



GOVERNMENT OF  
WESTERN AUSTRALIA

## CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

<b>Purpose Permit number:</b>	CPS 8753/1
<b>Permit Holder:</b>	Commissioner of Main Roads Western Australia
<b>Duration of Permit:</b>	12 August 2020 to 12 August 2035

### ADVICE NOTE

#### Monetary Offset Contribution

The funds referred to in condition 13 of this Permit are intended for contributing towards the purchase of 140 hectares of native vegetation with habitat for Carnaby's cockatoo (*Calyptorhynchus latirostris*) and 93 hectares of native vegetation that is representative of the 'Banksia woodlands of the Swan Coastal Plain' ecological community.

#### Allocation of pre-impact offset site

In 2016 Main Roads Western Australia provided funding to the Department of Biodiversity, Conservation and Attractions to acquire five lots in Lake Clifton as an environmental offset for a historical project, comprising 965 hectares. The entirety of the offset was not required for the project and the offset balance was banked. Main Roads Western Australia has allocated 30.5 hectares of this pre-impact offset site for this project. The offset site is considered to be representative of the 'Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain' ecological community.

The Permit Holder is authorised to clear native vegetation subject to the following conditions of this Permit.

### PART I – CLEARING AUTHORISED

#### 1. Purpose for which clearing may be done

Clearing for the purposes of road reconstruction, widening and associated activities.

#### 2. Land on which clearing is to be done

Property Details	Locality
CROWN RESERVE – 49844	ALKIMOS, NOWERGUP
CROWN RESERVE – 27575	ALKIMOS, CARABOODA, NOWERGUP
ROAD RESERVE - PIN 1139447	NOWERGUP
ROAD RESERVE - PIN 1254856	CARABOODA
ROAD RESERVE - PIN 1139446	NOWERGUP
ROAD RESERVE – PIN 1254857	NOWERGUP
LOT 101 ON DEPOSITED PLAN 416082	NOWERGUP
LOT 120 ON DIAGRAM 91582	CARABOODA
LOT 14040 ON PLAN 221398	NOWERGUP
LOT 2002 ON PLAN 409771	ALKIMOS
LOT 5002 ON PLAN 60315	BUTLER
LOT 586 ON PLAN 69319	NOWERGUP
LOT 587 ON PLAN 69319	NEERABUP
LOT 700 ON DEPOSITED PLAN 405358	NOWERGUP
LOT 813 ON PLAN 61909	RIDGEWOOD
LOT 9515 ON DEPOSITED PLAN 416082	BUTLER
LOT 9602 ON PLAN 409771	ALKIMOS
LOT 9045 ON DEPOSITED PLAN 412098	ALKIMOS

**3. Area of clearing**

The Permit Holder must not clear more than 32.86 hectares of native vegetation within the areas shaded yellow on attached Plan 8753/1a, Plan 8753/1b, Plan 8753/1c and Plan 8753/1d.

**4. Application**

This Permit allows the Permit Holder to authorise persons, including employees, contractors and agents of the Permit Holder, to clear native vegetation for the purposes of this Permit subject to compliance with the conditions of this Permit and approval from the Permit Holder.

**5. Type of clearing authorised**

This Permit authorises the Permit Holder to clear native vegetation for the activities described in condition 1 of this Permit to the extent that the Permit Holder has the power to carry out work involving clearing for those activities under the *Main Roads Act 1930* or any other written law.

**6. Period in which clearing is authorised**

The Permit Holder shall not clear any native vegetation after 12 August 2025.

**PART II –MANAGEMENT CONDITIONS**

**7. 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
- (c) reduce the impact of clearing on any environmental value.

**8. Dieback and weed control**

When undertaking any clearing authorised under this Permit, the Permit Holder must take the following steps to minimise the risk of the introduction and spread of *weeds* and *dieback*:

- (a) clean machines and other vehicles 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
- (c) restrict the movement of machines and other vehicles to the limits of the areas to be cleared.

**9. Fauna management - direction of clearing**

The Permit Holder shall conduct clearing in a slow progressive manner from one direction to the other (e.g. east to west) to allow fauna to move into adjacent native vegetation ahead of the clearing activity.

**10. Wind erosion management**

The Permit Holder must ensure that road widening and associated activities commence within three months of the authorised clearing being undertaken, to reduce the risk of soil erosion by minimising the exposure time of soils prior to construction.

**11. Fauna management - black cockatoo nesting trees**

- (a) Immediately prior to undertaking any clearing authorised under this Permit:
  - (i) the areas shaded yellow on attached Plan 8753/1a, Plan 8753/1b, Plan 8753/1c and Plan 8753/1d shall be inspected by a *fauna specialist* who shall identify *black cockatoo nesting trees*, and
  - (ii) each *black cockatoo nesting tree* identified shall be inspected by a *fauna specialist* for evidence of current or past breeding use by *black cockatoos*.
- (b) Where a *black cockatoo nesting tree(s)* with evidence of current breeding use by *black cockatoos* is identified and cannot be avoided, that tree(s) shall be monitored by a *fauna specialist* to determine when it is no longer in use for that *breeding season*.
- (c) Any *black cockatoo nesting tree(s)* with evidence of current breeding use by *black cockatoos* shall not be cleared while it is in use as determined by the *fauna specialist* under condition 11(b) of this Permit.
- (d) Where a *black cockatoo nesting tree(s)* with evidence of past breeding use by *black cockatoos* is identified and cannot be avoided, that tree(s) shall only be cleared:

- (i) later the same day of the inspection required under condition 11(a)(ii) of this Permit if that inspection does not identify evidence of current breeding use; or
- (ii) later the same day of a repeat inspection undertaken by a *fauna specialist* if that inspection does not identify evidence of current breeding use.

**12. Fauna management - artificial black cockatoo nest hollows**

- (a) Within six months of clearing *black cockatoo nesting trees* identified under condition 11, and before the following *breeding season*, the Permit Holder shall install at least one artificial *black cockatoo* nest hollows for every suitable hollow identified in a *black cockatoo nesting tree(s)* cleared, identified under condition 11;
- (b) The Permit Holder shall install at least 12 artificial *black cockatoo* nest hollows;
- (c) The design and placement of the artificial *black cockatoo* nest hollows must be determined based on the guidelines provided in Schedule 1 and must be installed in consultation with, and on land vested with, the Department of Biodiversity, Conservation and Attractions;
- (d) The Permit Holder must monitor and maintain the installed artificial *black cockatoo* nest hollows for a period of at least ten years; and
- (e) Monitoring and maintenance must be undertaken in accordance with the guidelines provided in Schedule 2.

**13. 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 August 2021, the Permit Holder shall provide documentary evidence to the *CEO* that funding of \$194,600 has been transferred to the Department of Water and Environmental Regulation to purchase land for the purpose of establishing or maintaining native vegetation.

**14. Pre-impact offset site**

The Permit Holder must fund the purchase of 30.5 hectares of native vegetation within the area cross-hatched red on attached Plan 8753/1e (Lot 2240 on Plan 126969 and Lot 2275 on Plan 128612 – Crown Reserve 53178) for inclusion of native vegetation into conservation estate managed by the Department of Biodiversity, Conservation and Attractions.

**15. Revegetation plan**

- (a) Within 12 months of clearing commencing, the Permit Holder must submit a Project Revegetation Plan to the *CEO* for approval for the areas cross-hatched red on attached Plan 8753/1f and Plan 8753/1g, which shall be developed in accordance with *A Guide to Preparing Revegetation Plans for Clearing Permits* (Department of Water and Environmental Regulation (DWER) 2018).
- (b) The Project Revegetation Plan must be prepared by an *environmental specialist*.
- (c) The Project Revegetation Plan must include the following:
  - (i) *site preparation*
  - (ii) *weed control*
  - (iii) *regeneration, direct seeding or planting, at an optimal time*
  - (iv) *a vegetation establishment period*
  - (v) *revegetation success completion criteria* based on *reference sites 1* for the area cross-hatched red on attached Plan 8753/1f and *reference sites 2* for the area cross-hatched red on attached Plan 8753/1g
  - (vi) *revegetation success completion criteria* shall include but not be limited to target weed cover, target vegetation condition, target density and target structure
  - (vii) remedial actions to be undertaken if *completion criteria* are not met
  - (viii) ongoing maintenance and monitoring of the area to be *revegetated* and *rehabilitated*
  - (ix) timeframes for completion of the activities
  - (x) management commitments that will be achieved.

(d) The Permit Holder shall implement the Project Revegetation Plan as approved by the *CEO*.

#### 16. Ecological linkage management

Within 24 months of commencing clearing, the Permit Holder must install a fauna underpass within the area cross-hatched red on attached Plan 8753/1h (Romeo Road reserve) to allow the safe movement of fauna between north and south remnants of native vegetation.

### PART III - RECORD KEEPING AND REPORTING

#### 17. 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)
  - (iv) the purpose for which clearing was undertaken.
  - (v) actions taken in accordance with condition 6 of this Permit
  - (vi) actions taken to avoid, minimise and reduce the impacts and extent of clearing in accordance with condition 7 of this Permit;
  - (vii) actions taken to minimise the risk of the introduction and spread of *weeds* and *dieback* in accordance with condition 8 of this Permit;
  - (viii) activities undertaken in accordance with condition 9 of this Permit;
  - (ix) actions taken in accordance with condition 10 of this Permit;
  - (x) actions taken in accordance with condition 13 of this Permit;
  - (xi) actions taken in accordance with condition 14 of this Permit;
  - (xii) actions taken in accordance with condition 16 of this Permit;
- (b) In relation to fauna management pursuant to condition 11 of this Permit:
  - (i) the time(s) and date(s) of inspection(s) by the *fauna specialist*
  - (ii) a description of the *fauna specialist* inspection methods employed;
  - (iii) the location of each *black cockatoo nesting tree* identified, recorded using a GPS unit set to GDA94, expressing the geographical coordinates in Eastings and Northings or decimal degrees;
  - (iv) a description of the evidence of current or past breeding use observed for each *black cockatoo nesting tree* identified;
  - (v) a photo of each *black cockatoo nesting tree* with evidence of current or past breeding use identified;
  - (vi) for each *black cockatoo nesting tree* with evidence of current breeding use:
    - (1) the time and date it was determined to no longer be in use for that breeding season;
    - (2) the evidence by which it was determined to no longer be in use for that breeding season *nesting tree* with evidence of current or past breeding use was cleared.
  - (vii) the time and date each *black cockatoo nesting tree* with evidence of current or past breeding use was cleared.
- (c) In relation to the installation of artificial *black cockatoo* nest hollows pursuant to condition 12 of this Permit:
  - (i) the date that each artificial *black cockatoo* nest hollow was installed;
  - (ii) the location where each artificial *black cockatoo* nest hollow was installed recorded using a GPS unit set to GDA94, expressing the geographical coordinates in Eastings and Northings or decimal degrees;
  - (iii) a photo of each installed artificial *black cockatoo* nest hollow;
  - (iv) the dates each artificial *black cockatoo* nest hollow installed was monitored;
  - (v) a description of the monitoring methods employed for each artificial *black cockatoo* nest hollow installed;
  - (vi) a description of the monitoring observations for each artificial *black cockatoo* nest hollow installed;

- (vii) the date(s) each artificial *black cockatoo* nest hollow installed was maintained;
  - (viii) a description of the maintenance activities undertaken for each artificial *black cockatoo* nest hollow installed; and
  - (ix) the total number of artificial hollows installed.
- (d) In relation to the *revegetation* and *rehabilitation* of areas pursuant to condition 15 of this Permit:
- (i) a description of the *revegetation* and *rehabilitation* activities undertaken;
  - (ii) the size of the areas *revegetated* and *rehabilitated* (in hectares);
  - (iii) the date that *revegetation* and *rehabilitation* works began; and
  - (iv) actions taken in accordance with condition 15 of this Permit.

#### 18. Reporting

- (a) The Permit Holder must provide to the *CEO* on or before 30 June of each year, a written report:
  - (i) of records required under condition 17 of this Permit; and
  - (ii) concerning activities done by the Permit Holder under this Permit between 1 January to 31 December of the preceding calendar year.
- (b) If no clearing authorised under this Permit has been undertaken, a written report confirming that no clearing under this Permit has been undertaken, must be provided to the *CEO* on or before 30 June of each year.
- (c) Prior to 12 May 2035, the Permit Holder must provide to the *CEO* a written report of records required under condition 17 of this Permit where these records have not already been provided under condition 18(a) of this Permit.

#### DEFINITIONS

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

***black cockatoo(s)*** means Carnaby's cockatoo (*Calyptorhynchus latirostris*) and forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*);

***black cockatoo nesting tree/s*** means trees that have a diameter, measured at 1.5 metres from the base of the tree, of 50 centimetres or greater (or 30 centimetres or greater for *Eucalyptus salmonophloia* or *Eucalyptus wandoo*) that contain hollows suitable for nesting by Carnaby's cockatoo, Baudin's cockatoo or forest red-tailed black cockatoo;

***breeding season*** means the period from 1 June to 29 February of any given year;

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

***completion criteria*** means a measurable outcome based on suitable *reference sites*, used to determine revegetation/*rehabilitation* success

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

***direct seeding*** means a method of re-establishing vegetation through the establishment of a seed bed and the introduction of seeds of the desired plant species;

***environmental specialist*** means a person who holds a tertiary qualification in environmental science or equivalent, and has experience relevant to the type of environmental advice that an environmental specialist is required to provide under this Permit, or who is approved by the *CEO* as a suitable environmental specialist

***fauna specialist*** means a person who holds a tertiary qualification specialising in environmental science or equivalent, and has a minimum of two years' work experience in fauna identification and surveys of fauna native to the region being inspected or surveyed, or who is approved by the *CEO* as a suitable fauna specialist for the bioregion, and who holds a valid fauna licence issued under the *Biodiversity Conservation Act 2016*.

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

**local provenance** means native vegetation seeds and propagating material from natural sources within 100 kilometres and the same Interim Biogeographic Regionalisation for Australia (IBRA) subregion of the area cleared

**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

**optimal time** means the optimal time for undertaking direct seeding and planting as set out in the table in Schedule 2 of this Permit;

**planting** means the re-establishment of vegetation by creating favourable soil conditions and planting seedlings of the desired species

**quadrat** means a sample plot established for the purpose of data collection and monitoring vegetation characteristics, for example species composition, structure, density and condition

**reference sites 1** means nearby sites used to provide baseline data for planning a revegetation project. Measurements from fixed reference points or plots where biodiversity components are measured are used to set measurable completion criteria for revegetation projects. The *reference sites* must contain the following values:

- (b) Suitable foraging habitat for Carnaby's cockatoo (*Calyptorhynchus latirostris*)
- (c) Vegetation that is representative of the 'Banksia Woodlands' ecological community
- (d) Vegetation in a very good (Keighery, 1994) or better condition

**reference sites 2** means nearby sites used to provide baseline data for planning a revegetation project. Measurements from fixed reference points or plots where biodiversity components are measured are used to set measurable completion criteria for revegetation projects. The *reference sites* must contain the following values:

- (a) Suitable foraging habitat for Carnaby's cockatoo (*Calyptorhynchus latirostris*)
- (b) Vegetation in a very good (Keighery, 1994) or better condition

**rehabilitate/ed/ion/ing** means actively managing an area containing native vegetation in order to improve the ecological function of that area

**revegetate/ed/ion/ing** means the re-establishment of a cover of *local provenance* native vegetation in an area using methods such as natural *regeneration*, *direct seeding* and/or *planting*, so that the species composition, structure and density is similar to pre-clearing vegetation types in that area

**regeneration** means revegetation that can be established from in situ seed banks contained either within the topsoil or seed-bearing mulch;

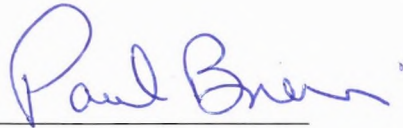
**site preparation** means management of existing site topsoil and preparation of the finished soil surface for revegetation, for example by ripping or tilling the soil surface and respreading site topsoil and chipped native vegetation;

**vegetation condition** means the rating given to native vegetation which refers to the impact of disturbance on each of the layers and the ability of the community to regenerate (Keighery 1994)

**vegetation establishment period** means a period of at least two summers after the revegetation during which time replacement and infill revegetation works may be required for areas in which revegetation has been unsuccessful, and involves regular inspections of revegetation sites to monitor the success of revegetation;

*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 species-led ecological impact and invasiveness ranking summary, regardless of ranking; or
- (c) not indigenous to the area concerned.



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Paul Brown  
ACTING DIRECTOR GENERAL  
DEPARTMENT OF WATER AND ENVIRONMENTAL REGULATION

13 July 2020

# Plan 8753/1a

115°42'36.000"E

115°42'54.000"E

31°36'36.000"S

31°36'36.000"S

31°36'54.000"S

31°36'54.000"S




115°42'36.000"E

115°42'54.000"E


## Legend

### CPS layers

 Areas Approved to Clear

### base layers

 Road Centrelines

 Local Government Authorities



*Paul Brown*  
13/7/2020

Officer delegated under section 20 of the  
Environmental Protection Act 1986



GOVERNMENT OF  
WESTERN AUSTRALIA



# Plan 8753/1b

115°42'36.000"E

115°42'54.000"E

115°43'12.000"E

31°37'12.000"S

31°37'12.000"S

31°37'30.000"S

31°37'30.000"S




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115°42'54.000"E


115°43'12.000"E


## Legend

### CPS layers

 Areas Approved to Clear

### base layers

 Road Centrelines

 Local Government Authorities



0 250 500 m



*Paul Brown*  
13/7/2020

Officer delegated under section 20 of the  
Environmental Protection Act 1986



GOVERNMENT OF  
WESTERN AUSTRALIA

# Plan 8753/1c

115°42'18.000"E

115°42'36.000"E

115°42'54.000"E

31°37'48.000"S

31°37'48.000"S

31°38'6.000"S

31°38'6.000"S

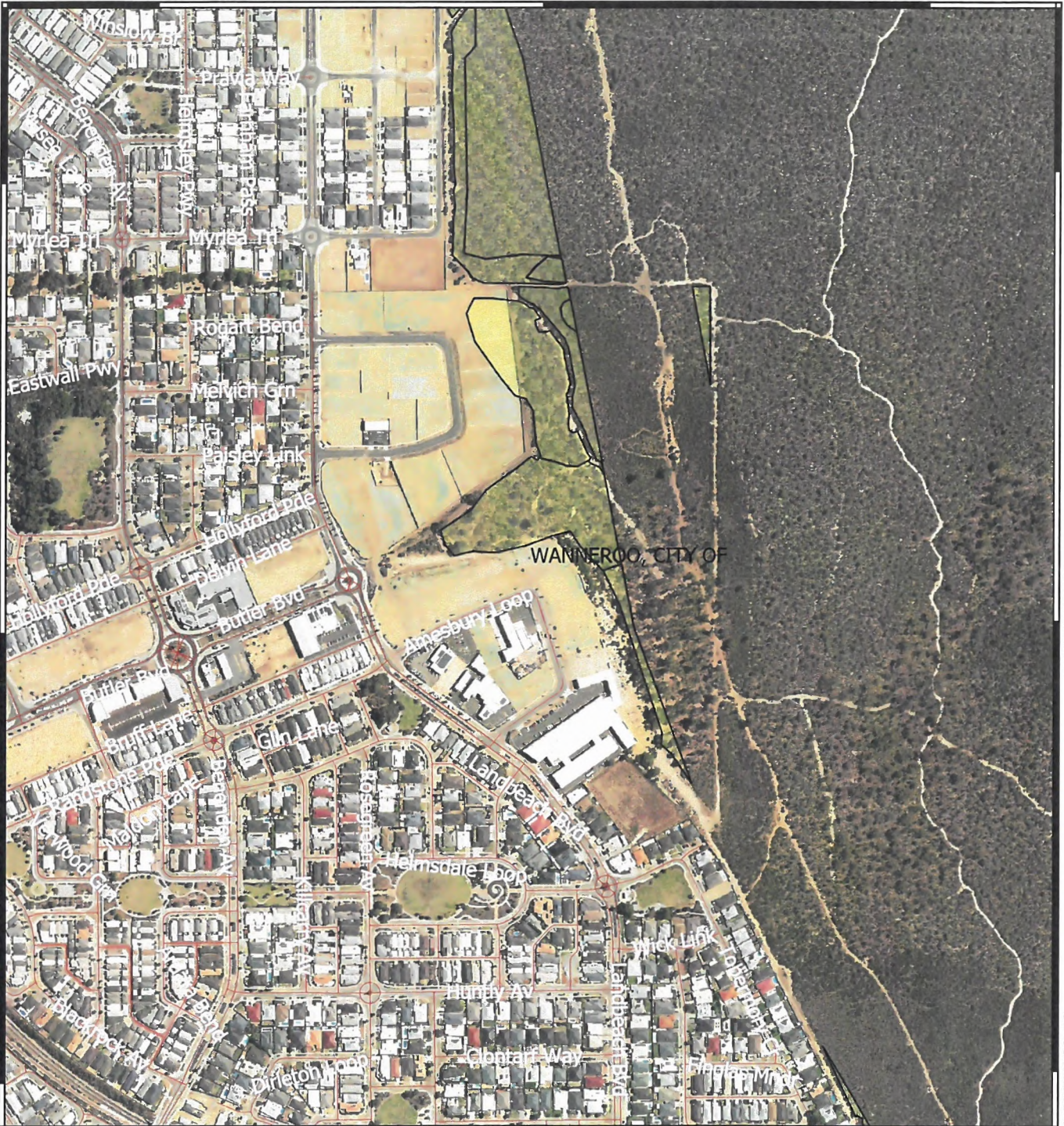
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31°38'24.000"S

115°42'18.000"E


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115°42'54.000"E





## Legend

### CPS layers

 Areas Approved to Clear

### base layers

 Road Centrelines

 Local Government Authorities



*Paul B...*  
13/7/2020

Officer delegated under section 20 of the Environmental Protection Act 1986



GOVERNMENT OF WESTERN AUSTRALIA

# Plan 8753/1d

115°42'54.000"E

115°43'12.000"E

115°43'30.000"E

31°38'24.000"S

31°38'42.000"S

31°39'0.000"S

31°38'24.000"S

31°38'42.000"S

31°39'0.000"S




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115°43'12.000"E


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## Legend

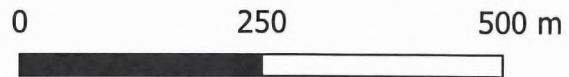
### CPS layers

 Areas Approved to Clear

### base layers

 Road Centrelines

 Local Government Authorities



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13/7/2020

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GOVERNMENT OF  
WESTERN AUSTRALIA

# Plan 8753/1e

115°37'48.000"E

115°38'6.000"E

115°38'24.000"E

115°38'42.000"E

32°45'54.000"S

32°46'12.000"S

32°46'30.000"S

32°45'54.000"S

32°46'12.000"S

32°46'30.000"S





115°37'48.000"E

115°38'6.000"E

115°38'24.000"E

115°38'42.000"E

## Legend

-  Area Subject to Conditions
-  Local Government Authority (LGA) Boundaries (LGATE-233)



0 100 200 m



*Paul Bon*  
13/7/2020

Officer delegated under section 20 of the  
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GOVERNMENT OF  
WESTERN AUSTRALIA



# Plan 8753/1f

115°45'0.000"E

115°45'18.000"E



## Legend

-  Areas Subject to Conditions
-  Road Centrelines

## base layers

LGA Boundaries (LGATE-233)



*Paul Bon*  
13/7/2020

Officer delegated under section 20 of the  
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GOVERNMENT OF  
WESTERN AUSTRALIA

# Plan 8753/1g

115°43'12.000"E

115°43'30.000"E

115°43'48.000"E

115°44'6.000"E

115°44'24.000"E



115°43'12.000"E



115°43'30.000"E

115°43'48.000"E

115°44'6.000"E

115°44'24.000"E

## Legend

-  Areas Subject to Conditions
-  Road Centrelines



0 100 200 m



## base layers

LGA Boundaries (LGATE-233)

*Paul Brun*  
13/7/2020

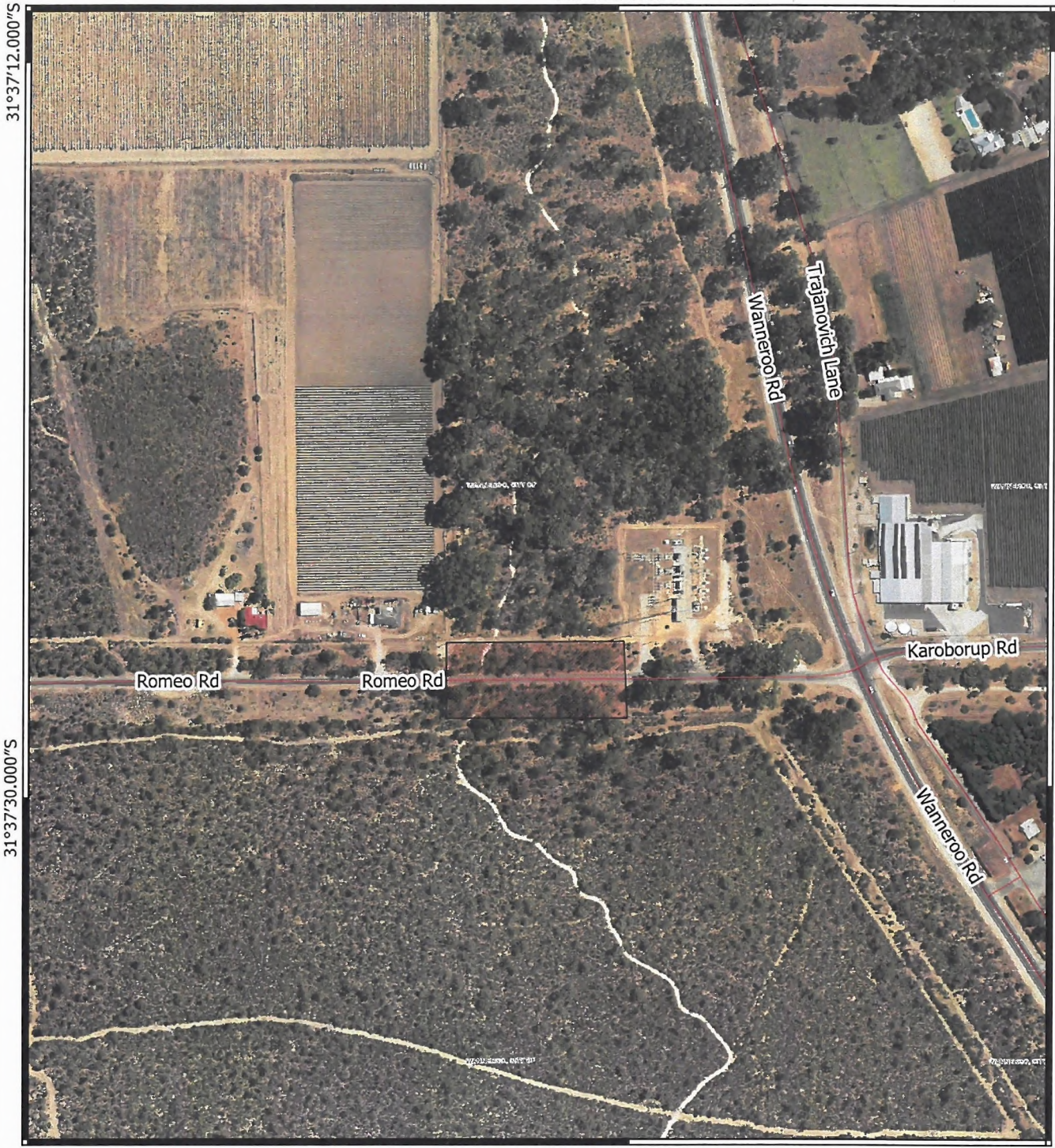
Officer delegated under section 20 of the  
Environmental Protection Act 1986



GOVERNMENT OF  
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# Plan 8753/1h

115°42'54.000"E



115°42'54.000"E

**Legend**

- Areas Subject to Conditions
- Road Centrelines

**base layers**

LGA Boundaries (LGATE-233)

**Scale:** 0 100 200 m

**North Arrow:** N

*Paul Brown*  
13/7/2020

Officer delegated under section 20 of the Environmental Protection Act 1986

GOVERNMENT OF WESTERN AUSTRALIA



## 1. Application details and Decision Summary

### 1.1. Permit application details

Permit application No.: 8753/1  
Permit type: Purpose Permit

### 1.2. Applicant details

Applicant's name: Commissioner of Main Roads WA (Main Roads)  
Application received date: 9 December 2019

### 1.3. Property details

Properties: Various land parcels along Romeo Road and Wanneroo Road in Butler, Carabooda, Nowergup, Neerabup, Ridgewood and Alkimos  
Local Government Authority: City of Wanneroo

### 1.4. Application

Clearing Area (ha)	Method of Clearing	Purpose category:
32.86	Mechanical Removal	Road construction or upgrades

### 1.5 Application Decision on application

Decision on Permit Application: Grant  
Decision Date: 13 July 2020

### Reasons for Decision

The clearing permit application has been assessed against the clearing principles, planning instruments and other matters in accordance with section 51O of the *Environmental Protection Act 1986* (EP Act). It has been concluded that the proposed clearing is seriously at variance with Principle (b), is at variance with Principles (a), (e) and (h), may be at variance with Principle (g), and is not likely to be at variance with the remaining Clearing Principles.

The applicant has implemented or committed to a number of minimisation and mitigation measures, including:

- Installing a dual use fauna / pedestrian underpass at Romeo Road between segregated portions of Neerabup National Park
- Adding 6.735 hectares into Neerabup National Park estate which is currently vested with Main Roads and as unallocated Crown land, as it is surplus to the Mitchell Freeway upgrade requirements
- Limiting vegetation clearing to areas adjacent to existing roads
- Clearing within the median to reduce overall road widening for avoidance of potential fauna habitat trees along Wanneroo Road
- Using steeper batter slopes at a 1:3 ratio to reduce the clearing footprint
- Constructing laydown areas and site offices in areas that have been historically cleared.

Taking into account the above measures, the CEO considers that the following significant impacts remain:

- Loss of 29.39 hectares of critical habitat for Carnaby's cockatoo
- Loss of five tuart trees with 12 hollows of a suitable size for nesting by Carnaby's cockatoo and forest red-tailed black cockatoo
- Loss of up to 19.31 hectares of native vegetation representative of the federally listed Banksia Woodlands of the Swan Coastal Plain (Banksia Woodlands) threatened ecological community (TEC)
- Loss of up to 8.27 hectares of native vegetation representative of the federally listed Tuart (*Eucalyptus gomphocephala*) woodlands of the Swan Coastal Plain (Tuart Woodlands) TEC.

To ensure black cockatoos are not impacted during the clearing process, a condition has been placed on the clearing permit requiring the Permit Holder to check potential habitat trees for the presence of Carnaby's cockatoo and forest red-tailed black cockatoo prior to clearing. Where habitat trees are identified with signs of use and these cannot be avoided, the condition prevents their clearing while in use by these species.

To mitigate impacts associated with the loss of five trees with 12 suitably sized hollows for Carnaby's cockatoo and forest red-tailed black cockatoo nesting, the applicant will be required to install artificial nesting hollows at a ratio of 1:1, which will result in the installation of at least 12 nesting hollows within land managed by the Department of Biodiversity, Conservation and Attractions (DBCA).



The CEO considers that the following revegetation/rehabilitation and land acquisition offsets are adequate to counterbalance the significant residual impacts of clearing:

- Acquisition and conservation of 140 hectares of native vegetation containing:
  - 140 hectares of foraging habitat for Carnaby's cockatoo
  - 93 hectares of native vegetation representative of the Banksia Woodlands TEC
- Revegetation/rehabilitation of 10 hectares within a DBCA managed site adjacent to Neerabup National Park (within Bush Forever Site 383) with species that form part of the Banksia Woodlands TEC and provide habitat for Carnaby's cockatoo
- Revegetation/rehabilitation of 8 hectares within Neerabup Nature Reserve surrounding Lake Nowergup with species that provide habitat for Carnaby's cockatoo (within Bush Forever Site 383)
- Allocation of 30.5 hectares of a banked offset site (Lake Clifton – Crown Reserve 53178), to address the residual impact to the Tuart Woodlands TEC. This requirement has been conditioned on the clearing permit.

As a condition of the clearing permit, the applicant is required to provide a monetary offset contribution, which will be used to acquire 140 hectares of native vegetation that provides the values specified above. Based on desktop analysis, it is considered that acquisition of an appropriate offset site utilising these funds is achievable.

A condition has been placed on the clearing permit which requires the applicant to submit a comprehensive revegetation plan for the 18 hectares of revegetation/rehabilitation proposed, which includes target completion criteria for DWER's approval. The applicant has advised that the revegetation/rehabilitation will be undertaken in consultation with DBCA.

To minimise other potential impacts, the applicant will be required to undertake the following measures as conditions of the Clearing Permit:

- Undertake slow, progressive one directional clearing to allow terrestrial fauna to move into adjacent habitat ahead of the clearing activity
- Implement weed and dieback management measures to reduce the risk of spread
- Undertake road upgrade activities within three months of clearing to reduce the exposure time of bare sandy soils and minimise the risk of land degradation through wind erosion

The CEO also considered the cumulative impacts associated with this application and two other nearby Main Roads clearing permit applications related to the larger Mitchell Freeway extension project (CPS 8861/1 and CPS 8826/1) (assessed concurrently) and the development associated with the larger surrounding Mitchell Freeway extension.

Under Section 51O(3) of the EP Act, the Chief Executive Officer may approve clearing which is seriously at variance with a clearing principle if, and only if, in the CEO's opinion there is a good reason for doing so. In this instance, the CEO considers that the following good reasons exist for granting a clearing permit:

- the road upgrades are necessary for the larger Mitchell Freeway extension project, which has received approval under Part IV of the EP Act and is provided for in the Metropolitan Regional Scheme (MRS). The Mitchell Freeway extension project is understood to provide the following social and economic benefits:
  - improved network connectivity, accessibility and road safety for all road users;
  - reduced travel times for communities north of Burns Beach;
  - a more direct route to Perth's northern suburbs and relieve traffic build up on nearby roads
  - facilitate economic and social development to communities in Perth's northern suburbs
- The impacts of clearing have been avoided or mitigated to the extent practicable
- The significant residual impacts of the clearing have been appropriately offset in accordance with the WA Offsets Policy 2011.

## 2. Site Information

### Clearing Description

The proposed clearing of 32.86 hectares is for the purpose of undertaking road upgrade works at Romeo Road and Wanneroo Road in the City of Wanneroo. The proposed works are required to facilitate the larger Mitchell Freeway extension, which involves extending the Mitchell Freeway between Hester Avenue (south) and Romeo Road (See Appendix 1, Figure 2).

The proposed Mitchell Freeway extension terminates at Romeo Road, and a number of upgrades are required in and around Romeo Road to account for the resulting increased traffic. These upgrades include (GHD, 2019a):

- Road construction of around seven kilometres, including the upgrade of Romeo Road and of Wanneroo Road to a dual carriageway for 5.5 kilometres between Dunstan and Triana Road
- Construction of the intersection at Romeo Road (where the proposed Mitchell Freeway enters)

- Construction of the intersection between Romeo Road and Wanneroo Road
- Installation of culverts, safety barriers and other related infrastructure
- Installation of road reserve fencing.

The applicant notes that the proposed clearing is required to improve accessibility, travel times and road safety (GHD, 2019a). The applicant advised that the application area is predominantly located along existing transport corridors (Wanneroo Road, Joondalup line railway and Romeo Road) as well as established residential areas. A site map of the project area is shown in Appendix 1, Figure 1.

The larger Mitchell Freeway extension project has been designed to support the expansion of Perth's outer northern suburbs. The majority of the larger project was considered under MRS Amendment (992/33), which was assessed by the Environmental Protection Authority (EPA), and approved under Ministerial Statement 629. The clearing permit application area was not included within the MRS amendment.

### Biological Surveys

A larger project area encompassing the application area has been subject to fauna and flora surveys by GHD with the findings encompassed within a larger survey report (GHD, 2019b). The survey's included the following (GHD, 2019b):

- A single season detailed and targeted vegetation and flora assessments and a reconnaissance survey of an extended survey area, herein referred to as Flora Survey 1 (GHD, 2019b). These included;
  - targeted searches for conservation significant flora undertaken over multiple visits between early and late spring (September to November 2018)
  - an additional targeted flora search undertaken in early summer (December 2018)
  - methods undertaken in accordance with the EPA *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment*
- Four fauna field surveys undertaken between August 2018 and February 2019, herein referred to as the Fauna Survey. These included;
  - a habitat assessment (including specific black cockatoo habitat assessment)
  - level 2 fauna trapping and assessment within the extended survey area (diurnal and nocturnal with opportunistic observations also recorded)
  - monitoring of identified black cockatoo habitat trees and monitoring of identified black cockatoo breeding hollows
  - methods undertaken in accordance with the EPA *Technical Guidance – Sampling Methods for Terrestrial Vertebrate Fauna* and *Technical Guidance – Terrestrial Fauna Surveys*

The applicant commissioned GHD to undertake a further finer scale targeted flora survey between 7 and 9 October 2019, herein referred to as Flora Survey 2 (GHD, 2020a). This included:

- A sampling method involving walking traverses spaced approximately 30 to 50 metres apart in areas of native vegetation
- If significant flora were recorded, finer scale and meandering transects would be employed

A follow up targeted Tuart Woodlands TEC assessment (TEC Survey) was undertaken in May 2020, to identify and map areas representative of the Tuart Woodlands TEC in accordance with the *Approved Conservation Advice for the Tuart (Eucalyptus gomphocephala) woodlands and forests of the Swan Coastal Plain ecological community* (Department of the Environment and Energy (DoEE) 2019) (MRWA, 2020b).

The applicant commissioned GHD to undertake a follow up targeted black cockatoo breeding tree assessment between 2 and 4 October 2020 (BCB Survey). This survey involved monitoring 20 trees identified within the abovementioned Fauna Survey as having hollows of a suitable nesting size for black cockatoos (GHD, 2020b).

### Vegetation Description

Based on regional vegetation complex mapping, one vegetation complex is mapped within the application area (Hedde et al., 1980):

- Cottesloe Complex – Central and South is described as a mosaic of woodland of *Eucalyptus gomphocephala* (Tuart and open forest of *E. gomphocephala* – *E. marginata* (Jarrah) – *Corymbia calophylla* (Marri); closed heath on the limestone outcrops.

Flora Survey 1 identified seven vegetation types within the application area as shown below in Table 1.

**Table 1: Vegetation types and condition within the application area (GHD, 2019a)**

Vegetation Type	Description	Area (ha)	Condition	Area (hectares)
<b>Banksia low woodland</b>	Low woodland of <i>Banksia attenuata</i> and <i>Banksia menziesii</i> with occasional <i>Allocasuarina fraseriana</i> and <i>Eucalyptus tottiana</i> over a mid to low shrubland of <i>Hibbertia hypericoides</i> , <i>Xanthorrhoea preissii</i> and <i>Acacia pulchella</i> over open sedgeland and forbland of <i>Mesomelaena pseudostygia</i> , <i>Conostylis aculeata</i> and <i>Desmocladius flexuosus</i> .	17.95	Completely degraded	0.01
			Degraded	2.18
			Good-degraded	1.91
			Good	4.65
			Very good-good	0.44
			Very good	8.76
<b>Banksia sessilis tall closed shrubland</b>	Tall closed shrubland of <i>Banksia sessilis</i> , <i>Melaleuca systena</i> and <i>Calothamnus quadrifidus</i> over shrubland of <i>Xanthorrhoea preissii</i> , <i>Hibbertia hypericoides</i> and <i>Hakea trifurcata</i> over forbland/sedgeland of <i>Desmocladius flexuosus</i> , <i>Conostylis aculeata</i> and <i>Mesomelaena pseudostygia</i> .	0.3	Good	0.1
			Very good-good	0.2
<b>Jarrah tall woodland</b>	Tall woodland of <i>Eucalyptus marginata</i> , <i>Banksia</i> spp. And <i>Allocasuarina fraseriana</i> over shrubland of <i>Hibbertia hypericoides</i> , <i>Xanthorrhoea preissii</i> and <i>Acacia pulchella</i> over a forbland/grassland of <i>Mesomelaena pseudostygia</i> , <i>Desmocladius flexuosus</i> and weedy grasses ( <i>*Ehrharta longiflora</i> and <i>*Briza maxima</i> ).	0.82	Degraded	0.82
<b>Mixed low heathland</b>	Low heath of mixed species dominated by <i>Melaleuca systena</i> , <i>Calothamnus quadrifidus</i> , <i>Acacia lasiocarpa</i> over a mixed dense understorey dominated by <i>Mesomelaena pseudostygia</i> , <i>Desmocladius flexuosus</i> and <i>Lomandra maritima</i> .	1.26	Degraded	0.09
			Good	0.78
			Very good	0.39
<b>Scattered natives over weeds</b>	Areas that have been impacted by previous clearing or grazing and consist of scattered native trees and/or shrubs including <i>Eucalyptus marginata</i> , <i>Eucalyptus gomphocephala</i> , <i>Corymbia calophylla</i> , <i>Banksia</i> sp., and <i>Allocasuarina fraseriana</i> with a scattered mid and lower storey including <i>Acacia</i> sp., <i>Xanthorrhoea preissii</i> and <i>Hibbertia hypericoides</i> over a groundcover completely dominated by introduced grasses and herbs.	8.57	Completely degraded	1.18
			Degraded-completely degraded	6.35
			Degraded	0.86
			Good	0.19
<b>Tuart tall woodland</b>	Woodland of <i>Eucalyptus gomphocephala</i> over sparse shrubland of <i>Xanthorrhoea preissii</i> , <i>Acacia saligna</i> and <i>Rhagodia baccata</i> over a sparse forbland/grassland of weeds.	2.57	Degraded	0.45
			Good-degraded	1.79
			Good	0.33
<b>Tuart/Banksia open woodland</b>	Tall open woodland of <i>Eucalyptus gomphocephala</i> , <i>Banksia attenuata</i> and <i>Allocasuarina fraseriana</i> over a mid to low shrubland of <i>Hibbertia hypericoides</i> , <i>Xanthorrhoea preissii</i> , and <i>Acacia pulchella</i> over open sedgeland and weedy grassland of <i>Mesomelaena pseudostygia</i> , <i>*Bromus diandrus</i> and <i>*Briza maxima</i>	1.38	Good	1.38
<b>Total</b>		32.86		32.86

**Vegetation Condition**

The condition of the vegetation within the application area ranges from very good to completely degraded as summarised in Table 2 below (Keighery, 1994; GHD, 2019a).

**Table 2: Vegetation Condition within the application area**

Vegetation Condition	Extent within the application area (hectares)
Very good - Vegetation structure altered; obvious signs of disturbance (Keighery, 1994)	9.15
Very good to good	0.64

Good - Structure significantly altered by multiple disturbance; retains basic structure/ability to regenerate (Keighery, 1994)	7.43
Good to degraded	3.7
Degraded - Structure severely disturbed; regeneration to good condition requires intensive management (Keighery, 1994)	4.4
Degraded to completely degraded	6.35
Completely degraded - No longer intact, completely/almost completely without native species (Keighery, 1994)	1.19

### Soils and Landform

The application area has been mapped as the following land subsystems (DPIRD, 2017):

- Karrakatta Sand Yellow Phase – described as low hilly to gently undulating terrain with yellow sand over limestone at 1-2 metres.
- Karrakatta Shallow Soils Phase – described as low hills and ridges with bare limestone or shallow siliceous or calcareous sand over limestone.
- Spearwood Sands Phase – described as irregular banks of karst depressions with some limestone outcrops and shallow brown sands.

### 3. Avoidance, minimisation and mitigation measures

The applicant has advised that the upgrade of Romeo Road will prevent more extensive clearing for a new, greenfield road corridor, noting the project has been designed to avoid better condition vegetation in the vicinity, as well as impacts to large trees, threatened and priority ecological communities and conservation significant flora and fauna (GHD, 2019a). The applicant advised that the following measures will be undertaken to avoid/minimise the impact of clearing:

- Utilising existing carriageway as much as possible and clearing within the median, rather than significantly widening beyond the road verges. This has resulted in a reduction in the clearing of trees with a diameter at breast height of greater than 500mm, particularly on the eastern side of Wanneroo Road from 300 metres south of Romeo Road
- Using barriers on the outside edge of the carriageway that allows steeper batter slopes at a 1:3 ratio (greater than recommended 1:4 in the Austroads Guide to Road Design) resulting in a reduced project footprint
- Locating laydown areas and site offices in already cleared areas
- Limiting areas of clearing to land adjacent to existing cleared areas of Wanneroo Road, Romeo Road and urban residential areas to avoid severing patches of native vegetation, including Neerabup National Park
- Modifying road design and drainage, particularly along Wanneroo Road, to minimise the clearing of black cockatoo habitat
- Installing a fauna underpass on Romeo Road to minimise impacts to linkage values
- Adding 6.735 hectares of land not required for the Mitchell Freeway extension to Neerabup National Park and Bush Forever Site 383
- Installing a 1.8 metre fauna exclusion fencing along the boundary of Neerabup National Park to prevent uncontrolled access to Neerabup National Park and minimise the spread of weeds, dieback and fires
- Landscaping with local native plant species suitable as Carnaby's cockatoo foraging habitat to provide a managed buffer between the road corridor and the Neerabup National Park and Neerabup Nature Reserve
- Implementing surface water control measures including swales and culverts to prevent impacts to adjacent vegetation from surface water runoff.

The applicant has prepared a Construction Environmental Management Plan (CEMP) for the larger Mitchell Freeway extension (Hester Avenue to Romeo Road) and has advised that this CEMP will be utilised for the proposed works associated with this application. The applicant has advised that the CEMP includes the following (GHD, 2019a):

#### Vegetation Clearing Management

- Vegetation to be retained will be clearly marked with flagging on site
- Additional areas required for construction such as laydown areas, stockpile areas and vehicle turn around, will be located in areas cleared for permanent works.

#### Fauna Management

- Pre-clearance surveys will be undertaken for all areas of black cockatoo habitat proposed to be cleared within the breeding period of black cockatoos
- Speed limits between 40-80 kilometres per hour will be applied throughout the construction site to reduce the risk of fauna strikes during construction

Other management measures:

- Water carts and/or surface stabilisation measures (e.g. hydro mulch) will be used to minimise dust
- Temporary drainage will be installed to capture and infiltrate surface runoff from construction areas and prevent runoff from entering adjacent native vegetation
- All heavy plant and machinery will be inspected at entry and exit of the work site and be confirmed to be clean and free of vegetation and soil material
- Dieback management
- Weed control, specifically targeting Weeds of National Significance and Declared Pests. The application area would also be subject to yearly Main Roads weed spraying program.

**4. Assessment of application against clearing principles, planning instruments and other matters**

**(a) Native vegetation should not be cleared if it comprises a high level of biodiversity.**

**Proposed clearing is at variance with this Principle**

CEO's Key Considerations

It is considered that the application area contains a high level of biodiversity, as it contains the following values:

- 29.39 hectares of critical habitat for Carnaby's cockatoo
- 19.31 hectares of vegetation that is representative of the federally listed Banksia Woodlands TEC/PEC
- 8.27 hectares of vegetation that is representative of the federally listed Tuart Woodlands TEC/PEC
- 1.95 hectares of vegetation that is representative of the Spearwood Shrublands PEC
- Ecological linkage values within a highly cleared landscape

The applicant has provided the following offset measures to counterbalance impacts to the Banksia Woodlands TEC, Carnaby's cockatoo habitat and Tuart Woodlands TEC (detailed under Section 5):

- Revegetation/rehabilitation of 18 hectares within DBCA managed sites adjacent to Neerabup National Park
- Providing a monetary contribution for the acquisition of 140 hectares of native vegetation that is representative of the Banksia Woodlands TEC and contains Carnaby's cockatoo habitat
- Allocation of 30.5 hectares of a banked offset site that is representative of the Tuart Woodlands TEC

As a condition of the Clearing Permit, the applicant will be required to undertake the following measures:

- Install a dual use pedestrian/fauna underpass around the portion of Romeo road proposed for upgrade, to mitigate impacts to ecological linkage values and allow the safe north-south movement of fauna.
- Undertake weed and dieback management measures to limit their spread

Additional fauna management requirements are outlined under Principle (b).

In considering impacts to biodiversity the CEO took into account that the road upgrades are required to ensure road safety and form part of the larger Mitchell Freeway extension upgrades.

**Threatened and Priority Flora**

There are records of 22 conservation significant flora species (threatened and priority) within the local area (10 kilometre radius surrounding the application area) (see Appendix 2). Flora Survey 1 identified seven priority and one threatened flora species within the larger survey area (see Table 2). None of these records occur in the application area. The closest record is *Leucopogon* sp. Yanchep (P3), located around 30 metres from the application area (GHD, 2019b).

The application area provides suitable habitat for an additional seven species not recorded during Flora Survey 1, which are known from the local area (defined as a 10 kilometre radius surrounding the application area) (see Table 3) (DBCA, 2020; GHD, 2019b).

**Table 2.** Conservation significant flora recorded in the larger survey area (not within the application area)

Taxon	Conservation Status	Total Number of Known Records	Individuals recorded in larger survey area (outside of the application area)	Individuals recorded in an extended survey area (outside of the application area)
<i>Melaleuca</i> sp. Wanneroo (G.J. Keighery 16705)	Threatened (Vulnerable)	11		3

<i>Baeckea</i> sp. Limestone (N. Gibson & M.N. Lyons 1425)	Priority (P) 1	20 (eight in DBCA managed land)	354	83
<i>Acacia benthamii</i>	P2	28 (12 in DBCA managed land)	15	2
<i>Pimelea calcicola</i>	P3	28 (10 in DBCA managed land)	125	1341
<i>Stylidium maritimum</i>	P3	42 (22 in DBCA managed land)	944	141
<i>Leucopogon</i> sp. Yanchep (M. Hislop 1986)	P3	32 (14 in DBCA managed land)	425	67
<i>Hibbertia spicata</i> subsp. <i>leptotheca</i> (now <i>Hibbertia leptotheca</i> )	P3	36 (10 in DBCA managed land)	73	291

**Table 3.** Additional conservation significant flora with potential to occur in the application area

Taxon	Conservation Status	Total Number of Known Records
<i>Eucalyptus argutifolia</i>	Threatened (Vulnerable)	42
<i>Leucopogon maritimus</i>	P1	17
<i>Fabronia hampeana</i>	P2	6
<i>Conostylis bracteata</i>	P3	14
<i>Austrostipa mundula</i>	P3	14
<i>Jacksonia sericea</i>	P4	57
<i>Conostylis pauciflora</i> subsp. <i>euryrhipis</i>	P4	30

DBCA provided comment on the findings of Flora Survey 1 and noted that the search for conservation significant flora comprised transects of 100 metres, and may not have identified some of the above species should they have occurred between transects (DBCA, 2020).

To support Flora Survey 1, the applicant commissioned GHD to conduct a finer scale targeted flora survey of the application area in October 2019 (Flora Survey 2) (GHD, 2020a). Flora Survey 2 comprised transects spaced between 30 to 50 metres apart in areas of native vegetation. The targeted survey did not identify any threatened or priority flora species (GHD, 2020a) and it is considered that the survey would have identified the species listed in Tables 2 and 3 should they have occurred within the application area.

### Threatened and Priority Ecological Communities

Flora Survey 1 identified three state listed priority ecological communities (PEC) within the application area. Two of these PEC's are considered to align with federally listed TEC's under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). These TEC/PEC's are shown in table 4 below:

**Table 4.** TEC's and PEC's recorded in the Application Area (GHD, 2019a, GHD, 2020b).

TEC/PEC name	Conservation status	Recorded extent within application area (hectares)
<p><u>PEC listing:</u> 'Banksia dominated woodlands of the SCP IBRA region'</p> <p><u>TEC listing:</u> 'Banksia woodlands of the Swan Coastal Plain'</p> <p>(Herein collectively referred to as Banksia Woodland PEC/TEC)</p>	<p><u>TEC listing:</u> Endangered under the EPBC Act</p> <p><u>PEC listing:</u> P3 classified by DBCA</p>	<p>19.31 representative of the PEC</p> <p>16.66 representative of the TEC</p>
<p><u>PEC listing:</u> 'Tuart (<i>Eucalyptus gomphocephala</i>) woodlands of the Swan Coastal Plain'</p> <p><u>TEC listing:</u> 'Tuart (<i>Eucalyptus gomphocephala</i>) woodlands and forests of the Swan Coastal Plain'</p> <p>(Herein collectively referred to as Tuart Woodlands PEC/TEC)</p>	<p><u>TEC listing:</u> Endangered under the EPBC Act</p> <p><u>PEC listing:</u> P3 classified by DBCA</p>	<p><u>Flora Survey 1:</u> Initially up to 2.57 hectares determined to be potentially representative</p> <p><u>TEC Survey:</u> 8.27 representative of the TEC/PEC</p>

Northern Spearwood shrublands and woodlands (floristic community type 24) (Northern Spearwood Shrublands)	P3 listed by DBCA	1.56
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#### Tuart Woodland PEC/TEC

The supporting information provided by the applicant noted that the Tuart tall woodland vegetation type (comprises 2.57 hectares) identified in Flora Survey 1, is potentially representative of the Tuart Woodlands TEC (GHD, 2019a). However detailed analysis was not undertaken as part of that survey as the TEC was not listed at that time (GHD, 2019a). The applicant subsequently commissioned a follow up TEC Survey to identify and map areas representative of the Tuart Woodlands TEC. The TEC survey identified 8.27 hectares of native vegetation representative of the Tuart Woodlands TEC within the application area (GHD, 2020b).

It is estimated that around 80-86 per cent of the TEC has been lost as a result of clearing for agriculture, grazing, logging, mining and urban development (TSSC, 2019). All remaining patches have been disturbed to some degree and are at risk of losing further plant and animal species unless they are conserved and managed to prevent further degradation (TSSC, 2019). Given the high level of past damage to the ecological community and ongoing risk of degradation, the community is likely to be completely lost if it is not protected and restored (TSSC, 2019).

Based on the approved conservation advice for this TEC, it is considered that impacts to 8.27 hectares of this TEC/PEC is significant. The applicant has proposed to allocate 30.5 hectares of a banked offset site to address this impact as outlined under Section 5.

#### Banksia Woodland TEC/PEC

Flora Survey 1 recorded 19.31 hectares of the state listed Banksia Woodlands PEC, which corresponds with the recorded Banksia woodland vegetation type and the majority of the Tuart/Banksia woodland vegetation type. Of this 19.31 hectares, 16.66 hectares was deemed to be representative of the federally listed Banksia Woodland TEC (GHD, 2019a).

DBCA notes that the description, area and condition thresholds that apply to the TEC also apply to the state listed PEC and the area of PEC should match that of the TEC (DBCA, 2020). Therefore, it is considered that the proposed clearing may impact on 19.31 hectares of the Banksia Woodland TEC.

This extent of this community has declined significantly and it is estimated that up to 60 per cent has been lost, with most remaining patches of small size (TSSC, 2016). Clearing for development has been identified as a key threatening process for this community, and conservation efforts are focused on protecting, managing and restoring the best surviving remnants (TSSC, 2016).

Based on the approved conservation advice for this TEC, it is considered that impacts to 19.31 hectares of this TEC/PEC is significant. The applicant has proposed to undertake 10 hectares of revegetation and provide a monetary offset contribution to address this impact, as outlined under Section 5.

#### Northern Spearwood Shrublands

Flora Survey 1 recorded 1.56 hectares of this PEC within the application area, corresponding with the '*Banksia sessilis* tall closed shrubland' (0.3 hectares) and 'mixed low heathland' (1.26 hectares) vegetation types. This PEC is known from around 1009.5 hectares and the application area comprises 0.12 per cent of the total known occurrence of this PEC. Noting this, the proposed clearing is not likely to significantly impact on the known occurrence of the PEC.

#### Melaleuca Shrublands TEC

As discussed under Principle (d), Flora Survey 1 identified several occurrences of the *Melaleuca huegellii* – *Melaleuca systema* shrublands on limestone ridges (Melaleuca Shrublands), SCP26a, which is a state listed TEC (endangered). None of these occurrences were recorded in the application area, with the closest occurrence around 40 metres from the application area (GHD, 2019a).

As a condition of the Clearing Permit, the applicant will be required to undertake weed and dieback management measures to ensure that the risk of indirect impacts to this community are minimised.

## Threatened and Priority Fauna

As discussed under Principle (b), the Fauna Survey recorded five conservation significant fauna species within the larger survey area, and an additional two species were considered likely to occur (GHD, 2019b).

### Recorded

- Carnaby's cockatoo (*Calyptorhynchus latirostris*) (Endangered under the BC Act and EPBC Act)
- Forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*) (Vulnerable under the BC Act and EPBC Act)
- Peregrine falcon (*Falco peregrinus*) (Other Specially Protected under the BC Act)
- Southern brown bandicoot (*Isodon fusciventer*) (state listed as Priority 4)
- Western brush wallaby (*Notamacropus Irma*) (state listed as Priority 4)

### Likely to Occur

- Black-striped snake (*Neelaps calonotos*) (State listed as Priority 3)
- Jewelled south west Ctenotus (*Ctenotus gemmula*) (Swan Coastal Plain population) (state listed as Priority 3)

It is considered that the application area provides critical habitat for Carnaby's cockatoo, as it provides 29.39 hectares of foraging habitat and five trees with 12 suitably sized nesting hollows within a highly fragmented landscape. The application area is also within 12 kilometres of a known Carnaby's cockatoo breeding site. The applicant has proposed offset measures to address the impact to Carnaby's cockatoo as outlined under Section 5. Management measures relating to the other fauna species referred to above have been described under Principle (b).

## Ecological Linkages

The application area forms part of a north south regionally significant ecological linkage (Conceptual Linkage) defined by the Gngangara Sustainability Strategy (2009) (see Appendix 1, Figure 4). Conceptual linkages are proposed ecological linkages based on past studies and new linkages across the landscape with less than 60 per cent native vegetation retained or on core landscapes that are predominantly over private property (Brown et al., 2009). A significant portion of the linkage follows Neerabup National Park which forms a broadly contiguous north-south remnant of native vegetation, before extending further north to Yanchep National Park.

This linkage connects Neerabup National Park to Yanchep National Park, as well as other remnants (including bush forever areas) within a highly fragmented landscape. The vegetation within the application area is therefore likely to contribute to the movement of fauna and ecological processes between these areas. It is noted that the existing Romeo Road has already severed the linkage, and the proposed clearing will further widen this separation distance.

In considering the impacts to ecological linkages, it is further acknowledged that those portions of the linkage located immediately north, comprising larger remnants of native vegetation, have been zoned as 'Central City Area' and 'Primary Regional Roads' under the MRS, and are therefore scheduled for future development. The impact on the larger Mitchell Freeway extension on linkage values in the local area is also acknowledged.

The applicant has proposed a dual use pedestrian/fauna underpass (approximately 2.7 metres high by 4.6 metres wide) to assist in maintaining the north south linkage around the portion of Romeo road proposed for upgrade, and allow for the safe passage of fauna. Similar underpasses have been used by the applicant for a project to upgrade Neerabup Road south, to reduce impacts to fauna linkage values.

## Conservation Areas

As discussed under Principle (h), the application area (western boundary) includes 4.865 hectares of native vegetation within Neerabup National Park (Class A Reserve, R 27575). This area is the subject of a historical Scheme Amendment which included a rezoning process involving the excision of this portion of land from the National Park boundary. As part of a number of agreed excisions and additions from the National Park, the applicant has committed to adding 6.735 hectares of land surplus to the Mitchell Freeway upgrade requirements into Neerabup National Park estate. The revegetation/rehabilitation of 18 hectares within DBCA managed land adjacent to Neerabup National Park, will also help to offset the loss of biodiversity within conservation areas.

## Weeds and Dieback

Flora Survey 1 identified five weed species listed as Declared Pests under the *Biosecurity and Agricultural Management Act 2007*, with three of these species also listed as Weeds of National Significance (WoNS). Flora Survey 1 notes that Dieback is also likely to be present within the application area (GHD, 2019b).



The applicant has advised that the risk of spreading weeds will be managed as part of the CEMP for the larger Mitchell Freeway extension project, which includes the following measures (GHD, 2019a):

- All heavy plant and machinery will be inspected at entry and exit of the work site and be confirmed to be clean and free of vegetation and soil material
- Weed control will be undertaken during works as part of the CEMP, specifically targeting WoNS and Declared Pests. The application area will also be subject to the yearly Main Roads weed spraying program.

The applicant will be required to undertake weed and dieback management measures to minimise the risk of spread into adjacent native vegetation and nearby conservation areas.

**(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.**

**Proposed clearing is seriously at variance with this Principle**

CEO's Key Considerations

The application area comprises significant habitat for fauna as it contains the following values:

- 29.39 hectares of critical foraging habitat for Carnaby's cockatoo which includes;
  - 17.95 hectares of preferred Banksia woodland foraging habitat on the Swan Coastal Plain
  - 17.22 hectares of foraging habitat in a very good or good condition
  - Foraging habitat within 12 kilometres of a known breeding site in a highly cleared landscape
  - Five trees with 12 suitably sized nesting hollows for Carnaby's cockatoo and forest red-tailed black cockatoo
- Ecological linkage values contributing to north south fauna movement between existing remnants

The applicant has provided the following offset measures to counterbalance impacts to Carnaby's cockatoo (detailed under Section 5):

- Revegetation/rehabilitation of 18 hectares within DBCA managed sites adjacent to Neerabup National Park
- Providing a monetary contribution for the acquisition of 140 hectares of native vegetation that contains Carnaby's cockatoo habitat

As a condition of the permit, the applicant will also be required to undertake the following measures:

- Install black cockatoo artificial nesting hollows at a 1:1 ratio which will result in the installation of at least 12 hollows within land managed by DBCA
- Engage a fauna specialist to check habitat trees for the presence of Carnaby's cockatoos and forest red-tailed black cockatoos prior to clearing. The applicant will not be permitted to clear trees where these species have been identified, until a fauna specialist has verified that the hollow/s are no longer being utilised for nesting
- Install a dual use pedestrian/fauna underpass around the portion of Romeo road proposed for upgrade, to mitigate impacts to ecological linkage values
- Slow progressive one directional clearing to allow terrestrial fauna to disperse ahead of the clearing activity should they occur on site at the time of clearing.

**Fauna Habitat Types**

The Fauna Survey identified five fauna habitat types within the application area which are shown in the table below. Banksia woodland was the dominant habitat type (GHD, 2019b):

Fauna Habitat	Area (hectares)
Banksia Woodland	17.95
Tuart Forest	3.95
Jarrah Woodland	0.82
Mixed Heathland	1.57
Scattered natives over weeds (highly disturbed)	8.57
Total	32.86

The Fauna Survey recorded five conservation significant fauna species within the larger survey area with an additional two species considered likely to occur (GHD, 2019b). The application area provides suitable habitat for all seven of these species, as shown below:

#### Recorded

- Carnaby's cockatoo (*Calyptorhynchus latirostris*) (Endangered under the BC Act and EPBC Act)
- Forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*) (Vulnerable under the BC Act and EPBC Act)
- Peregrine falcon (*Falco peregrinus*) (Other Specially Protected under the BC Act and EPBC Act)
- Southern brown bandicoot (*Isodon fusciventer*) (state listed as Priority 4)
- Western brush wallaby (*Notamacropus Irma*) (state listed as Priority 4)

#### Likely to Occur

- Black-striped snake (*Neelaps calonotos*) (State listed as Priority 3)
- Jewelled south west Ctenotus (*Ctenotus gemmula*) (Swan Coastal Plain population) (state listed as Priority 3)

There is the potential for one additional fauna species, *Hesperocolletes douglasi* (Douglas' broad-headed bee), to occur within the application area. Little is known about the preferred habitat for this species, with the singular record in the local area mapped around 9.9 kilometres north east, adjacent to a portion of the Gngangara-Moore River State Forest. The record was noted as being within *Banksia* woodland vegetation in a pristine condition.

It is considered that the application area may provide suitable habitat for this species. However, noting that the application area comprises fragments of *Banksia* woodland vegetation largely adjacent to Neerabup National Park and within close proximity to Gngangara-Moore River State Forest, which contain high quality remnant vegetation, the application area is unlikely to contain significant habitat for this species. It is also noted that bees, in general, are highly mobile and known to have quite variable foraging distance characteristics that are largely driven by the function of the landscape, context and size of the individual.

#### **Carnaby's cockatoo**

Carnaby's cockatoo breeds in flat-topped yate, salmon gum, wandoo, marri, karri, blackbutt, tuart, and introduced eucalypts (for example blue gum) (Commonwealth of Australia, 2012). To be suitable as a breeding site, trees require a suitable nest hollow or be of a suitable diameter at breast height (DBH) to develop a nest hollow. For most tree species, a suitable DBH is 500 millimetres (Commonwealth of Australia, 2012). The Fauna Survey identified a total of 230 potential breeding trees within the application area.

A follow up targeted black cockatoo breeding tree assessment identified that of the above potentially suitable breeding trees, there are five within the application area (all *Eucalyptus gomphocephala*) which contain 12 hollows of a suitable size for nesting. No current nesting use was identified (GHD, 2020b).

The closest confirmed breeding site is around 7.5 kilometres north of the application area. There are nine confirmed roost sites within the local area.

Carnaby's cockatoo forages on the seeds, nuts and flowers of a large variety of plants including Proteaceous species (*Banksia*, *Hakea* and *Grevillea*), as well as *Allocasuarina* and *Eucalyptus* species, *Corymbia calophylla* and a range of introduced species (Valentine and Stock, 2008). The records of foraging activity for Carnaby's cockatoo on the Swan Coastal Plain show that *Banksia* species account for nearly 50 per cent of the diet for this species (Shah, 2006).

The Fauna Survey identified 29.39 hectares of suitable foraging habitat for Carnaby's cockatoo, including all of the recorded *Banksia* woodland, Tuart forest, Jarrah woodland, and mixed heathland habitat types and around 5.11 hectares of the scattered natives over weeds habitat type. Of this, 17.22 hectares is in a good or very good condition and 17.95 hectares provides preferred *Banksia* woodland foraging habitat. Carnaby's cockatoo foraging evidence was recorded within the larger survey area (GHD, 2019b).

The EPA technical advice for Carnaby's cockatoo notes that *Banksia* species (predominantly *Banksia attenuata*, *Banksia menziesii* and *Banksia sessilis*) provide the most important natural food resource on the Swan Coastal Plain (EPA, 2019). The significance of *Banksia* woodland habitat has been confirmed through foraging studies, which determined that Carnaby's cockatoo exploit all areas of available *Banksia* food resources on the Swan Coastal Plain (EPA, 2019). *Banksia* woodland in the Perth metropolitan area has been reduced to one third of its pre-European extent. The remaining portions are fragmented, with the majority (82 per cent) of remnant patches under 10 hectares (EPA, 2019).

The importance of foraging habitat increases when it occurs within foraging distance of nesting sites (12 kilometres), as it supports breeding effort.

Therefore nesting sites, and the foraging habitat and water sources within 12 kilometres of nesting sites, are considered to be habitat critical to the survival of this species (Parks and Wildlife, 2013).

The loss or degradation of foraging habitat within 12 kilometres of nesting sites is considered to pose the greatest risk to Carnaby's cockatoo (Parks and Wildlife, 2013).

Noting the above, the application area provides critical habitat for Carnaby's cockatoo as it contains:

- 29.39 hectares of suitable foraging habitat on the Swan Coastal Plain, of which 17.95 hectares is Banksia woodland and 17.22 hectares is in a good or better condition
- Five trees containing 12 suitably sized nesting hollows
- Foraging habitat within 12 kilometres of known breeding and roosting sites and within a highly cleared landscape

#### **Forest red-tailed black cockatoo**

The forest red-tailed black cockatoo commonly inhabits dense jarrah, karri, and marri forests receiving more than 600 millimetres annual average rainfall (Commonwealth of Australia, 2012). This species also occurs in a range of other forest and woodland types, including blackbutt (*E. patens*), wandoo (*E. wandoo*), tuart (*E. gomphocephala*), Albany blackbutt (*E. staen*), yate (*E. cornuta*), and flooded gum (*E. rudis*). This species mostly feeds on the seeds of marri and jarrah which comprise around 90 per cent of its diet (Commonwealth of Australia, 2012).

This species was identified flying over and foraging on jarrah, marri and *Allocasuarina* within the larger survey area (GHD, 2019b). The Fauna Survey noted the recent expansion of this species into northern portions of the Swan Coastal Plain, where it is now a relatively common occurrence (GHD, 2019b).

Forest red-tailed black cockatoo breeds within tall jarrah, marri, blackbutt, tuart and introduced eucalypt trees within or on the edges of forests. As for Carnaby's cockatoo, the fauna survey's identified a total of 230 potential breeding trees within the application area of which five *Eucalyptus gomphocephala* collectively contain 12 hollows of a suitable size for nesting. No current nesting use was identified (GHD, 2019b, GHD, 2020b).

Preferred foraging habitat for this species is limited to the 'jarrah tall woodland' (0.82 hectares) and the 'scattered natives over weeds' (8.57 hectares) vegetation types, which are largely in a degraded to completely degraded (Keighery, 1994) condition (GHD, 2019a). Noting the above, the application area is unlikely to provide significant habitat for this species.

#### **Peregrine falcon**

The Peregrine falcon is found on and near cliffs, gorges, timbered watercourses, riverine environments, wetlands, plains, open woodlands, and pylons and spires of buildings, though less frequently in desert regions (GHD, 2019a). Two opportunistic sightings of this species were recorded during the Fauna Survey, the closest of which is 100 metres from the application area.

The applicants supporting information notes that the application area provides suitable foraging habitat for this species, however it is not considered to provide core breeding habitat (GHD, 2019a). Noting that this species is a highly mobile species with a large home range that doesn't rely on specialist niche habitats, the proposed clearing is not likely to impact on significant habitat for this species.

#### **Quenda**

Quenda prefer dense scrubby, often swampy, vegetation with dense cover up to one metre high. It also occurs in woodlands, and may use less ideal habitat where this habitat occurs adjacent to the thicker, more desirable vegetation (GHD, 2019a). On the Swan Coastal Plain, quenda are often associated with wetlands. This species was recorded 43 times within the larger survey area, including two records within the application area.

The application area contains woodland and heathland vegetation types that provide suitable habitat for this species. The supporting information notes that the suitable habitat in the application area comprises 24.29 hectares (GHD, 2019a).

While the suitability of habitat for this species is acknowledged, the application area is unlikely to provide significant habitat for this species given the presence of higher quality dense riparian vegetation immediately east and south surrounding Carabooda and Nowergup Lakes, within areas further removed from surrounding development.

#### **Western brush wallaby**

The western brush wallaby inhabits open forest or woodland, particularly favouring open, seasonally wet flats with low grasses and open scrubby thickets. The application area contains woodland habitat (GHD, 2019a) and therefore provides suitable habitat for this species. This species was recorded seven times within the larger clearing footprint, including one record within the application area.

Noting that this species is highly mobile and doesn't rely on specialist niche habitats, the proposed clearing is not likely to impact on significant habitat for this species, particular given that Neerabup National Park (comprises around 950 hectares) is adjacent to the majority of the application area.

#### **Black-striped snake and Jewelled south west Ctenotus (Swan Coastal Plain population)**

Both species are known to occur on areas of deep sands with Banksia woodland and Jarrah woodland habitat, which is considered the preferred habitat for these species (GHD, 2019a). Based on this, the application area provides 20.34 hectares of suitable habitat for these species.

Higher quality habitat for these species exists in the nearby Neerabup (comprises around 950 hectares) and Yanchep National Parks (comprises around 2900 hectares). Therefore the proposed clearing is not likely to impact on significant habitat for these species.

It is considered that these species, the quenda and western brush wallaby, may be subject to individual harm should they be present at the time of clearing. Slow progressive one directional clearing will help to allow these species to disperse ahead of the clearing activity should they occur on site at the time of clearing.

#### **Ecological linkage**

As discussed under Principle (a), the application area forms part of a north south regionally significant ecological linkage (Conceptual Linkage) defined by the Gngangara Sustainability Strategy (2009) (see figure 2).

This linkage connects Neerabup National Park to Yanchep National Park, as well as other remnants (including bush forever areas) within a highly cleared landscape, and the vegetation within the application area is likely to contribute to the movement of fauna and ecological processes throughout these areas. The proposed clearing around Romeo Road would impact most on the linkage values by creating a wider barrier for fauna moving between the northern portions of Neerabup National Park and remnant vegetation on the north side of Romeo Road, including Yanchep National Park. This would increase the risk of fauna being struck by vehicles in attempting to cross Romeo road.

The applicant has proposed a dual use pedestrian/fauna underpass (approximately 2.7 metres high by 4.6 metres wide) to assist in maintaining the north south linkage around the portion of Romeo road proposed for upgrade, and this requirement has been included as a condition on the permit.

It is acknowledged that those portions of the linkage located immediately north, comprising larger remnants of native vegetation, are zoned as 'Central City Area' and 'Primary Regional Roads' under the Metropolitan Regional Scheme, and are therefore likely to be subject to future development. The impact on the larger Mitchell Freeway extension on linkage values in the local area is also acknowledged.

#### **(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora.**

##### **Proposed clearing is not likely to be at variance with this Principle**

According to available databases, there are records of three threatened flora species (under the BC Act) in the local area, *Eucalyptus argutifolia*, *Marianthus paralius* and *Melaleuca* sp. Wanneroo (G.J. Keighery 16705).

One of these species, *Melaleuca* sp. Wanneroo (G.J. Keighery 16705) was recorded (three records) in the larger survey area during Flora Survey 1, with all records around one kilometre east of the southernmost portion of the application area (GHD, 2019b). This species was not identified in a follow up finer scale targeted flora survey (Flora Survey 2) of the application area (GHD, 2020a).

This species occurs on limestone ridges, or higher slope positions at 60 metres or more above sea level, within closed shrubland and heathland comprising other *Melaleuca* species such as *Melaleuca systema*. While the mixed low heathland vegetation type recorded within the application area (comprises 1.26 hectares) aligns with the required vegetation type for this species, this vegetation type was not recorded on clearly defined ridges or topography of more than 40 metres. Therefore, the application area doesn't align with the required habitat for this species (on the basis of known records). Noting this, and the flora survey findings, the application area is not likely to contain this species.

A likelihood of occurrence analysis within Flora Survey 1 noted that *Eucalyptus argutifolia* may occur in the application area as it provides this species required habitat. The closest known record is 3.5 kilometres east of the application area. This species was not identified during Flora Survey 1 or Flora Survey 2 (GHD, 2019b, GHD, 2020a) and is not likely to occur within the application area.

The closest record of *Marianthus paralius* is 3.6 kilometres south west of the application area. This species was not identified during Flora Survey 1 or Flora Survey 2 (GHD, 2019b, GHD, 2020a). This species occurs on low coastal limestone cliffs (Western Australian Herbarium, 1998- ) and is not likely to occur within the application area.

Given the above, and noting the distance to known records of the above species, the proposed clearing is not likely to impact on any threatened flora species.

**(d) 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.**

**Proposed clearing is not likely to be at variance with this Principle**

One state listed threatened ecological community (TEC) was identified within the larger area encompassed by Flora Survey 1, known as *Melaleuca huegelii* - *Melaleuca systema* shrublands on limestone ridges (Gibson et al. 1994 type 26a). Several small scattered occurrences of this community were identified (largely within Neerabup National Park) during Flora Survey 1, with the closest occurrences around 40 metres from the southern portion of the application area (GHD, 2019b). The occurrence of this patch totalled around 0.3 hectares (GHD, 2019b).

The portion of the application area at the closest point to this TEC comprises a relatively thin linear section of around 0.328 hectares, largely in a degraded (Keighery, 1994) condition. This is separated from the recorded TEC patch by remnant vegetation and a four metre wide firebreak/access track.

Noting the above, direct impacts to this TEC as a result of clearing are unlikely. However given the relatively close occurrence of this TEC, there is the potential for the proposed clearing to result in the spread of weeds and dieback into the TEC occurrence. The applicant will be required to undertake weed and dieback management measures to reduce this risk.

As described under Section 2, the applicant has advised that it will undertake the following measures to reduce the risk of spreading weeds and dieback into adjacent native vegetation in line with the CEMP for the larger Mitchell Freeway upgrade project that this application is associated with (GHD, 2019a):

- Heavy plant and machinery will be inspected at entry and exit of the work site and be confirmed to be clean and free of vegetation and soil material
- Weed control will be undertaken during works as part of the CEMP, specifically targeting WoNS and Declared Pests
- The application area will be subject to the annual Main Roads weed spraying program.

Flora Survey 1 did not identify any other known state listed TEC's (GHD, 2019b).

Two federally listed TEC's (state listed as Priority 3 PEC's) have been recorded within the application area, these are known as:

- *Banksia* woodlands of the Swan Coastal Plain ecological community
- Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain ecological community

Given that these communities are not state listed TEC's, impacts to these communities have been described under Principle (a).

The vegetation within the application area is unlikely to represent any known state listed TEC's, and given that the applicant will be required to adhere to weed and dieback management measures, the proposed clearing is unlikely to impact on the *Melaleuca huegelii* - *Melaleuca systema* shrublands on limestone ridges TEC.

**(e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.**

**Proposed clearing is at variance with this Principle**

CEO's Key Considerations

It is considered that the application area is a significant remnant in an extensively cleared area, as it contains the following values:

- 32.86 hectares of native vegetation within a highly cleared landscape subject to multiple known large scale future road upgrade developments
- 29.39 hectares of critical habitat for Carnaby's cockatoo
- 19.31 hectares of vegetation representative of the federally listed Banksia Woodlands TEC/PEC
- 8.27 hectares of vegetation representative of the federally listed Tuart Woodlands TEC/PEC
- Ecological linkage values contributing to north south fauna movement between existing remnants

The applicant has provided the following mitigation measures to address impacts to clearing significant vegetation in a highly cleared area:

- Revegetation/rehabilitation of 10 hectares within a DBCA managed site adjacent to Neerabup National Park
- Revegetation/rehabilitation of 8 hectares within Neerabup Nature Reserve surrounding Lake Nowergup

The applicant has also agreed to provide an offset to address the remaining residual impacts (see Section 5).

As a condition of the permit the applicant will be required to install a dual use pedestrian/fauna underpass around the portion of Romeo road proposed for upgrade to mitigate impacts to ecological linkage values.

While it is acknowledged that the proposed clearing is at variance with this Principle, noting that the application area is within a constrained area, a direct offset in addition to the above mitigation measures is not warranted.

The national objectives and targets for biodiversity conservation in Australia has a target to prevent clearance of ecological communities with an extent below 30 per cent of that present pre-1750, below which species loss appears to accelerate exponentially at an ecosystem level (Commonwealth of Australia, 2001). Within constrained areas (areas of urban development in cities and major towns) on the Swan Coastal Plain, the threshold for representation of the pre-clearing extent of a particular native vegetation complex is 10 per cent (EPA, 2008). The application area is classified as a constrained area.

As indicated in Table 2, the Swan Coastal Plain Interim Biogeographic Regionalisation of Australia (IBRA) bioregion and the Heddle vegetation complex mapped within the application area retain greater than the abovementioned 10 per cent vegetation threshold for constrained areas (Government of Western Australia, 2019a; Government of Western Australia, 2019b).

The local area (taking into account the coastal watermark) retains approximately 44 per cent native vegetation cover (13,527 hectares). The application area represents approximately 0.24 per cent of the remaining native vegetation within the local area and the proposed clearing would reduce the extent of native vegetation within the local area to 13,494.14 hectares.

While the remnant vegetation extents for the local area and mapped vegetation complexes is above the 10 and 30 per cent vegetation thresholds outlined above, the application area is bordered by significant urban development to the west (extending to the coast) and significant agricultural land uses to the east, and is generally considered to occur within an area that has undergone extensive clearing.

Furthermore the cumulative impact of multiple proposals associated with the larger Mitchell Freeway extension have been considered. It is estimated that the project will involve the loss of around 165 hectares of native vegetation from this portion of the Swan Coastal Plain (including the proposed clearing for this application), further contributing to the already extensively cleared landscape.

The application area forms part of a corridor of remnant native vegetation, recognised as a regionally significant ecological linkage (as described under Principles (a) and (b)) within a highly cleared landscape. It also provides significant habitat for Carnaby's cockatoo, and includes occurrences of two federally listed TEC's. Therefore, the application area is considered to be a significant remnant within an extensively cleared area.

The applicant has committed to revegetating/rehabilitating 18 hectares within conservation areas (and Bush Forever Site 383) managed by the Department of Biodiversity, Conservation and Attractions (DBCA) which will help to mitigate the loss of significant remnant vegetation within a highly cleared area.

**Table 5 – Remnant Vegetation Statistics (Government of Western Australia, 2019).**

	Pre-European (ha)	Current Extent (ha)	Remaining (%)	Extent of pre-European extent in DBCA Managed Lands (%)
<b>IBRA Bioregion</b>				
Swan Coastal Plain	1,501,222	579,813	39	15
<b>Vegetation Complex</b>				
Cottesloe Complex – Central and South	45,299	14,568	32	15

**(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.**

**Proposed clearing is not likely to be at variance with this Principle**

There are no wetlands, watercourses or drainage lines located within the application area. The closest wetlands or watercourses to the application area are:

- Carabooda Lake, which is a resource enhancement wetland recorded around 200 metres from the eastern boundary of the application area
- Nowergup Lake, which is a resource enhancement wetland recorded approximately 700 metres from the south eastern boundary of the application area
- Unknown multiple use wetland, recorded around 500 metres from the eastern boundary of the application area.

Flora Survey 1 did not identify any watercourses or wetlands within the application area, and none of the vegetation types identified within the application area are considered to be specifically riparian (GHD, 2019b).

The vegetation within the application area appears to be generally contiguous with that mapped within Carabooda Lake, and there is a risk of weeds and dieback spreading into the vegetation that comprises this wetland. The applicant will be required to undertake weed and dieback management measures to minimise this risk.

Given the above, the vegetation under application is unlikely to impact on, or be growing in, or in association with a watercourse or wetland.

**(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.**

**Proposed clearing may be at variance with this Principle**

The application area has been mapped as the following land subsystems (DPIRD, 2017):

- Karrakatta Sand Yellow Phase – described as low hilly to gently undulating terrain with yellow sand over limestone at 1-2 metres.
- Karrakatta Shallow Soils Phase – described as low hills and ridges with bare limestone or shallow siliceous or calcareous sand over limestone.
- Spearwood Sands Phase – described as irregular banks of karst depressions with some limestone outcrops and shallow brown sands.

According to DPIRDs land degradation risk mapping, these soils are generally considered to present a low risk of water erosion, water logging, flooding and salinity, and a high risk of wind erosion.

Noting the described soils of each mapped landform are largely light sandy substrates (given the lack of wetland habitats within the application area), there is a risk of wind erosion. This may result in appreciable land degradation should the soils remain exposed for an extended period post clearing.

To reduce this risk, as a condition of the Clearing Permit, the applicant will be required to undertake road upgrade activities within three months of clearing to reduce the exposure time of sandy soils.

As part of a CEMP associated with the larger proposed Mitchell Freeway upgrades, which this application is associated with, the applicant has noted that water carts and/or surface stabilisation measures (e.g. hydro mulch)

will be used to minimise dust generated from cleared areas, and in turn reduce the potential for wind erosion (GHD, 2019a).

**(h) 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.**

**The proposed clearing is at variance to this Principle**

CEO's Key Considerations

The proposed clearing will impact on the environmental values of a conservation area, as it will result in the following:

- Loss of 4.865 hectares of native vegetation within the Neerabup National Park
- Loss of 6.18 hectares of native vegetation within Bush Forever Site 383
- Impact on ecological linkage values between conservation areas
- Increase the risk of weeds and dieback spreading into conservation areas.

The excision of the overlapping portions of the application area and the National Park has been endorsed by the Conservation and Parks Commission (vesting authority) and DBCA (land managers), given that these land parcels would be segregated from the bulk of the National Park by the larger Mitchell Freeway road upgrades, and difficult to manage as viable conservation areas.

To minimise impacts to the above conservation areas, as a condition of the Clearing Permit the applicant will be required to undertake the following activities:

- Revegetate/rehabilitate 10 hectares within a DBCA managed site adjacent to Neerabup National Park (within Bush Forever Site 383)
- Revegetate/rehabilitate 8 hectares within Neerabup Nature Reserve surrounding Lake Nowergup (within Bush Forever Site 383)
- Weed and dieback management measures to reduce their spread into surrounding conservation areas
- Install a dual use pedestrian/fauna underpass around the portion of Romeo road proposed for upgrade to mitigate impacts to ecological linkage values.

It is also acknowledged that as part of a number of agreed excisions and additions from Neerabup National Park, the applicant has committed to adding 6.735 hectares of land surplus to the Mitchell Freeway upgrade requirements into Neerabup National Park estate.

The western portion of the application area includes two segregated portions of Neerabup National Park (Class A Reserve, R 27575), being Lots 586 and 587. The proposed clearing would result in the removal of 4.865 hectares of native vegetation from Neerabup National Park.

The application area includes 6.18 hectares of native vegetation (which overlaps with the 4.865 hectares in Neerabup National Park) within Bush Forever Site 383, known as 'Neerabup National Park, Lake Nowergup Nature Reserve and adjacent bushland'. The overlapping portions with Neerabup National Park and Bush Forever Site 383 are largely in a good to very good (Keighery, 1994) condition, and it is considered that the proposed clearing will impact on the environmental values of these areas.

As discussed under Principles (a) and (b), the application area forms part of a regionally significant ecological linkage that helps facilitate the movement of fauna between conservation areas, and particularly Neerabup National park and Yanchep National Park. The proposed clearing will widen the separation distance between remnant vegetation on the either side of Romeo Road, and may impact on safe fauna movement between these conservation areas.

To minimise impacts to the ecological linkage, as a condition of the Clearing Permit the applicant will be required to install a fauna underpass between remnant vegetation on either side of Romeo Road, to facilitate the safe north-south movement of fauna.

The excision of the overlapping portions of the application area and the National Park have been previously considered under Metropolitan Regional Scheme (MRS) Amendment 992/33, assessed by the EPA. The Conservation and Parks Commission (vesting authority) supported the proposed excision of the overlapping areas with the National Park, as did DBCA, noting that these land parcels would be segregated from the bulk of the National Park and difficult to manage as viable conservation areas. The actual final transfer of this 4.865 hectare area to the National Park estate has not yet taken place.



The applicant has committed to revegetating/rehabilitating 10 hectares within a DBCA managed site adjacent to Neerabup National Park and 8 hectares within Neerabup Nature Reserve surrounding Lake Nowergup, with both sites in Bush Forever Site 383. The revegetation/rehabilitation of these areas will help to enhance the environmental values of these conservation areas and support the values of Neerabup National Park.

The proposed clearing may also result in the spread of weeds and dieback into adjacent native vegetation within Neerabup National Park and Bush Forever Site 383.

As described under Section 2, the applicant advised that it will undertake the following measures to reduce the risk of spreading weeds and dieback, in line with the CEMP for the larger Mitchell Freeway upgrades (GHD, 2019a):

- Heavy plant and machinery will be inspected at entry and exit of the work site and be confirmed to be clean and free of vegetation and soil material.
- Weed control will be undertaken during works as part of the CEMP, specifically targeting WoNS and Declared Pests.
- The site will be subject to the annual Main Roads weed spraying program.

As a condition of the Clearing Permit, the applicant will be required to adhere to weed and dieback management measures.

**(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.**

**Proposed clearing is not likely to be at variance with this Principle**

As discussed under Principle (f) there are no wetlands, watercourses or drainage lines located within the application area, with the closest, Carabooda Lake, 200 metres away.

The portion of the application area closest to Carabooda Lake comprises a linear section adjacent to the existing Wanneroo Road, which is in a degraded to completely degraded (Keighery, 1994) condition, and the proposed clearing is not likely to cause deterioration to the surface water quality of this wetland.

As part of the overarching CEMP for the larger Mitchell Freeway extension project, the applicant has advised that temporary drainage will be installed to capture and infiltrate surface runoff from construction areas and prevent runoff from entering adjacent native vegetation, which would minimise the already low risk of sedimentation.

Groundwater salinity within the application is mapped between 500 – 1000 milligrams per litre total dissolved solids which is considered marginal (Mayer, Ruprecht & Bari, 2005). Noting the marginal salinity levels, and that the proposed clearing largely occurs as multiple segments bordered on one boundary by vegetation within Neerabup National Park, the proposed clearing is not likely to result in a perceptible rise in groundwater salinity levels.

**(j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.**

**Proposed clearing is not likely to be at variance with this Principle**

The local area has a mean average rainfall of around 800 millimetres. Noting this relatively moderate rainfall, lack of wetlands or watercourses within or adjacent to the application area, and highly permeable sandy soils mapped within the application area, the proposed clearing is not likely to cause or exacerbate flooding.

**Planning instruments and other relevant matters.**

**Submissions**

The clearing permit application was advertised on the DWER website on 17 January 2020 with a 21 day submission period. One public submission was received. The submission noted the following concerns (Submission, 2020):

- The proposed clearing will impact on two threatened ecological communities
- The proposed clearing will impact on threatened fauna species habitat (Carnaby's cockatoo)
- The proposed offset for a monetary contribution to purchase land in Gingin is inadequate on the basis that it is a substantial distance from the proposed clearing
- Any proposed offset should incorporate both land acquisition and revegetation components

The applicant has provided an offset that comprises both land acquisition and revegetation/rehabilitation elements. As considered under Section 5, these offset measures are considered adequate to address the impacts to the Carnaby's cockatoo habitat and Banksia Woodlands and Tuart Woodlands TEC/PEC's.

## Planning

### Mitchell Freeway Extension Project

This proposed works relating to this clearing permit application are required as part of the applicants larger Mitchell Freeway extension project, which has been designed to support the expansion of Perth's outer northern suburbs. The applicant has advised that the greater project will alleviate pressure on the local road network, reduce travel times and improve safety and connectivity for people living and working in the region (GHD, 2019a). The larger project includes a development footprint of around 250 hectares, of which around 165 hectares requires the clearing of native vegetation. The majority of the project (not inclusive of the application area) was previously assessed by the EPA under a Metropolitan Regional Scheme Amendment (see 'Other Approvals' section below).

### City of Wanneroo comment

The City of Wanneroo provided the following comments on the proposed clearing (City of Wanneroo, 2020):

- "The majority of the proposed clearing is located within Primary Regional Road Reserves and Other Regional Road Reserves under the MRS. Any development within this reserve is not subject to a development application, but is subject to the provisions of the MRS
- The remaining minor areas appear to be zoned Rural and Urban under the MRS. Any clearing undertaken in Rural and Urban would be subject to approval by the City.
- The City does not support the clearing of any Rural and Urban zoned areas until such a time the development application is approved by the City".

The applicant has acknowledged that some of the application areas are inconsistent with the current MRS zoning. The applicant advised that an MRS amendment to accommodate the application areas will follow construction and will likely be part of an omnibus amendment considered by the Western Australian Planning Commission. The applicant notes that it is common practice for the MRS to be amended following construction (MRWA, 2020a).

The applicant also acknowledged that Development Approval will be required from the City of Wanneroo where the road works extend outside of the MRS road reservation, with Development Application to be progressed once all land is acquired (MRWA, 2020a)

### Department of Planning, Lands and Heritage (DPLH) comment

DPLH provided the following comments on the proposed clearing (DPLH, 2020):

- "The proposal is consistent with State Planning Policy 2.8 and its existing implementation category
- Given the high level of biodiversity of the Bush Forever areas that will be subject to clearing, the following is recommended;
  - an offset package is prepared and approved by DWER
  - rehabilitation occurs within the immediate vicinity of Bush Forever Site (BF) 383, for the nine hectares of the Bush Forever Site being cleared, rather than a financial contribution to buy land outside the Perth Metropolitan Region
- The development including construction, access, drainage, battering and ongoing maintenance shall not result in further disturbance (outside of the application area) or clearing of any native vegetation within BF 383 and BF 130
- An approved environmental management plan be developed prior to any clearing, to avoid impacts to vegetation and flora such as dust, introduction and the spread of weeds in conservation areas and, conservation significant fauna
- Fencing, where considered appropriate, be installed to mitigate any adverse impacts from pedestrian traffic on BF 383 and BF 130.

The applicant has committed to revegetating/rehabilitating 18 hectares within Bush Forever Site 383.

### Other Matters

The application area is located in the Perth Groundwater Area proclaimed under the *Rights in Water and Irrigation Act 1914* and a Priority 3 public drinking water source area (PDWSA), proclaimed under the *Metropolitan Water Supply, Sewerage and Drainage Act 1909*. Development for road infrastructure is considered to be a compatible land use within Priority 3 PDWSA's.

There are no Aboriginal Sites of Significance mapped within the application area.

## Other Approvals

### EPA Metropolitan Region Scheme Amendment 992/33

The majority of the Mitchell Freeway extension was previously assessed by the EPA, as part of Metropolitan Region Scheme amendment 992/33, approved under Ministerial Statement 629 on 8 July 2003. Under MS 629, large parcels of land (around 218 hectare development footprint) were rezoned as Primary Regional Road or Other Regional Roads to facilitate the expansion.

The application area forms part of additional works required to facilitate the larger Mitchell Freeway extensions, with these works not considered under Ministerial Statement 629. Therefore the applicant has applied to clear the application area under Part V of the *Environmental Protection Act 1986*.

The applicant advised that Wanneroo Road was zoned "Primary Regional Road" under the MRS at the time the MRS Amendment was assessed, while Romeo Road was zoned "Other Regional Road" under the MRS. The applicant notes that as Wanneroo Road and Romeo Road were already in the MRS it is assumed that the Western Australian Planning Commission did not include them in the MRS Amendment 992/33 (MRWA, 2020a).

### Related Clearing Permit Applications

The applicant has also applied to clear under Part V of the EP Act for two other projects associated with the larger Mitchell Freeway extension, being CPS 8826/1 and CPS 8861/1, which were not considered under Ministerial Statement 629. These applications comprise the following:

- CPS 8826/1 – application to clear 1.91 hectares of native vegetation for the 'Nowergup Depot Access' project
- CPS 8861/1 – application to clear 0.5 hectares of native vegetation for the 'Quins Quarry Access' project

DWER has given concurrent consideration to the impacts of these applications through the assessment and decision-making process, including through the calculation of monetary offset contributions.

### Department of Agriculture, Water and the Environment (DoAWE)

The Mitchell Freeway extension project is currently being assessed separately by the Commonwealth Department of Agriculture, Water and the Environment (DoAWE) under the *Environment Protection and Biodiversity and Conservation Act 1999* (reference 2018/8367 - Mitchell Freeway Extension and Wanneroo Road Upgrade). On 5 April 2019 DoAWE determined that the development is a controlled action that requires assessment and approval under the EPBC Act. DoAWE is yet to finalise a decision on the referral.

### Neerabup National Park

As discussed under Principle (h), two portions of the application area, being Lots 586 and 587 on Plan 69319, occur within the boundary of Neerabup National Park. The applicant advised that Lot 587 (comprising 4.885 hectares) had its vesting changed from Parks and Recreation to Urban under MRS Amendment 992/33. A further MRS amendment changed part of the zoning (around 50 per cent of the eastern side of Lot 587) to Primary Regional Roads. Similarly, Lot 586 was rezoned from Parks and Recreation to Urban under MRS Amendment 992/33. It is therefore considered that the excision of the overlapping portions of the application area and the National Park were considered under MRS 992/33.

The Conservation and Parks Commission (vesting authority) supported the proposed excision of the overlapping areas with the National Park, as did DBCA, noting that these land parcels would be segregated from the bulk of the National Park as a result of the larger Mitchell Freeway extension project, and difficult to manage as viable conservation areas. The final transfer of lots 586 and 587 from the National Park estate has not yet taken place.

It is noted that under MRS 992/33, the combined excisions and additions undertaken following MRS Amendment 992/33 and from previous MRS Amendments resulted in a commitment to a net increase in the "Parks and Recreation" zoned land of approximately 432 hectares.

## 5. Offset Consideration

### Offset Proposal

After consideration of the proposed avoidance and minimisation measures, the proposed clearing will result in the following significant residual impacts:

- Loss of 29.39 hectares of critical habitat for Carnaby's cockatoo
- Loss of up to 19.31 hectares of native vegetation that is representative of the federally listed Banksia Woodlands of the Swan Coastal Plain (Banksia Woodlands) TEC/PEC
- Loss of up to 8.27 hectares of native vegetation that is representative of the federally listed Tuart (*Eucalyptus gomphocephala*) woodlands of the Swan Coastal Plain (Tuart Woodlands) TEC/PEC
- Loss of native vegetation that forms part of a regionally significant ecological linkage
- Loss of 4.865 hectares of native vegetation within Neerabup National Park and 6.18 hectares within Bush Forever Site 383
- Loss of five trees with 12 hollows of a suitable size for Carnaby's cockatoo and forest red-tailed black cockatoos nesting

To counterbalance the above impacts, the applicant has committed to the following offset/mitigation measures:

- Revegetation/rehabilitation of 10 hectares within a DBCA managed site adjacent to Neerabup National Park (within Bush Forever Site 383)
- Revegetation/rehabilitation of 8 hectares within Neerabup Nature Reserve surrounding Lake Nowergup (within Bush Forever Site 383)
- Providing a monetary offset contribution of \$194,600 for the purchase of 140 hectares of land within the Shire of Gingin to address impacts specific to Banksia Woodlands TEC/PEC and Carnaby's cockatoo habitat.
- Allocation of 30.5 hectares of a banked offset site in the Shire of Waroona (Lake Clifton – Crown Reserve 53178) to address impacts specific to Tuart Woodlands TEC/PEC
- Installation of a minimum 12 artificial nesting hollows within land managed by DBCA

With regard to the revegetation measures, the applicant has advised that a comprehensive revegetation plan will be developed, in consultation with DBCA. The requirement to provide a revegetation plan with specific completion criteria has been conditioned on the permit.

The applicant will also be required to install artificial nest hollows within DBCA managed land at a ratio of 1:1 to mitigate impacts to the loss of suitable nesting habitat for Carnaby's cockatoo and forest red-tailed black cockatoo.

### Offset Adequacy

In assessing whether the proposed offset is adequately proportionate to the significance of the habitat values being impacted, DWER undertook a calculation using the Commonwealth Offsets Assessment Guide.

#### Revegetation/Rehabilitation

It was determined that the proposed revegetation/rehabilitation would offset 9.78 per cent of the total residual impacts to Carnaby's cockatoo habitat, 8.27 per cent of the impact to Banksia Woodlands TEC/PEC, and impacts to Bush Forever Site 383.

#### Allocation of Banked Offset Site

The calculation determined that the allocation of 30.5 hectares of the Lake Clifton banked offset site, which is representative of the Tuart Woodlands TEC/PEC, is adequate to counterbalance the significant residual impacts to this TEC/PEC.

#### Monetary Contribution for Land Acquisition

The calculation determined that the allocation of the following areas of native vegetation to be put to conservation estate is adequate to counterbalance the significant residual impacts to Banksia Woodlands TEC/PEC and Carnaby's cockatoo habitat (taking into account the above revegetation measures):

- 140 hectares of native vegetation in excellent condition that provides suitable foraging habitat for Carnaby's cockatoo
- 93 hectares of native vegetation in excellent condition that is representative of the Banksia Woodlands TEC/PEC

The cost of acquiring a 140 hectare parcel of land (to acquire land with the Banksia Woodland TEC/PEC and Carnaby's cockatoo habitat) equates to a monetary contribution of \$194,600, determined based on the estimated value per hectare of a 200 hectare vegetated parcel of land in the Shire of Gingin.

Given the above, the following measures are considered adequate to counterbalance the significant residual impacts of clearing, consistent with the *WA Environmental Offsets Policy September 2011*:

- A monetary contribution of \$194,600 for the acquisition of 140 hectares of native vegetation in excellent condition that contains Banksia Woodland TEC/PEC and Carnaby's cockatoo habitat
- The allocation of 30.5 hectares of a banked offset site representative of the Tuart Woodlands TEC/PEC
- The revegetation/rehabilitation of 8 hectares within Neerabup Nature Reserve and 10 hectares adjacent to DBCA managed land.

#### **Related applications and cumulative offsets**

In the assessment of the proposed offset, the impacts of two other Main Roads clearing permit applications associated with the larger Mitchell Freeway Extension Project have also been considered. Through the assessment of those applications, which were undertaken concurrently with this assessment, the following significant residual impacts were determined to result:

- Nowergup Depot Access Project (CPS 8826/1) – impacts to 1.91 hectares of Carnaby's cockatoo habitat and 1.3 hectares representative of the Banksia Woodlands TEC/PEC
- Quins Quarry Access Project (CPS 8861/1) – impacts to 0.5 hectares of Carnaby's cockatoo habitat and 0.5 hectares representative of the Banksia Woodland TEC/PEC.

At the time of this assessment it is considered that the following offsets, as committed to by the applicant, are adequate to address the above impacts:

- Nowergup Depot Access Project (CPS 8826/1) – a monetary offset contribution for the purchase of 8.4 hectares of native vegetation in an excellent condition that provides habitat for Carnaby's cockatoo, including 5.73 hectares representative of the Banksia Woodlands TEC/PEC
- Quins Quarry Access Project (CPS 8861/1) – a monetary offset contribution for the purchase of 2.7 hectares of native vegetation in excellent condition that provides habitat for Carnaby's cockatoo and is representative of the Banksia Woodlands TEC/PEC.

Taking into account the above, a summary of the total offset required to counterbalance impacts to Banksia Woodland TEC/PEC and Carnaby's cockatoo habitat is as follows:

- A monetary contribution of \$210,029 for the purchase of 151.1 hectares of native vegetation in an excellent condition that provides habitat for Carnaby's cockatoo, including 101.43 hectares representative of the Banksia Woodlands TEC/PEC

## **6. References**

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- City of Wanneroo (2020). Advice received in relation to clearing permit application CPS 8753/1. Received on 21 April 2020. DWER Ref A1886644.
- Commonwealth of Australia (2001) National Objectives and Targets for Biodiversity Conservation 2001-2005, Canberra.
- Commonwealth of Australia (2012) EPBC Act referral guidelines for three threatened black cockatoo species. Department of Sustainability, Environment, Water, Populations and Communities, Canberra.
- Department of Biodiversity, Conservation and Attractions (DBCA) (2020) Advice provided for Clearing Permit Application CPS 8753/1 (DWER Ref A1882891).
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- GHD (2019a) Main Roads Western Australia. Romeo Road and Wanneroo Road Upgrade Native Vegetation Clearing Permit Supporting Documentation. DWER Ref A1849538.

- GHD (2019b) Main Roads Western Australia. Mitchell Freeway Extension Hester Avenue to Romeo Road Biological Survey. Supporting Information provided for Clearing Permit Application CPS 8753/1. DWER Ref A1849538.
- GHD (2020a) Mitchell Freeway Extension Hester Avenue to Romeo Road Targeted Flora Survey. Supporting Information provided for Clearing Permit Application CPS 8753/1. DWER Ref A1902889.
- GHD (2020b) Mitchell Freeway Extension Hester Avenue to Romeo Road Black Cockatoo Monitoring. Supporting Information provided for Clearing Permit Application CPS 8753/1. DWER Ref A1902890.
- Government of Western Australia. (2019) 2018 South West Vegetation Complex Statistics. Current as of October 2018. WA Department of Biodiversity, Conservation and Attractions, Perth.
- Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.
- Main Roads Western Australia (MRWA) (2020a) Response to DWER request for further information received 6 February 2020. DWER Ref A1896494.
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- Mayer X., Ruprecht J., and Bari M. (January 2005). Stream Salinity Status and Trends in South-west Western Australia. Department of Environment. Salinity and land use impacts series. Report No. SLUI 38.
- Shah, B. (2006) Conservation of Carnaby's Black-Cockatoo on the Swan Coastal Plain, Western Australia. December 2006 Carnaby's Black-Cockatoo Recovery Project. Birds Australia, Western Australia.
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<http://www.environment.gov.au/biodiversity/threatened/communities/pubs/131-conservation-advice.pdf>
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**GIS databases:**

- CPS Areas applied to clear
- NatureMap (conservation significant fauna)
- DAFWA Subsystems V5
- Soils of WA
- Vegetation Complexes – Swan Coastal Plain
- Managed Tenure
- Environmentally Sensitive Areas
- TPFL Data June 2020
- WAHerb Data June 2020
- Aboriginal Sites Register
- IBRA Vegetation WA
- WA TECPEC
- Land Degradation Hazards

Appendix 1: Site Maps



Figure 1. CPS 8753/1 Project Area (marked red)

# MITCHELL FREEWAY EXTENSION

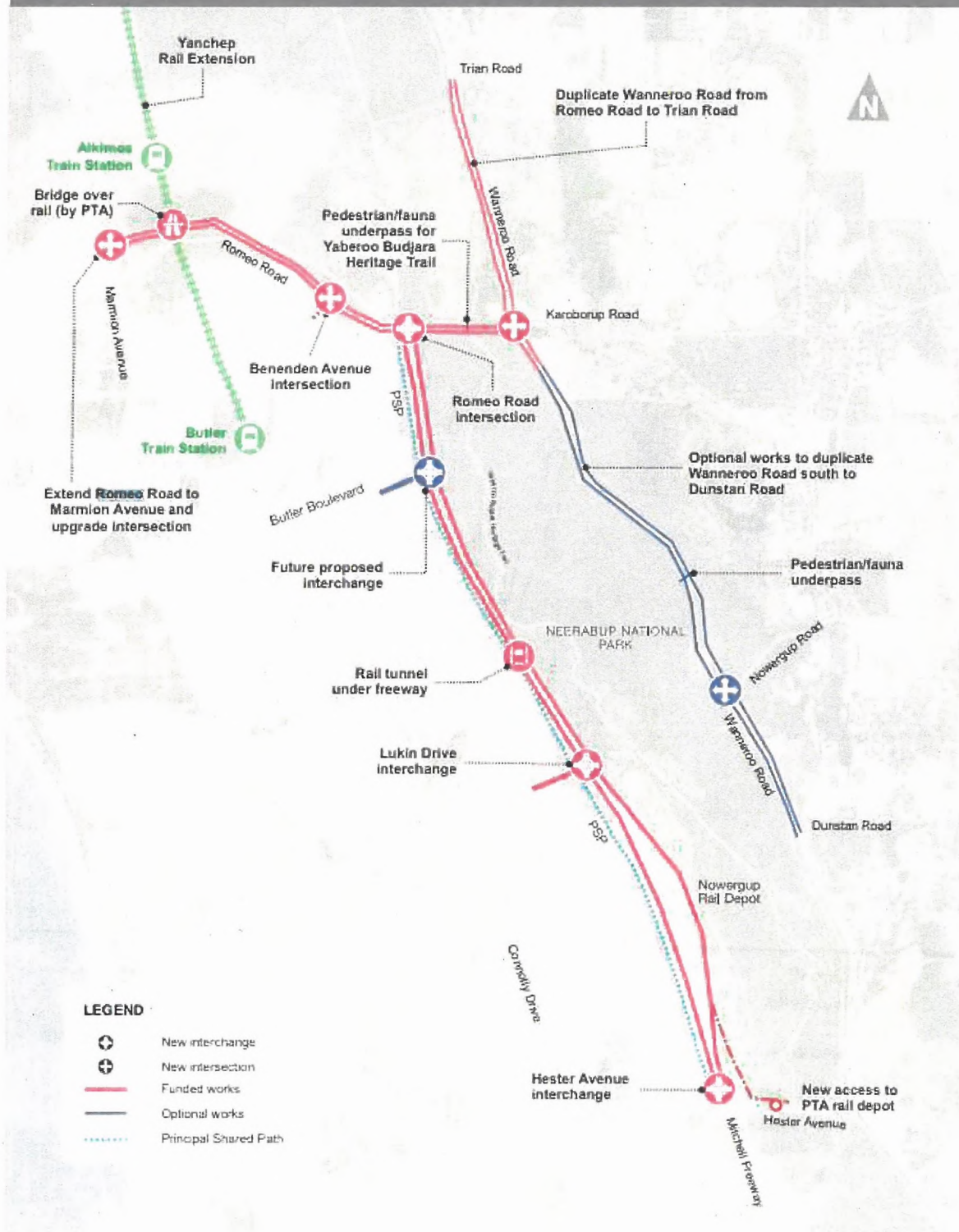


Figure 2. Mitchell Freeway proposed extension upgrades (MRWA, 2020b).



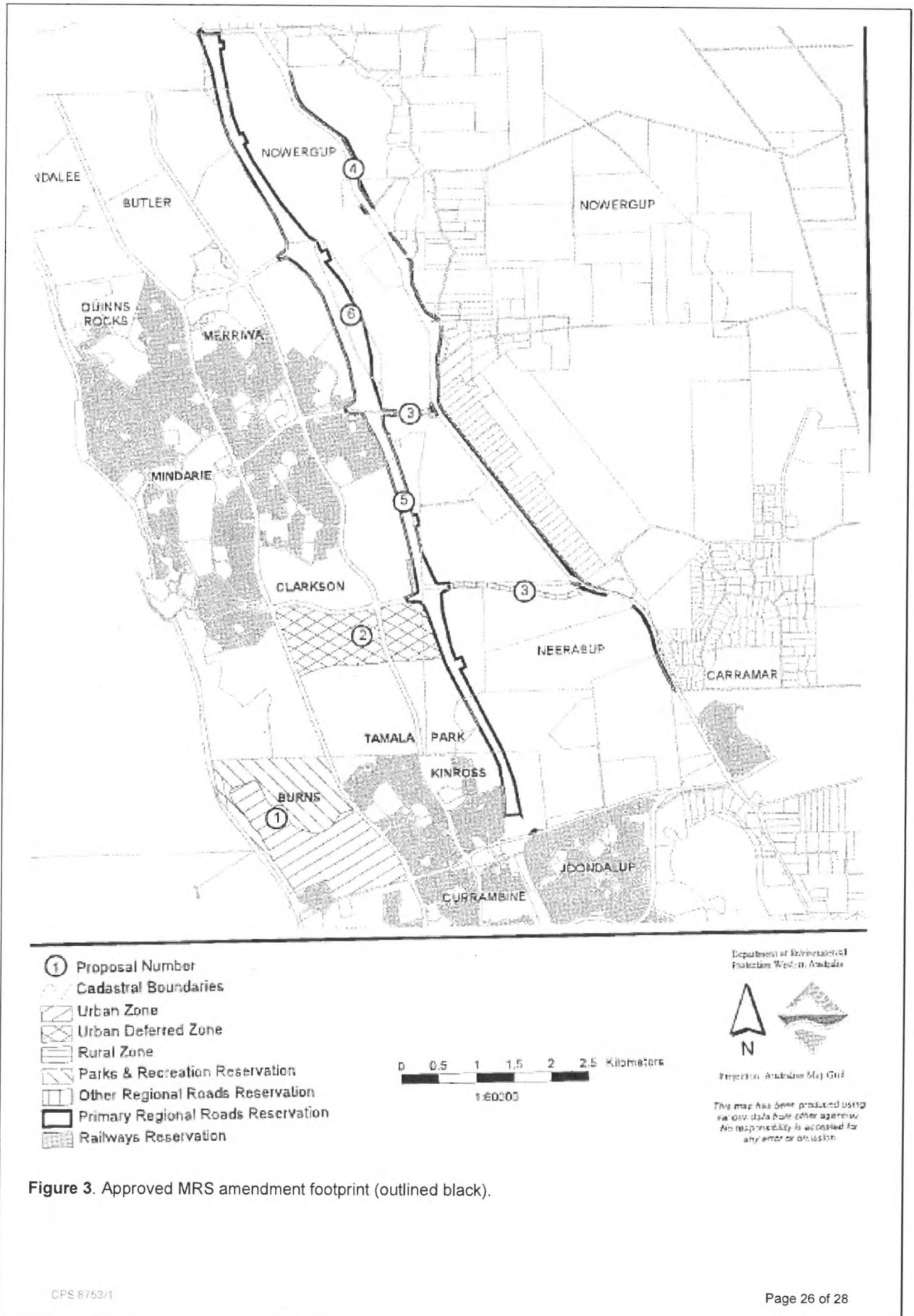


Figure 3. Approved MRS amendment footprint (outlined black).

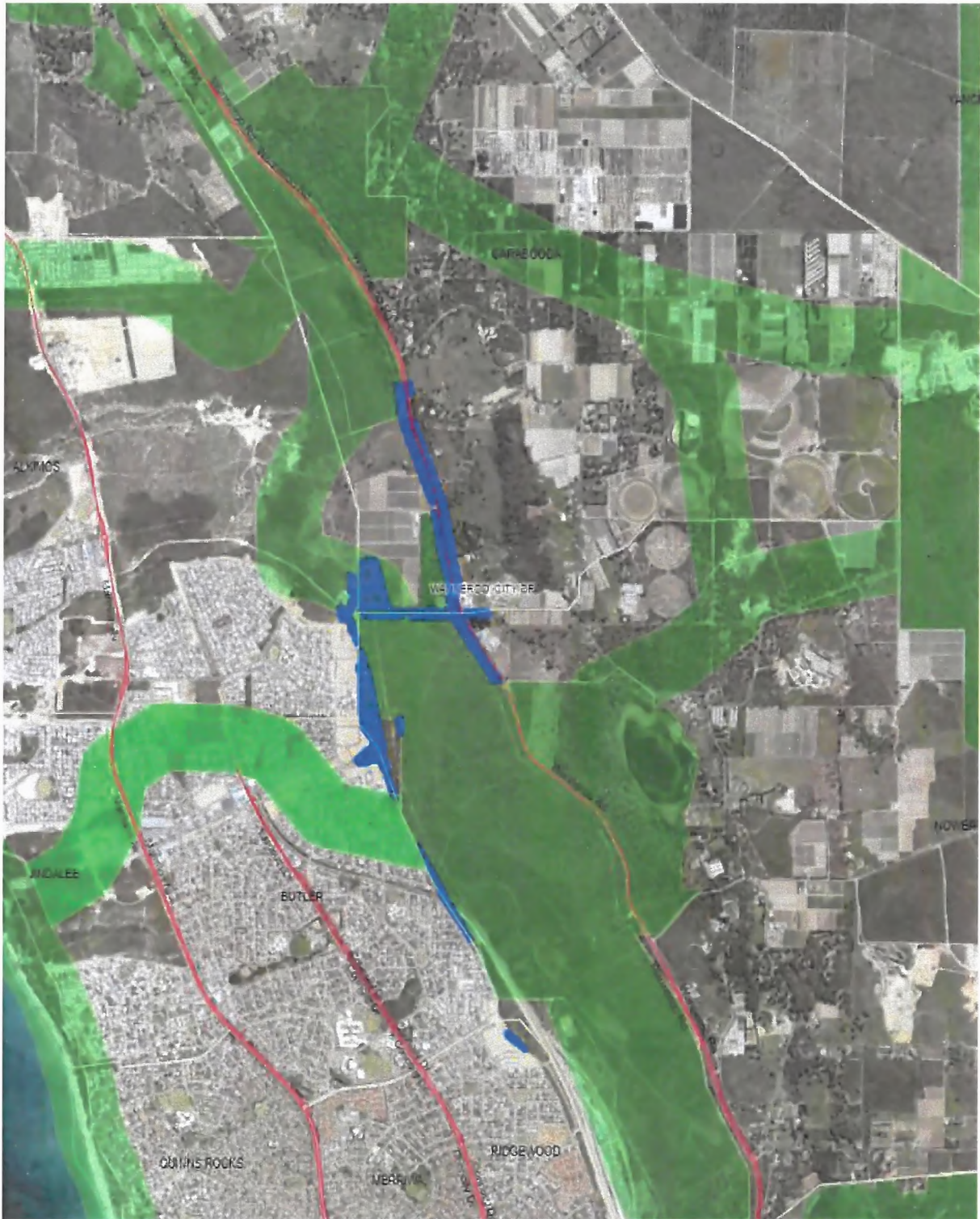


Figure 4. Mapped ecological linkage (shaded green) in the context of the application area (shaded blue)

**Appendix 2: Flora Recorded in the local area (10 kilometre radius)**

Taxon	Conservation Code	Suitability of habitat in the application area
<i>Baeckea</i> sp. Limestone (N. Gibson & M.N. Lyons 1425)	1	Suitable
<i>Leucopogon maritimus</i>	1	Suitable
<i>Acacia benthamii</i>	2	Suitable
<i>Fabronia hampeana</i>	2	Suitable
<i>Tetraria</i> sp. Chandala (G.J. Keighery 17055)	2	Unlikely
<i>Adenanthos cygnorum</i> subsp. chamaephyton	3	Suitable
<i>Conostylis bracteata</i>	3	Suitable
<i>Hibbertia leptotheca</i>	3	Suitable
<i>Jacksonia gracillima</i>	3	Unlikely
<i>Leucopogon</i> sp. Yanchep (M. Hislop 1986)	3	Suitable
<i>Pimelea calcicola</i>	3	Suitable
<i>Pithocarpa corymbulosa</i>	3	Unlikely
<i>Sarcozona bicarinata</i>	3	Unlikely
<i>Sphaerolobium calcicola</i>	3	Unlikely
<i>Stylidium maritimum</i>	3	Suitable
<i>Conostylis pauciflora</i> subsp. euryrhipis	4	Suitable
<i>Jacksonia sericea</i>	4	Suitable
<i>Stylidium longitubum</i>	4	Unlikely
<i>Tripterococcus</i> sp. Brachylobus (A.S. George 14234)	4	Unlikely
<i>Eucalyptus argutifolia</i>	T	Suitable
<i>Marianthus paralius</i>	T	Unlikely – occurs on coastal limestone cliffs (see Principle (c))
<i>Melaleuca</i> sp. Wanneroo (G.J. Keighery 16705)	T	Unlikely – occurs on limestone ridges or topography greater than 60m (see Principle (c))