed land degradation mitigation measures, the proposed clearing is also considered unlikely to result in significant land degradation from wind erosion.

Conclusion: Based on the above assessment, the Delegated Officer has determined that the proposed clearing is acceptable in relation to this environmental value.

Conditions: N/A

### **3.3. Relevant planning instruments and other matters**

Other relevant authorisations required for the proposed land use include:

- Development approval from Western Australian Planning Commission (WAPC) for forward works (note this is for outside the proposed clearing areas);
- Amendment of the Metropolitan Region Scheme by Western Australian Planning Commission, to rezone Lot 9010 on Plan 414089 from 'Rural – Water Protection' to 'Public Purposes – High School' (Western Australian Planning Commission).

A development approval for forward works was approved on 4 September 2020, however it is noted that these works did not entail clearing of native vegetation.

The application area is currently within a Priority 2 (P2) area of the Jandakot Underground Water Pollution Control Area. The following planning considerations are relevant to P2 areas (Western Australian Planning Commission, 2017):

- Have a high priority for public water supply use;
- Management objective of these areas is to ensure no increased risk of pollution to the water source (i.e. risk minimisation);
- Suitable land uses normally include private rural with few buildings, with low-risk, low-intensity land use;
- Restricted development in these area may take place under specific guidelines; and
- Schools are an incompatible land use for P2 areas (Department of Water, 2016).

In order to allow the high school to be built on Lot 9010 on Plan 414089, an amendment to the Metropolitan Region Scheme (MRS) was required to rezone this property from 'Rural – Water Protection' to 'Public Purposes – High School'. The MRS amendment was lodged with WAPC in March 2020 (MRS 1370/57) and approved on 3 November 2020. Accordingly, the property will be reclassified from a P2 area to a P3 area, where a high school is a permitted land use (DWER, 2020a). Given this DWER Swan Avon office advised that they have no objection to the proposed school, that potential impacts to water quality from clearing are unknown however are considered minimal, and the impacts associated with the proposed school are also unknown but are considered low risk and manageable (DWER, 2020a).

The MRS amendment was referred to the Environmental Protection Authority (EPA) and determined as a 'Scheme Amendment Not to be Assessed Under Part IV of the EP Act. Advice Given (Not Appealable)' on 30 March 2020, and was considered "unlikely to have a significant impact on the environment" (EPA, 2020). However, in their decision (CMS17787) EPA noted that an MRS amendment to allow for rezoning from a P2 to a P3 compatible purpose requires a District Water Management Strategy (DWMS) to be prepared to the satisfaction of DWER (DWER, 2018), and EPA identified that the DWMS initially submitted to DWER to support MRS amendment MRS 1370/57 required changes to sufficiently address the impacts, risks and management of urban development for surface water and groundwater resources (EPA 2020). It is noted that since EPA issued this decision, the District Water Management Strategy (DWMS) initially submitted to DWER was revised and the final version of this endorsed by DWER in August 2020 (DWER, 2020a).

EPA (2020) also noted the following:

- Updated flora and vegetation and fauna surveys, consistent with EPA technical guidance, are required to inform future local planning scheme amendments; and

- The EPA does not support a concurrent amendment to the City of Armadale local planning scheme for West Piara when MRS 1370/57 is finalised.

The City of Armadale advised DWER that when the aforementioned MRS amendment is finalised and gazetted, the City's Town Planning Scheme No. 4 (TPS) will be automatically amended and no Local Scheme Amendment will be required to allow for a High School on Lot 9010 on Plan 414089 (City of Armadale, 2020). Furthermore, the City advised that once the MRS amendment is finalised and gazetted, the school will become exempted from normal Development Approval requirements under the MRS or TPS. Under clause 16 (1)(a) of the MRS Text, the development of a High School on land reserved under the Metropolitan Region Scheme for "Public Purposes – High School" will not require local planning approval. As such, the City advised that they have no statutory role in the planning process for the proposed high school.

The City of Armadale also provided the following advice regarding environmental matters pertaining to the proposed clearing:

- Based on the results of the Flora and Vegetation Survey undertaken by Focused Vision Consulting (2020a) and in consideration of the EPA advice above, a Spring Flora survey in accordance with EPA technical guidance should be undertaken to ensure no conservation significant flora species will be impacted. Final concept plans and management plans should respond to the findings of this survey;
- The site contains an under-represented vegetation complex (Southern River), and Black Cockatoo foraging habitat which increases the value of the remnant vegetation on the site. Final concept plans for the site should aim to minimise clearing as much as practicable;
- Detailed management plans should be provided to demonstrate how retained vegetation will be protected during construction, and improved post-construction Fauna management including the need for relocation prior to clearing should also be considered (dependant on the final clearing plan);
- School landscaping or revegetation plans should use locally native species to increase biodiversity (City of Armadale, 2020).

DWER Contaminated sites branch advised that the proposed clearing lies within an area identified as having a moderate to low risk of ASS occurring within 3 metres of the natural soil surface, but high to moderate risk of ASS beyond 2 metres below the natural soil surface (DWER, 2020b).

Spatial data indicates that no Registered Aboriginal Heritage sites listed in accordance with Section 5 of the *Aboriginal Heritage Act 1972 (WA)* occur within the proposed clearing area. The nearest Registered Site (Place ID: 21811 – Kraemer Reserve), occurs approximately 2.4 kilometres south-west of the proposed clearing area. One site (Place ID: 4339 – Warton Road, Banjup) has a status of 'Lodged' and has not yet been assessed. It is the permit holder's responsibility to comply with the *Aboriginal Heritage Act 1972 (WA)* and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

#### **4. Suitability of offsets**

Through the detailed assessment outlined in Section 3.2 above, the Delegated Officer has determined that the following significant residual impacts remain after the application of the avoidance and mitigation measures summarised in Section 3.1:

- impacts to 0.84 hectares of moderate to good quality foraging habitat for Carnaby's cockatoo, forest red-tailed black cockatoo and Baudin's cockatoo.

The applicant proposed an environmental offset consisting of a monetary contribution of \$55,690.15 to DWER to purchase 3.25 hectares of land containing excellent quality vegetation providing foraging habitat for Carnaby's cockatoos (also likely to provide foraging habitat for forest red-tailed black cockatoo and Baudin's cockatoo) for the purpose of maintaining native vegetation for black cockatoo foraging habitat.

The Delegated Officer considers that, consistent with the *Environmental Offsets Policy October 2012* and *WA Environmental Offsets Policy September 2011*, this adequately counterbalances the significant residual impacts listed above. The justification for the values used in the offset calculation is provided in Appendix D.

**End**

## Appendix A. Site characteristics

The information provided below describes the key characteristics of the area proposed to be cleared and is based on the best information available to DWER at the time of this assessment. This information was used to inform the assessment of the clearing against the Clearing Principles, contained in Appendix B.

### 1. Site characteristics

Site characteristic	Details
Local context	The proposed clearing area is a 1.225 ha area of native vegetation, occurring across a number of patches (see Section 1.5) as a result of historical clearing for sand extraction and turf production. The proposed clearing area is surrounded by residential development to the east, largely cleared rural land to the northeast and south, partially cleared rural land to the northwest and remnant vegetation to the southwest. Spatial data indicates the local area (10 km radius of the proposed clearing area) retains approximately 20.76% of the original native vegetation cover.
Vegetation description	<p>A reconnaissance level flora and vegetation survey conducted in March 2020 (Focused Vision Consulting, 2020a) indicates the vegetation within the application area consists of six native vegetation units, planted vegetation and cleared areas):</p> <ul style="list-style-type: none"> <li>• EmBaLW</li> <li>• BaEtLW</li> <li>• EmBaLW(-B)</li> <li>• BaEtLW(-B)</li> <li>• MpOLW</li> <li>• AcOS</li> </ul> <p>The full descriptions and mapping for each vegetation unit are provided in Appendix E. This vegetation unit mapping was similar to vegetation unit mapping identified in a Level 2 flora and vegetation survey in 2011 (Bennett Consulting, 2011), with minor refinements.</p> <p>Vegetation units mapped during flora and vegetation surveys (Bennett Consulting, 2011 and Focused Vision Consulting, 2020a) are consistent with the vegetation type mapped by Hedde et al., 1980):</p> <ul style="list-style-type: none"> <li>• Southern River Complex: predominantly an open woodland of <i>Corymbia calophylla</i> – <i>Eucalyptus marginata</i> – <i>Banksia</i> spp. with fringing woodland of <i>Eucalyptus rudis</i> – <i>Melaleuca raphiophylla</i> along creek beds.</li> </ul> <p>Two broad fauna habitat types occur within the application area (Harewood, 2018 cited in Coterra, 2020):</p> <ul style="list-style-type: none"> <li>• Low Woodland/Open Low Woodland of Banksia, Sheoak, <i>Nuytsia floribunda</i> and Coastal Blackbutt or Jarrah over Dwarf Scrub, Heath, Grass and/or Herbs</li> <li>• Dense Low Forest/Low Woodland of Paperbark (occasional Flooded Gum in some areas) over Scrub/Dense Thicket of Kunzea over Herbs/Dense Scrub and Tall Sedges.</li> </ul> <p>The full survey descriptions and mapping are available in Table E-1 and Figures E-1 and E-2, Appendix E.</p>
Vegetation condition	<p>A Level 2 flora and vegetation survey (Bennett Consulting, 2011) and reconnaissance level flora and vegetation survey (Focused Vision Consulting, 2020a) indicates the vegetation within the application area ranges from 'Completely Degraded' to 'Good' (Keighery, 1994) condition.</p> <p>The full Keighery condition rating scale is provided in Appendix C, below. Vegetation condition mapping is provided in Figure E-3, Appendix E.</p>
Soil description	The proposed clearing area is mapped within the following soil sub-systems of the 'Bassendean System':

Site characteristic	Details
	<ul style="list-style-type: none"> <li>• Majority of the area: <ul style="list-style-type: none"> <li>○ 'Bassendean B1 Phase', described as 'Extremely low to very low relief dunes, undulating sandplain and discrete sand rises with deep bleached grey sands sometimes with a pale yellow B horizon or a weak iron-organic hardpan at depths generally greater than 2 m; banksia dominant' (Mapping Unit 212Bs__B1);</li> </ul> </li> <li>• Approx. 0.01 ha portion of eastern application area: <ul style="list-style-type: none"> <li>○ 'Bassendean B2 Phase', described as 'Flat to very gently undulating sandplain with well to moderately well drained deep bleached grey sands with a pale yellow B horizon or a weak iron-organic hardpan 1-2 m' (Mapping unit 212Bs__B2); and</li> </ul> </li> <li>• Approx. 0.03 ha portion of eastern application area: <ul style="list-style-type: none"> <li>○ 'Bassendean B4 Phase', described as 'Broad poorly drained sandplain with deep grey siliceous sands or bleached sands, underlain at depths generally greater than 1.5 m by clay or less frequently a strong iron-organic hardpan' (Mapping Unit: 212Bs__B4) (DPIRD, 2017).</li> </ul> </li> </ul>
Land degradation risk	<p>Land degradation risk for soil subsystems mapped within the site are outlined below:</p> <ul style="list-style-type: none"> <li>• Bassendean B1 phase: <ul style="list-style-type: none"> <li>○ Flood risk: &lt;3% of the map unit has a moderate to high flood risk;</li> <li>○ Salinity risk: &lt;3% of map unit has a moderate to high salinity risk or is presently saline;</li> <li>○ Phosphorus export: &gt;70% of map unit has a high to extreme phosphorus export risk;</li> <li>○ Subsurface acidification: &gt;70% of the map unit has a high subsurface acidification risk;</li> <li>○ Water Erosion: &lt;3% of map unit has a high to extreme water erosion risk;</li> <li>○ Waterlogging risk: 3-10% of map unit has a moderate to very high waterlogging risk;</li> <li>○ Wind erosion: 50-70% of map unit has a high to extreme wind erosion risk.</li> </ul> </li> <li>• Bassendean B2 phase: <ul style="list-style-type: none"> <li>○ Flood risk: &lt;3% of the map unit has a moderate to high flood risk;</li> <li>○ Salinity risk: &lt;3% of map unit has a moderate to high salinity risk or is presently saline;</li> <li>○ Phosphorus export: &gt;70% of map unit has a high to extreme phosphorus export risk;</li> <li>○ Subsurface acidification: &gt;70% of the map unit has a high subsurface acidification risk;</li> <li>○ Water Erosion: &lt;3% of map unit has a high to extreme water erosion risk;</li> <li>○ Waterlogging risk: 3-10% of map unit has a moderate to very high waterlogging risk;</li> <li>○ Wind erosion: 30-50% of map unit has a high to extreme wind erosion risk.</li> </ul> </li> <li>• Bassendean B4 phase: <ul style="list-style-type: none"> <li>○ Flood risk: &lt;3% of the map unit has a moderate to high flood risk</li> <li>○ Salinity risk: &lt;3% of map unit has a moderate to high salinity risk or is presently saline;</li> <li>○ Phosphorus export: &gt;70% of map unit has a high to extreme phosphorus export risk;</li> <li>○ Subsurface acidification: &gt;70% of the map unit has a high subsurface acidification risk;</li> <li>○ Water Erosion: &lt;3% of map unit has a high to extreme water erosion risk;</li> <li>○ Waterlogging risk: &gt;70% of map unit has a moderate to very high waterlogging risk;</li> </ul> </li> </ul>

Site characteristic	Details
	<ul style="list-style-type: none"> <li>○ Wind erosion: 10-30% of map unit has a high to extreme wind erosion risk (Schoknecht et al, 2004).</li> </ul>
Waterbodies	<p>Wetlands in the Geomorphic Wetlands of the Swan Coastal Plain dataset have been evaluated and assigned a management category (or spatially divided into multiple categories where relevant) based on their ecological values. There are three management categories:</p> <ul style="list-style-type: none"> <li>• Conservation – wetlands which support a high level of attributes and functions;</li> <li>• Resource Enhancement – wetlands which may have been partially modified but still support substantial ecological attributes and functions; and</li> <li>• Multiple Use – wetlands with few remaining important attributes and functions (DBCA, 2014).</li> </ul> <p>One Multiple Use Wetland (UFI 14155) intersects with the eastern-most portion of native vegetation proposed to be cleared. Two Conservation Category dampland wetlands (UFIs 7169 and 7167) and a Resource Enhancement dampland wetland (UFI 7168) are located approximately 150 m southwest, 270m northwest and 230 northwest respectively of the proposed clearing area, on the opposite side of Warton Road.</p> <p>Two Ramsar Wetlands, Forrestdale Lake and Thomsons Lake, are also present within the local area (3.4 km southeast and 6.4 km southwest respectively).</p> <p>A series of insignificant tributaries of major drains occur to the south and east of the proposed clearing area.</p>
Conservation areas	<p>Spatial data indicates that the proposed clearing area is not located within any conservation areas. Bush Forever Site 390 occurs immediately south-west of the proposed clearing area. Remnant vegetation forming a portion of the larger Jandakot Regional Park occurs approximately 760 m to the south-west of the proposed clearing area.</p>
Climate and landform	<p>The proposed clearing area occurs on the Swan Coastal Plain, which has a warm Mediterranean climate, is characterised by hot dry summers and cool to mild wet winters (Mitchell <i>et al.</i> 2002). The Bureau of Meteorology (BoM) Jandakot Aero weather station (Site 009172) is the closest to the study area, operating since 1972. Average annual long-term rainfall recorded at the station is 819.6 mm. Annual mean maximum temperatures range from 18.0°C in winter to 31.6°C in summer (BoM 2020).</p> <p>Topography across the application area is relatively flat, ranging from 27 m AHD (east portion of application area) to 33 m AHD (southern portion). Maximum groundwater levels beneath the application area range from 26 (eastern portion of application area) to 28 m AHD (western portion), noting these are likely to vary seasonally and over time (DWER 2020c). Hydrogeology within the proposed clearing area is described as surficial sediments – shallow aquifers, with sand and gravel lithology.</p>

## 2. Flora, fauna and ecosystem analysis

With consideration for the site characteristics set out above, relevant datasets (see Appendix G), biological survey information, information from Florabase (WA Herbarium, 1998-) and other sources (as referenced) the following conservation significant flora and fauna species and ecological communities may be impacted by the clearing.

Flora Species / Ecological Community	No records in local area	Distance of closest record to application area (kilometres)	Suitable soil type?	Suitable vegetation type?	Suitable habitat features	Are surveys adequate to identify? (Y, N, N/A)
<b>Ecological community</b>						
Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Bioregion (P3)	2127	Mapped within proposed clearing area	Y	Y	Y	Y
<b>Flora</b>						
<i>Acacia benthamii</i> (P2)	2	5.0	Y	Y	N	Y
<i>Acacia oncinophylla</i> subsp. <i>patulifolia</i> (P4)	2	9.5	Y	Y	N	Y
<i>Aponogeton hexatepalus</i> (P4)	4	3.9	Y	Y	N	Y
<i>Austrostipa jacobiana</i> (T – CR)	6	3.8	Y	Y	Y	Y
<i>Byblis gigantea</i> (P3)	6	2.2	Y	Y	Y	Y
<i>Caladenia huegelii</i> (T – EN)	77	1.0	Y	Y	Y	Y
<i>Diuris purdiei</i> (T - EN)	16	3.3	Y	Y	Y except no recent fire (DEWHA, 2008a))	Y
<i>Dodonaea hackettiana</i> (P4)	19	5.2	Y	N	N	Y
<i>Drakaea elastica</i> (T – EN)	7	4.9	Y	Y	Not ideal (no large bare patches of sand) (DEC, 2009a)	Y
<i>Drakaea micrantha</i> (T – VU)	4	3.3	Y	Y	Not ideal (no large bare patches of sand) (DEWHA, 2008b))	Y
<i>Jacksonia gracillima</i> (P3)	9	1.6	Y	Y	Y	Y
<i>Jacksonia sericea</i> (P4)	2	2.7	Y	Y	N	Y
<i>Ornduffia submersa</i> (P4)	5	3.7	Y	Y	N	Y
<i>Schoenus benthamii</i> (P3)	2	5.4	Y	Y	N	Y
<i>Schoenus capillifolius</i> (P3)	2	3.9	Y	Y	N	Y
<i>Schoenus pennisetis</i> (P3)	2	2.4	Y	Y	N	Y
<i>Stenanthemum sublineare</i> (P2)	1	6.0	Y	Y	Y	Y
<i>Styphelia filifolia</i> (P3)	7	4.8	Y	Y	Y	Y
<i>Stylidium aceratum</i> (P3)	1	2.4	Y	Y	N	Y
<i>Stylidium paludicola</i> (P3)	3	3.8	Y	Y	N	Y
<i>Tripterococcus</i> sp. <i>Brachylobus</i> (A.S. George 14234) (P4)	15	3.2	Y	Y	Y	Y
<i>Verticordia lindleyi</i> subsp. <i>lindleyi</i> (P4)	13	2.4	Y	Y	N	Y

Fauna Species	No records in local area	Distance of closest record to application area (kilometres)	Most recent record	Suitable habitat features	Other	Are surveys adequate to identify? (Y, N, N/A)
<i>Lerista lineata</i> (Perth Lined Lerista) (P3)	215	Unknown	2018	Y	-	Y
<i>Falco peregrinus</i> (Peregrine Falcon) (OS)	48	3.5	2013	Y	-	Y
<i>Calyptorhynchus latirostris</i> (Carnaby's Black Cockatoo) (T – EN)*	1898	0.9, potential foraging evidence found within Harewood	2018	Y	85 known roost locations within 12 km (closest approx. 1.2 km)	Y

		(2018) survey area			20 potential white tailed black cockatoo breeding locations within 12km (closest approx. 9.6 km)	
<i>Calyptorhynchus baudinii</i> (Baudin's Black Cockatoo) (T – EN)*	3	10.0	2012	Y		Y
<i>Calyptorhynchus banksii naso</i> Forest Red-tailed Black Cockatoo (T – VU)	105	1.1, foraging evidence found within Harewood (2018) survey area	2019	Y		Y
<i>Isodon fusciventer</i> (Quenda) (P4)	1147	0.9	2019	Y	-	Y

\*An additional 78 records are present within the local area for *Calyptorhynchus sp.* 'white-tailed black cockatoo', which could be either Baudin's cockatoo or Carnaby's cockatoo

### 3. Vegetation extent

	Pre-European extent (ha)	Current extent (ha)	% remaining	Current extent in all DBCA managed land (ha)	% current extent in all DBCA managed land (proportion of pre-European extent)
<b>IBRA bioregion: Swan Coastal Plain</b>					
Beard Vegetation Association 1001	57,410.23	12,660.76	22.05	1,796.27	3.13
<b>Vegetation complex</b>					
Southern River Complex	58,781.48	10,832.18	18.43	940.36	1.60
<b>Vegetation complex – Local area (10 km)</b>					
Southern River Complex	9885.93	1,852.81	18.74	-	-

## Appendix B. Assessment against the Clearing Principles

Assessment against the Clearing Principles	Variance level	Is further consideration required?
<b>Environmental value: biological values</b>		
<p><b>Principle (a):</b> "Native vegetation should not be cleared if it comprises a high level of biodiversity."</p> <p><b>Assessment:</b> The proposed clearing area habitat for conservation significant flora and contains regional significant vegetation assemblages.</p>	May be at variance	Yes Refer to Section 3.2.1 and 3.2.2 above
<p><b>Principle (b):</b> "Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna."</p> <p><b>Assessment:</b> The proposed clearing area contains potential foraging and roosting habitat for conservation significant fauna; namely Baudin's Cockatoo (<i>Calyptorhynchus baudinii</i>), Carnaby's Cockatoo (<i>Calyptorhynchus latirostris</i>) and Forest Red-tailed Black-Cockatoo (<i>Calyptorhynchus banksii naso</i>).</p>	Is at variance	Yes Refer to Section 3.2.1 above.
<p><b>Principle (c):</b> "Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora."</p> <p><b>Assessment:</b> The proposed clearing area is unlikely to contain Threatened flora species listed under the BC Act.</p>	Not likely to be at variance	Yes Refer to Section 3.2.2 above.
<p><b>Principle (d):</b> "Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community."</p> <p><b>Assessment:</b> The proposed clearing area is not likely to contain vegetation consistent with a threatened ecological community listed under the BC Act 2016.</p>	Not likely to be at variance	No
<b>Environmental values: significant remnant vegetation and conservation areas</b>		



Assessment against the Clearing Principles	Variance level	Is further consideration required?
<p><u>Principle (e):</u> <i>“Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.”</i></p> <p><u>Assessment:</u> The extent of the mapped pre-European vegetation association and complex, and native vegetation in the local area is with the national objectives and targets for biodiversity conservation in Australia, in constrained areas (being &gt; 10%).</p> <p>Vegetation in the proposed clearing area is not considered to be part of a significant ecological linkage in the local area.</p>	Not likely to be at variance	No
<p><u>Principle (h):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.”</i></p> <p><u>Assessment:</u> Given the small extent of clearing and that the nearest conservation area (Bush Forever site 390) is separated from the application area by Warton Road, the proposed clearing is not likely to have an impact on the environmental values of nearby conservation areas, subject to appropriate weed control and dieback measures being taken during the clearing.</p>	Not likely to be at variance	No
<b>Environmental values: land and water resources</b>		
<p><u>Principle (f):</u> <i>“Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.”</i></p> <p><u>Assessment:</u> The application area intersects a mapped wetland, and includes vegetation associated with swamps (i.e. <i>Melaleuca pressiana</i>), however, ecological and water quality impacts to this wetland are unlikely to be significant.</p>	At variance	Yes: refer to Section 3.2.3 above.
<p><u>Principle (g):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.”</i></p> <p><u>Assessment:</u> The mapped soils are highly susceptible to wind erosion and nutrient export, and soils beyond 2 m below the natural soil surface have a high to moderate risk of acid sulfate soils. However, noting the extent of clearing and proposed management actions to stabilise soils retain adjacent patches of vegetation the proposed clearing is not likely to have an appreciable impact on land degradation.</p>	Not likely to be at variance	Yes: refer to Section 3.2.3 above.
<p><u>Principle (i):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.”</i></p> <p><u>Assessment:</u> Although soils within the site are susceptible to nutrient export and acid sulfate soils and the presence of groundwater and surface water receptors within and surrounding the application area, the proposed clearing is unlikely to result in deterioration of groundwater or surface water quality due to the small extent of clearing and proposed management actions to stabilise soils and retain adjacent patches of vegetation.</p>	Not likely to be at variance	Yes: refer to Section 3.2.3 above.
<p><u>Principle (j):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.”</i></p> <p><u>Assessment:</u> Based on the mapped soils and topographic contours of the application area, in addition to the small scale of clearing and retention of vegetation within the broader site, the proposed clearing is not likely to contribute to increased incidence or intensity of flooding or waterlogging.</p>	Not likely to be at variance	No

### Appendix C. Vegetation condition rating scale

Vegetation condition is a rating given to a defined area of vegetation to categorise and rank disturbance related to human activities. The rating refers to the degree of change in the vegetation structure, density and species present in relation to undisturbed vegetation of the same type. The degree of disturbance impacts upon the vegetation's ability to regenerate. Disturbance at a site can be a cumulative effect from a number of interacting disturbance types.

### Measuring Vegetation Condition for the South West and Interzone Botanical Province (Keighery, 1994)

Condition	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, with disturbance affecting individual species; weeds are non-aggressive species.
Very Good	Vegetation structure altered, with obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and/or grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and/or grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and/or grazing.
Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

## Appendix D. Justification for the values used in the offset calculator

Field Name	Description	Justification for value used
<i>IUCN Criteria</i>	The IUCN criteria for the value being impacted	<b>1.2%</b> - Afforded to Carnaby's cockatoo habitat as this species is listed as Endangered under the <i>Wildlife Conservation Act 1950</i> and the <i>Environment Protection and Biodiversity Conservation Act 1999</i> .
<i>Area of impact (habitat/community) or Quantum of impact (features/individuals)</i>	The area of habitat/community impacted or number of features/individuals impacted	BaETLW(-B): <b>0.38 ha</b> EmBaLW(-B): <b>0.3 ha</b> BaEtLW: <b>0.01 ha</b> EmBaLW: <b>0.15 ha</b> Calculated from areas of mapped vegetation units
<i>Quality of impacted area (habitat/community)</i>	The quality score for area of habitat/community being impacted - a measure of how well a particular site supports a particular threatened species or ecological community and contributes to its ongoing viability	BaETLW(-B): <b>4</b> EmBaLW(-B): <b>4</b> BaEtLW: <b>7</b> EmBaLW: <b>6</b> Based upon scores in <i>Black-cockatoo Foraging Habitat Assessment</i> (Focussed Vision Consulting, 2020)
<i>Time over which loss is averted (habitat/community)</i>	This describes the timeframe over which changes in the level of risk to the proposed offset site can be considered and quantified	<b>20</b> - The offset site would be conserved in perpetuity under conservation estate. 20 years is the maximum value associated with this field.
<i>Time until ecological benefit (habitat/community) or Time horizon (features/individuals)</i>	This describes the estimated time (in years) that it will take for the main benefit of the quality (habitat/community) or value (features/individuals) improvement of the proposed offset to be realised	<b>1</b> - Provides for up to 12 months for land acquisition, to complete the change in reserve purpose or put in place a conservation covenant.
<i>Start area (habitat/community) or Start value (features/individuals)</i>	The area of habitat/community or number of features/individuals proposed to offset the impacts	To mitigate impacts by 100%, the following areas of revegetation is required for each vegetation unit being impacted: BaETLW(-B): <b>1.34 ha</b> EmBaLW(-B): <b>1.06 ha</b> BaEtLW: <b>0.06 ha</b> EmBaLW: <b>0.79 ha</b> The total = <b>3.25 ha</b> - This is the area required to offset the total area of impact.
<i>Start quality (habitat/community)</i>	The quality score for the area of habitat/community proposed as an offset - a measure of how well a particular site supports a particular threatened species or ecological community and contributes to its ongoing viability	<b>8</b> - Assuming a site has been identified with vegetation in excellent quality condition that provides suitable foraging habitat for Carnaby's cockatoo.

<i>Future quality without offset (habitat/community) or Future value without offset (features/individuals)</i>	The predicted future quality score (habitat/community) or value (features/individuals) of the proposed offset site without the offset	<b>8</b> - As the offset site already exists, the quality of the habitat is unlikely to change as a result of the proposed change in reserve purpose over the next 12 months.
<i>Future quality with offset (habitat/community) or Future value with offset (features/individuals)</i>	The predicted future quality score (habitat/community) or value (features/individuals) of the proposed offset site with the offset	<b>8</b> - As the offset site already exists, it is assumed it would be maintained at its current quality.
<i>Risk of loss (%) without offset (habitat/community)</i>	This describes the chance that the habitat/community on the proposed offset site will be completely lost (i.e. no longer hold any value for the protected matter of concern) over the foreseeable future without an offset	<b>30%</b> - As the offset site is unknown, it is assumed that there is a reasonable risk that the offset site could be developed in accordance with the current purpose.
<i>Risk of loss (%) with offset (habitat/community)</i>	This describes the chance that the habitat/community on the proposed offset site will be completely lost (i.e. no longer hold any value for the protected matter of concern) over the foreseeable future with an offset	<b>10%</b> - Securing the land parcel within conservation estate should reduce the risk of loss to 10%. The risk of catastrophic events (fire, dieback etc.) remain.
<i>Confidence in result (%) – risk of loss (habitat/community)</i>	The capacity of measures to mitigate risk of loss of the proposed offset site	<b>90%</b> - There is a high level of confidence that securing in conservation estate would mitigate the risk of loss.
<i>Confidence in result (%) – Change in quality (habitat/community) or Change in value (features/individuals)</i>	The level of certainty about the successful achievement of the proposed change in quality (habitat/community) or value (features/individuals)	<b>100%</b> - Not applicable as the offset will not result in a change in quality.
<i>% of impact offset</i>	% of the significant residual impact that would be offset by the proposed offset (note: the offset calculations combined should equate to 100% for each residual impact)	To mitigate impacts by <b>100%</b> , the following areas of land acquisition are required for each vegetation unit being impacted: BaETLW(-B): 1.34 EmBaLW(-B): 1.06 BaEtLW: 0.06 EmBaLW: 0.79
<i>Other comment</i>	N/A	Based on the above, acquisition of a total of <b>3.25 hectares</b> of suitable property that provide foraging habitat for Carnaby's black cockatoo, forest red-tailed black cockatoo and Baudin's black cockatoo. will mitigate impacts by 100%. This amounts to a monetary contribution of <b>\$55,690.15</b> based on the Valuer General's market valuation (as of November 2019) of unimproved (vegetated) land in the Shire of Wandering for a land parcel size of 5 hectares.

**Appendix E. Biological survey information excerpts / photographs of the vegetation**

Table E-1 – Description of vegetation types within the application area (Coterra, 2020, based on Focused Vision Consulting, 2020a)

Vegetation Unit and Description
Native Vegetation
<p><b>EmBaLW</b></p> <p>Low Woodland A of <i>Eucalyptus marginata</i> subsp. <i>marginata</i> over <i>Banksia attenuata</i>, <i>Banksia menziesii</i>, <i>Allocasuarina fraseriana</i> and <i>Nuytsia floribunda</i> and Low Scrub B dominated by <i>Xanthorrhoea preissii</i> or Dwarf Scrub C dominated by <i>Hibbertia hypericoides</i> over Tall Grass dominated by <i>Avena barbata</i> and <i>Ehrharta calycina</i> in grey sand.</p>
<p><b>BaEtLW</b></p> <p>Low Woodland A of <i>Banksia attenuata</i>, <i>Banksia menziesii</i>, <i>Allocasuarina fraseriana</i>, <i>Nuytsia floribunda</i> and <i>Eucalyptus todtiana</i> over Heath B of mixed taxa dominated by <i>Xanthorrhoea preissii</i> over Open Tall Grass dominated by <i>Ehrharta calycina</i> over Open Herbs dominated by <i>Dasypogon bromeliifolius</i> or <i>Phlebocarya ciliata</i> in grey sand.</p>
<p><b>EmBaLW(-B)</b></p> <p>Low Woodland A of <i>Eucalyptus marginata</i> subsp. <i>marginata</i> over <i>Allocasuarina fraseriana</i>, <i>Nuytsia floribunda</i> and <i>Melaleuca preissiana</i> over Dense Thicket of <i>Kunzea glabrescens</i> over Low Scrub B dominated by <i>Xanthorrhoea preissii</i> or Dwarf Scrub C dominated by <i>Hibbertia hypericoides</i> over Tall Grass dominated by <i>Avena barbata</i> and <i>Ehrharta calycina</i> in grey sand.</p>
<p><b>BaEtLW(-B)</b></p> <p>Low Woodland A of <i>Eucalyptus todtiana</i>, <i>Allocasuarina fraseriana</i> and <i>Nuytsia floribunda</i> over Thicket of <i>Kunzea glabrescens</i> over Low Scrub B dominated by <i>Xanthorrhoea preissii</i> over Open Tall Grass dominated by <i>Ehrharta calycina</i> over Open Herbs dominated by <i>Dasypogon bromeliifolius</i> in grey sand.</p>
<p><b>MpOLW</b></p> <p>Open Low Woodland A of <i>Melaleuca preissiana</i> over Dense Tall Grass of <i>Ehrharta calycina</i>, <i>Eragrostis curvula</i> and <i>Ehrharta longiflora</i> in low lying grey sand over Open Herbs dominated by <i>Arctotheca calendula</i> in low lying grey sand.</p>
<p><b>AcOS</b></p> <p>Open Scrub of <i>Adenanthos cygnorum</i> regrowth over scattered sparse mixed shrubs and herbs.</p>

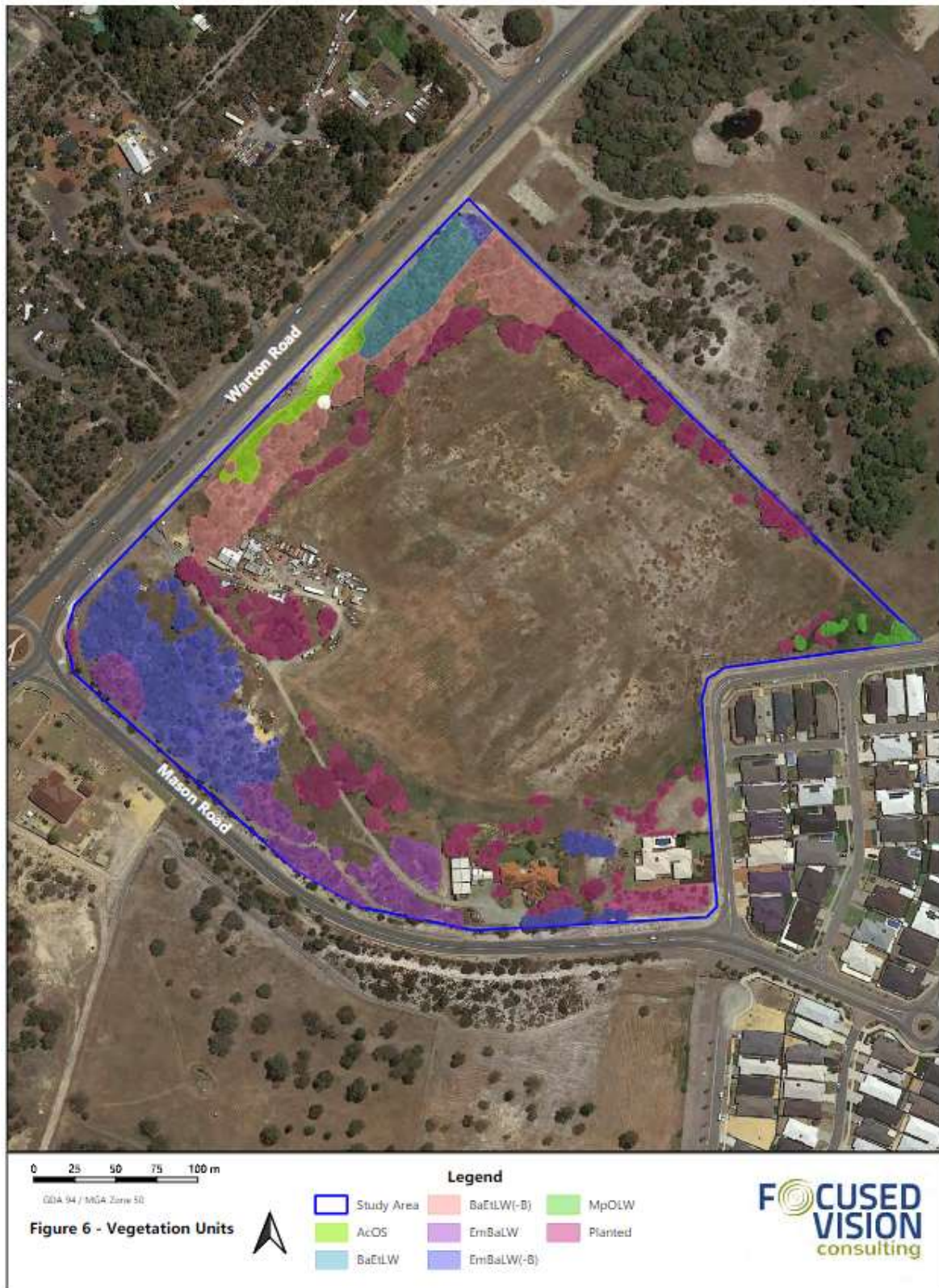


Figure E-1 – Vegetation unit mapping within Lot 9010 on Plan 414089 (Focused Vision Consulting, 2020a)

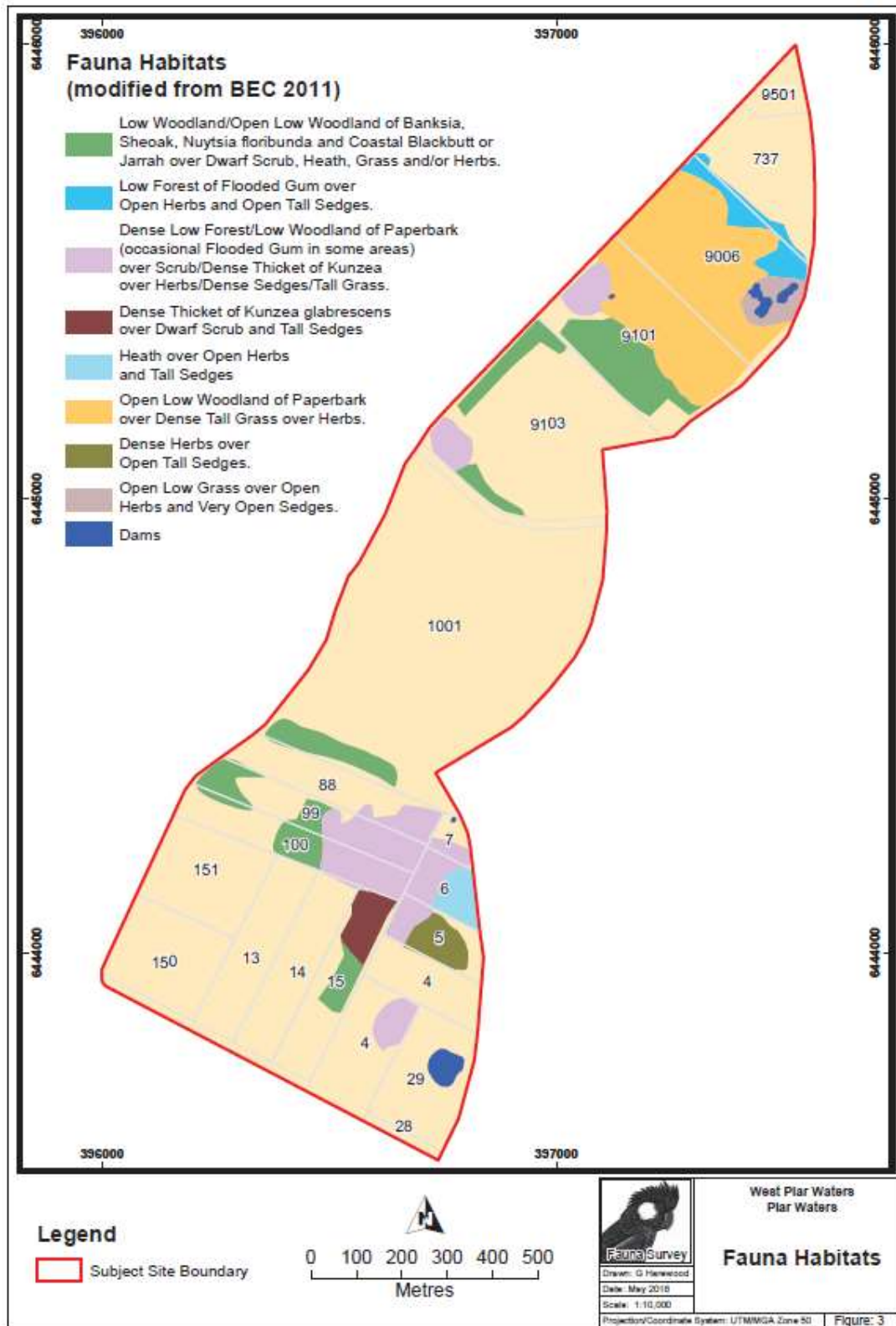


Figure E-2 – Fauna habitat mapping within the application area and surrounds (Harewood, 2018)



0 25 50 75 100 m  
GDA 94 / MGA Zone 50

Figure 7 - Vegetation Condition



**Legend**






 Study Area	 D	 G
 D-CD	 D-G	



Figure E-3 – Vegetation condition mapping within Lot 9010 on Plan 414089 (Coterra, 2020, based on Focused Vision Consulting, 2020a)



## Appendix F. References and databases

### 1. GIS datasets

Publicly available GIS Databases used (sourced from [www.data.wa.gov.au](http://www.data.wa.gov.au)):

- Aboriginal Heritage Places (DPLH-001)
- Cadastre Address (LGATE-002)
- Contours (DPIRD-073)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Flood Risk (DPIRD-007)
- Groundwater Salinity Statewide (DWER-026)
- IBRA Vegetation Statistics
- LiDAR Index External (DWER-045)
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Public Drinking Water Source Areas (DWER-033)
- Regional Parks (DBCA-026)
- Soil and Landscape Mapping – Best Available

Restricted GIS Databases used:

- ICMS (Incident Complaints Management System) – Points and Polygons
- Threatened Flora (TPFL)
- Threatened Flora (WAHerb)
- Threatened Fauna
- Threatened Ecological Communities and Priority Ecological Communities
- Threatened Ecological Communities and Priority Ecological Communities (Buffers)

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