



CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

Purpose Permit number:	CPS 8788/1
Permit Holder:	Western Australia Land Authority T/A Development WA
Duration of Permit:	26 May 2020 to 26 May 2025

ADVICE NOTE

The permit area forms part of the larger Ocean Reef Marina development area, which encompasses approximately 42 hectares of land, of which 16.79 hectares is currently vegetated. As part of Metropolitan Region Scheme (MRS) amendment 1270/41, the rezoning of 26.26 hectares of Bush Forever Site 325 was undertaken to facilitate the development of the Ocean Reef Marina. To counterbalance the impacts of the rezoning of this area, the Permit Holder has secured a 26 hectare portion of Lot 51 on Plan 9474, Carabooda, represented by the area hatched red on attached Plan 8788/1b. This land acquisition combined with rehabilitation of degraded vegetation adjacent to the development area was determined to counterbalance the environmental impacts to the portion of land excised from Bush Forever Site 325.

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 purpose of an early works program to facilitate development of the Ocean Reef marina.

2. Land on which clearing is to be done

Ocean Reef Road road reserve (PIN 1373594), Ocean Reef
Lot 10098 on Plan 216093, Ocean Reef
Lot 1029 on Diagram 57604, Ocean Reef
Lot 1032 on Plan 13198, Ocean Reef
Lot 15446 on Plan 40340, Ocean Reef
Lot 9000 on Plan 54595, Ocean Reef

3. Area of Clearing

The Permit Holder must not clear more than 4.47 hectares of native vegetation within the areas cross-hatched yellow and red on attached Plan 8788/1a.

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.

PART II – MANAGEMENT CONDITIONS

5. Avoid, minimise and reduce the impacts and extent of clearing

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

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

6. Dieback and weed control

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

7. Wind Erosion Management

The Permit Holder must commence construction associated with early works no later than one (1) month after undertaking the authorised clearing activities to reduce the potential for wind erosion.

8. Directional Clearing

The Permit Holder must conduct clearing activities in a slow, progressive manner to allow fauna to move into adjacent native vegetation.

9. Fencing

The Permit Holder must within three (3) months of commencing the authorised clearing activities, construct or install *conservation fencing* along the areas cross-hatched red that abut Bush Forever Site 325 on attached Plan 8788/1a, in accordance with approval from the City of Joondalup.

10. Fauna Management

Within three (3) months of the commencement of clearing authorised by this Permit, the Permit Holder must submit to the *CEO* for approval a Fauna Management Plan, prepared in consultation with relevant authorities, which includes:

- (a) a plan for minimising the risk of death and injury to native fauna through vehicle strike;
- (b) a table setting out the Permit Holder's commitments to the Plan's requirements; and
- (c) a program for monitoring compliance with the Permit Holder's commitments.

The Permit holder must implement and adhere to the approved Fauna Management Plan following approval by the *CEO*.

PART III – RECORD KEEPING AND REPORTING

11. Record keeping

The Permit Holder must maintain the following records in relation to the clearing of native vegetation authorised under this Permit:

- (a) 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 or decimal degrees;
- (b) the date(s) that the area was cleared;
- (c) the size of the area cleared (in hectares);
- (d) purpose for which the clearing was undertaken;
- (e) actions taken to avoid, minimise and reduce the impacts and extent of clearing in accordance with condition 5 of this Permit; and
- (f) actions taken to minimise the risk of the introduction and spread of *dieback* and *weeds* in accordance with condition 6 of this Permit;

- (g) the area in which the construction or installation of the fences was undertaken in accordance with condition 9 of this Permit; and
- (h) actions taken in accordance with the approved Fauna Management Plan, required by condition 10 of this Permit.

12. Reporting

The Permit Holder must produce the records required under condition 11 of this Permit when required by the *CEO*.

DEFINITIONS

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

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

conservation fencing means fencing installed for the purpose of conservation, with the intention to exclude unauthorised access without preventing the movement of fauna;


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

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

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

weed/s means any plant -

- (a) that is a declared pest under section 22 of the *Biosecurity and Agriculture Management Act 2007*; or
- (b) published in a Department of Biodiversity, Conservation and Attractions species-led ecological impact and invasiveness ranking summary, regardless of ranking; or
- (c) not indigenous to the area concerned.


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Ryan Mincham
MANAGER
NATIVE VEGETATION REGULATION

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



4 May 2020

Plan 8788/1a



Legend

CPS layers


-  CPS areas approved to clear
-  CPS areas subject to conditions

base layers

cadastre

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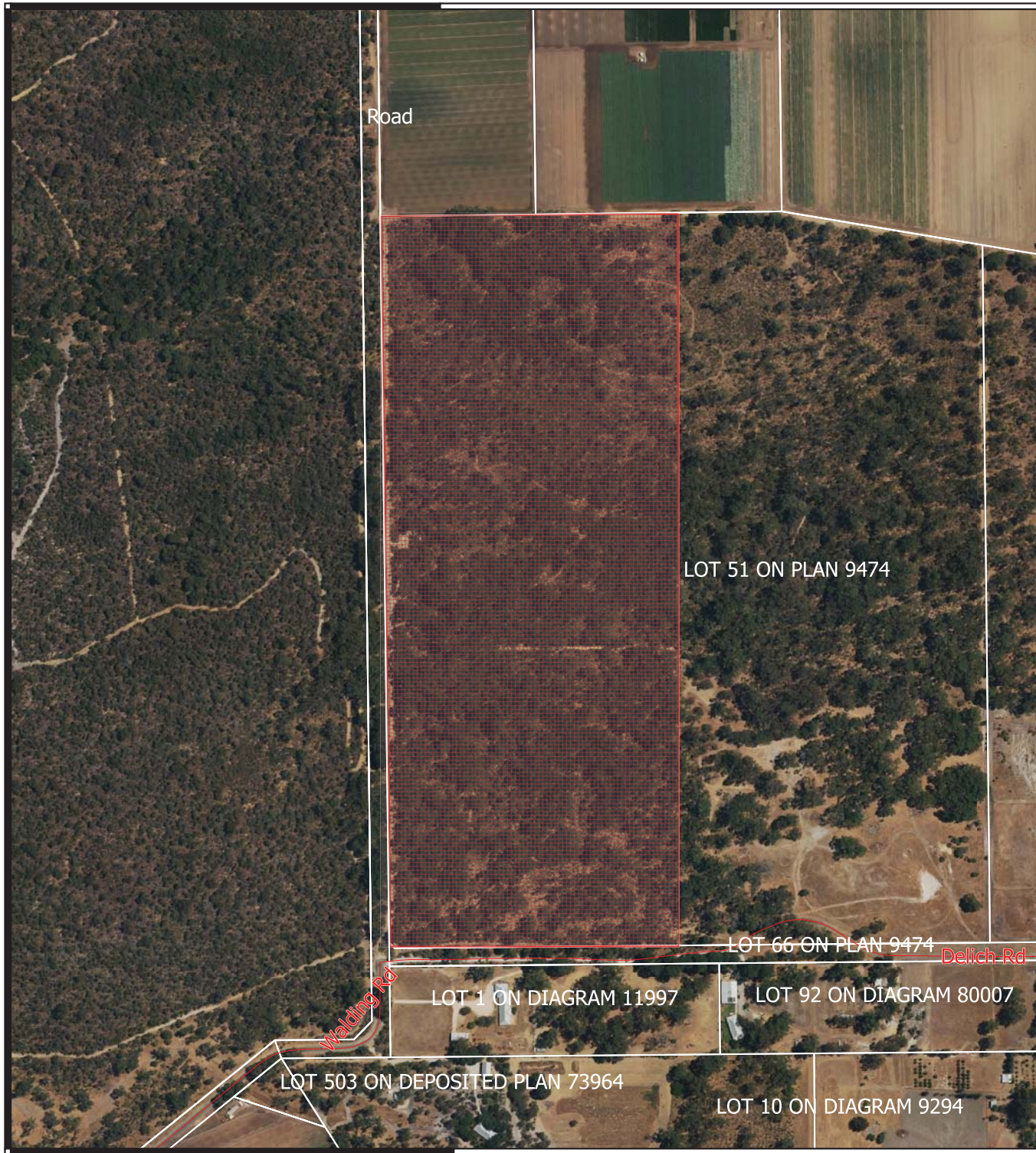
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Environmental Protection Act 1986



GOVERNMENT OF
WESTERN AUSTRALIA

Plan 8788/1b

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Legend

CPS layers

 Land Acquisition Area

base layers

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GOVERNMENT OF
WESTERN AUSTRALIA



Clearing Permit Decision Report

1. Application details

Permit application details

Permit application No.: 8788/1
Permit type: Purpose Permit

Applicant details

Applicant's name: Western Australian Land Authority T/A DevelopmentWA
Application received date: 10 January 2020

Property details

Property: Ocean Reef Road road reserve (PIN 1373594), Ocean Reef
Lot 10098 on Plan 216093, Ocean Reef
Lot 1029 on Diagram 57604, Ocean Reef
Lot 1032 on Plan 13198, Ocean Reef
Lot 15446 on Plan 40340, Ocean Reef
Lot 9000 on Plan 54595, Ocean Reef
Local Government Authority: City of Joondalup
Localities: Ocean Reef

Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
Revised to 4.47		Mechanical Removal	Utilities

Decision on application

Decision on Permit Application: Grant
Decision Date: 4 May 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*. It has been concluded that the proposed clearing is at variance with principles (a), (b), (e) and (h), may be at variance with clearing principles (c) and (g), and is not likely to be at variance with the remaining clearing principles.

The Delegated Officer noted that that vegetation in the application area contains a high level of biological diversity, including conservation significant flora, fauna and ecological communities. The application area is also considered significant habitat for fauna, with a Carnaby's cockatoo breeding and roosting location less than 5 kilometres from the application area, and foraging habitat noted on site. The application area was determined to be a significant remnant of vegetation based on the size and ecological linkage function that would be impacted by the proposed clearing. It was determined that the proposed clearing would impact on the environmental values of adjacent conservation areas; the majority of the surrounding vegetation is Bush Forever, and the proposed clearing includes a small portion of area classified as Bush Forever. It was determined that the proposed clearing will lead to vegetation fragmentation, a reduced area to perimeter ratio of the Bush Forever site, the potential introduction of weeds and disease, and erosion issues which may impact the adjacent conservation area.

The Delegated Officer noted that although no Threatened flora are present within the application area, some of the vegetation is consistent with critical habitat for a Threatened flora species. It was determined that the proposed clearing may lead to appreciable land degradation, noting that the timing of the clearing and the coastal location lead to an increased risk of wind and water erosion.

This clearing permit area is part of a wider development for the Ocean Reef Marina, a development encompassing 42 hectares (ha) of land. A Metropolitan Region Scheme (MRS) amendment (1270/41) included the excision of 26.26 ha of Bush Forever Site 325 (WAPC, 2016). As part of the MRS amendment, WAPC required a Negotiated Planning Outcome (NPO) to secure an appropriate conservation outcome for the project (Strategen-JBS&G, 2020a). This included the acquisition of an offset site and the rehabilitation of Bush Forever areas adjacent to the application area. The Delegated Officer determined that the measures outlined in the NPO were sufficient to mitigate the impacts of the proposed clearing to biodiversity, fauna habitat, impacts on adjacent conservation areas and impacts on suitable habitat for Threatened species (Section 4). The Delegated Officer noted that

plans required under the NPO have not yet been finalised and will require approval by the relevant authorities prior to development.

The Delegated Officer determined that the impacts on environmental values of the proposed clearing of 4.47 ha of native vegetation within a 5.17 ha envelope for early works associated with Ocean Reef Marina development have been suitably minimised and mitigated with the Negotiated Planning Outcome and management strategies proposed by the applicant.

2. Site Information

Clearing Description

The application is to clear 4.47 ha of native vegetation within a 5.17 ha envelope within Ocean Reef Road road reserve (PIN 1373594), Lot 10098 on Plan 216093, Lot 1029 on Diagram 57604, Lot 1032 on Plan 13198, Lot 15446 on Plan 40340 and Lot 9000 on Plan 54595, Ocean Reef for the purpose of early works construction (Figure 1), including:

- new Hodges Drive extension;
- new Boat Harbour Quays entry road;
- diversion of existing Coastal Shared Use Path;
- laydown area, site office and facilities (Site Compound);
- diversion of existing club and boat ramp access; and
- construction site related signage.

Vegetation Description

A flora and vegetation survey undertaken in 2013 identified nine major vegetation types within the broader development area, including five shrublands and four heathlands communities (Mattiske Consulting, 2013). Of these, eight were mapped within the application area:

- S1: Mid closed scrubland of *Acacia rostellifera* and *Melaleuca huegelii* with occasional emergent *Banksia sessilis* var. *cygnorum* over *Spyridium globulosum*, *Rhagodia baccata* subsp. *dioica* and *Hibbertia cuneiformis* over *Acanthocarpus preissii*, *Clematis linearifolia*, *Hardenbergia comptoniana* and mixed exotics on deep grey sands of primary and secondary dunes.
- S2: Tall shrubland of *Banksia sessilis* var. *cygnorum*, *Spyridium globulosum*, *Santalum acuminatum* and *Acacia saligna* with occasional emergent *Eucalyptus todtiana* over *Rhagodia baccata* subsp. *dioica*, *Alyogyne huegelii* and *Trymalium odoratissimum* over *Conostylis bracteata* (P3), *Desmocladius asper*, *Lepidosperma pubisquameum* and mixed exotics on deep grey or brown sands of secondary dune swales.
- S3: Tall shrubland of *Spyridium globulosum*, *Acacia rostellifera*, *Banksia sessilis* var. *cygnorum* and *Santalum acuminatum* over *Phyllanthus calycinus*, *Hibbertia hypericoides* and *Melaleuca systema* over *Clematis linearifolia*, *Austrostipa flavescens*, *Desmocladius flexuosus* and mixed exotics on light grey or brown sands of secondary dune swales.
- S4: Mid to tall scrubland of *Acacia rostellifera*, *Spyridium globulosum*, *Templetonia retusa*, *Melaleuca huegelii* and *Melaleuca cardiophylla* over *Leucopogon parvifolius*, *Thomasia cognata*, *Acanthocarpus preissii*, *Phyllanthus calycinus* and mixed exotics on grey sands of secondary dunes with frequent limestone outcropping.
- S5: Tall closed shrubland of *Acacia cochlearis*, *Acacia cyclops*, *Acacia rostellifera*, *Allocasuarina lehmanniana* subsp. *lehmanniana*, *Melaleuca huegelii* and *Templetonia retusa* over *Melaleuca systema*, *Scaevola crassifolia* and mixed exotics on grey sands of secondary dune swales with frequent limestone outcropping.
- H1: Low open scrubland to heath of *Acacia cyclops*, *Acacia rostellifera*, *Spyridium globulosum* and *Templetonia retusa* over *Scaevola crassifolia*, *Olearia axillaris*, *Myoporum insulare* and *Rhagodia baccata* subsp. *dioica* over *Acanthocarpus preissii*, *Threlkeldia diffusa*, *Senecio pinnatifolius* and *Frankenia pauciflora* over *Lepidosperma gladiatum*, *Spinifex longifolius*, *Sporobolus virginicus* and mixed exotics on white sands or light grey sands of fore- and primary dunes with frequent limestone outcropping.
- H3: Closed heath of *Acacia lasiocarpa* var. *lasiocarpa*, *Cryptandra mutila*, *Leucopogon insularis* and *Melaleuca systema* over *Comesperma confertum*, *Gompholobium tomentosum* and *Opercularia vaginata* over *Lepidosperma pubisquameum*, *Dianella revoluta* var. *divaricata* and mixed exotics on light grey sands of secondary dune slopes.
- H4: Low open scrub to heath of *Acacia rostellifera*, *Spyridium globulosum* and *Acacia saligna* over *Melaleuca systema*, *Acanthocarpus preissii*, *Olearia axillaris*, *Phyllanthus calycinus* and mixed exotics on white to light grey sands of primary and secondary dune crests.

The mapped vegetation type is the Quindalup Complex - Coastal dune complex consisting mainly of two alliances - the strand and fore-dune alliance and the mobile and stable dune alliance. Local variations include the low closed forest of *Melaleuca lanceolata* (Rottnest Teatree) - *Callitris preissii* (Rottnest Island Pine), the closed scrub of *Acacia rostellifera* (Summer-scented Wattle) and the low closed *Agonis flexuosa* (Peppermint) forest of Geographe Bay (Hedde *et al.*, 1980).

Vegetation Condition

Flora and vegetation surveying within the application area determined that the vegetation condition ranges from completely degraded to excellent (Keighery, 1994) condition (Mattiske Consulting, 2013; Strategen-JBS&G, 2020b), described as:

- Completely degraded; the structure of the vegetation is no longer intact and the area is completely or almost completely without native species;
- Excellent; vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.

The majority of the vegetation within the application area was determined to be in very good to excellent condition (Mattiske Consulting, 2013).

Soil and Landform Type:

Five soil types from two soil systems are mapped within the application area (Schoknecht *et al.*, 2004):

- Quindalup South shallow sand flat Phase (211Qu_Qs): undulating landscapes with shallow calcareous sands over limestone and much rock outcrop.
- Quindalup South oldest dune Phase (211Qu_Q1) the oldest phase. Dunes or remnants with low relief. Calcareous sands have organic staining to about 30 cm, overlying pale brown sand with definite cementation below 1 m.
- Quindalup South third dune Phase (211Qu_Q3): the third phase. Irregular dunes with high relief and slopes up to 20%. Loose calcareous sand with little surface organic staining and incipient cementation at depth.
- Quindalup South youngest dune Phase (211Qu_Q4): the youngest phase. Irregular dunes with slopes up to 20%. Loose pale brown calcareous sand with no soil profile development.
- Karrakatta shallow soils Phase (211Sp_KIs): Low hills and ridges. Bare limestone or shallow siliceous or calcareous sand over limestone. Dense low shrub dominated by *Dryandra sessilis*, *Melaleuca huegelii* and species of *Grevillea*.

The majority of the application area is mapped as 211Qu_Qs and 211Qu_Q1.

Comments:

The local area referred to in the assessment of this application is defined as a 10 kilometre radius measured from the perimeter of the application area.



Figure 1: Application area and MRS boundary

3. Avoidance and minimisation measures

The initial application was to clear up to 6.35 ha of native vegetation within a 7.38 ha envelope. This was later amended to 4.47 ha of native vegetation within a 5.17 ha envelope to reduce the impacts to priority ecological communities.

The applicant has advised that the proposed clearing is within the development footprint of the proposed Ocean Reef Marina. As part of the rezoning of areas for the development of Ocean Reef Marina, under the Metropolitan Regional Scheme Amendment 1270/41, a Negotiated Planning Outcome (NPO) was prepared (Strategen-JBS&G, 2020a). This NPO includes onsite mitigation requirements, the acquisition of an offset site and the rehabilitation of degraded vegetation outside of the development area, and was endorsed by DPLH, DBCA and the EPA (refer to Section 4). A Rehabilitation Plan and a Construction Environmental Management Plan are required to be submitted and approved by relevant authorities prior to development. The MRS amendment boundary does not include 1.77 ha of native vegetation within the application area (Figure 1).

In addition to the mitigation and minimisation measures outlined in the NPO, the following strategies have been suggested in the supporting documentation for this clearing application, including that:

- clearing will be undertaken no more than one month prior to the commencement of works;
- clear demarcation of clearing boundary (inclusive of spoil stockpiles and access tracks);
- seed and hygiene controls for equipment and personnel; and
- accurate and well-maintained clearing records during and post-clearing (Strategen-JBS&G, 2020b).

Other measures outlined in correspondence with the applicant which will be implemented to minimise and mitigate the impact of the proposed clearing on environmental values are:

- the installation of conservation fencing to prevent unauthorised access to Bush Forever Site 325, but allow for fauna movement;

- the incorporation of *Banksia sessilis* as a priority in the rehabilitation works where it naturally occurs to provide local foraging habitat for Carnaby's black cockatoo (Strategen-JBS&G, 2020c);
- *Lomandra maritima* consideration for use in the rehabilitation works to support Graceful Sun Moth population (Strategen-JBS&G 2020d);
- the rehabilitation of a minimum of 0.66 hectares of H1 community; which is consistent with critical habitat for *Marianthus paralius* (Strategen-JBS&G, 2020f)

It was determined that the most suitable mitigation method for the disruption of ecological linkage function would be the installation of fencing that excluded the public but allowed for fauna movement across the areas (such as conservation fencing used elsewhere along the coastline) and measures to reduce vehicle speed and increase driver awareness to minimise the risk of vehicle strike on fauna. Fauna underpasses were considered during the assessment and proposed during consultation with stakeholders, however it was determined that other mitigation measures would optimise environmental outcomes. The length of the proposed underpass would be approximately 40 metres, double the average length of culvert underpasses in Perth and the South-west (Bamford Consulting, 2019). It has been noted that as the length of underpasses increases, the frequency of use by animals, including quenda, decreases (Bamford Consulting, 2019; Chambers and Bencini, 2014). Advice from DBCA notes that if an underpass were to be installed, suitable fencing would be required to exclude animals from crossing the road. Presently, conservation fencing is utilised along the edges of Bush Forever Site 325; if exclusion fencing occurred only along the entrance roads there is a likelihood that this would direct animals onto Ocean Reef Road and adjacent residential properties (DBCA, 2020). Other disadvantages of underpasses include the facilitation of introduced species movement, and a potential increase in predation, with culverts acting as funnels for predators; both cats and foxes have been recorded in adjacent bushland (Natural Area, 2019).

Residual impacts to fauna have been minimised with the following mitigation strategies:

- Slow, directional clearing from non-vegetated areas to areas of remnant vegetation to allow for the movement of fauna into adjacent vegetation;
- A fauna management plan to be developed, in consultation with Main Roads Western Australia and the City of Joondalup, and submitted to DWER to appropriately mitigate vehicle speed on entrance roads and implement measures to minimise the risk of vehicle strike on fauna.

4. Assessment of application against clearing principles

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

Proposed clearing is at variance with this principle

A NatureMap report indicated 795 plant and 485 animal species have been recorded within the local area (DBCA, 2007-). A flora survey within the application area and surrounding vegetation identified 137 plant taxa, and a level 1 fauna survey identified 22 birds and one reptile during the site visit (Mattiske Consulting, 2013; Western Wildlife, 2008). A more recent flora and fauna survey in the remnant vegetation adjacent to the application area identified 121 flora and 92 fauna species (Natural Area, 2019).

According to available databases, 19 priority and two threatened flora have been recorded in the local area. Based on vegetation mapping, soil type, landscape position and proximity of records to the application area it was determined that the area has suitable habitat for six species, and may provide suitable habitat for an additional five species (Table 1, Western Australian Herbarium, 1998-). *Lecania turicensis* var. *turicensis* is a Priority 2 species that has only been recorded in two locations in 1988, however, it occurs on coastal limestone cliffs; it was determined that the habitat requirements may be consistent with the application area. There is one record of *Syldium maritimum* within the local area, from 2015; this species typically occurs on dunes and coastal limestone outcrops and the habitat was determined to be suitable for this species. A flora and vegetation survey undertaken in 2013 included a targeted search for the majority of the conservation significant species outlined in this desktop assessment, however, did not identify *Lecania turicensis* var. *turicensis* or *Styldium maritimum* as potentially occurring within the application area (Mattiske Consulting, 2013).

Conostylis bracteata, a Priority 3 species, was recorded throughout the area during the 2013 survey, with records in over 20 per cent of the quadrats (Mattiske Consulting, 2013). Of the 17 locations the species was recorded, two occur within the application area, representing 90 of the 804 plants recorded (11 per cent). However, the extent of the population outside of the quadrats was not noted, therefore, the proportion of the population to be impacted is not known. This impact has been identified in the NPO.

Grevillea sp. Ocean Reef, a Priority 1 species, was recorded during the 2013 survey, with an area of occupancy of approximately 50 x 50 metres (Mattiske Consulting, 2013). Assuming the GPS point is the centre of the population, the edge of the population is located approximately 25 metres from the application area.

An undescribed *Tetraria* species (*Tetraria* sp. (JC031, 16/10/2013)) was recorded approximately 60 metres from application area during the 2013 flora survey (Mattiske Consulting, 2013). The specimen was lodged at the Western Australian Herbarium (WAH); specialists noted that until a formal detailed evaluation and identification occurs at the WAH, it is recommended that this species be treated as a currently unrecognised taxon (Mattiske Consulting, 2013). DBCA have advised that this specimen has not yet undergone a formal detailed evaluation (DBCA, 2020a).

Table 1: Species which the habitat is suitable for (green) and may be suitable for (orange) within the application area.

Species	State Category	No. Records in Local Area	Habitat suitability of application area
<i>Baeckea</i> sp. Limestone (N. Gibson & M.N. Lyons 1425)	Priority 1	11	Recorded in association with <i>Banksia sessilis</i> shrubland, some within application area.

<i>Conostylis bracteata</i>	Priority 3	10	Recorded within application area.
<i>Eucalyptus argutifolia</i>	Vulnerable	4	South of southern most population, however soil and vegetation suitable. Not recorded in any surveys previously and is a fairly visible plant to be missed.
<i>Grevillea</i> sp. Ocean Reef (D. Pike Joon 4)	Priority 1	4	Only record of species is in adjacent bushland.
<i>Hibbertia leptotheca</i> (previously <i>H. spicata</i> subsp. <i>leptotheca</i>)	Priority 3	3	Flora survey in 2009 identified this species in adjacent bushland.
<i>Lecania turicensis</i> var. <i>turicensis</i>	Priority 2	1	Hasn't been recorded since 1988, but occurs on coastal limestone rocks at Burn Beach.
<i>Leucopogon maritimus</i>	Priority 1	1	Local record is historic (1966), and other records ~ 20 kilometres north, however habitat may be suitable.
<i>Marianthus paralius</i>	Endangered	3	A population in less than 2 kilometres north of application area, within the same soil subsystem that exists within the application area.
<i>Pimelea calcicola</i>	Priority 3	6	A lot of the records are historic, however habitat suitable.
<i>Sarcozona bicarinata</i>	Priority 3	5	Soil type suitable and vegetation community may be suitable.
<i>Stylidium maritimum</i>	Priority 3	1	Within area of occupancy, habitat suitable.

Other locally significant flora species recorded within the application area and surrounding vegetation include:

- *Allocasuarina lehmanniana* subsp. *lehmanniana* – Southern extent of northern population (Mattiske Consulting, 2013);
- *Callitris preissii* – Taxa endemic to the Swan Coastal Plain in the Perth Metropolitan Region (Government of Western Australia, 2000);
- *Hibbertia cuneiformis* – Northern extent of known range (Mattiske Consulting, 2013);
- *Melaleuca cardiophylla* – Southern extent of known coastal range (Mattiske Consulting, 2013);
- *Spinifex x alterniflorus* – Poorly collected; northern population of disjunct range (Mattiske Consulting, 2013); and
- *Diplolaena angustifolia* – southern extent of species (Submission, 2020; Western Australian Herbarium, 1998-).

Overall, the application area provides suitable habitat for a range of conservation significant flora species, and likely comprises a high floristic diversity.

Based on the available information, the application area was determined to be suitable for a range of fauna species. The application area lies within the City of Joondalup's Coastal bushland zone, which has been identified as an important habitat for a variety of reptile species (City of Joondalup, 2014). A fauna survey undertaken in adjacent areas identified 44 vertebrate and 48 invertebrate fauna species (Natural Area, 2019). A site inspection undertaken by DWER staff noted a range of bird species (DWER, 2020).

The application area forms part of the Gnangara Sustainability Strategy Ecological Linkages, a conceptual linkage of areas of vegetation throughout the Gnangara groundwater system (Brown *et al.*, 2009). The application area forms part of 14 kilometres of semi-continuous vegetation along the foreshore from Hillarys to Mindarie. Vegetation along the coastline forms an essential part of this conceptual linkage and coastal linkages are a priority for nature conservation in the area (Brown *et al.*, 2009). A high proportion of these coastal vegetation complexes have been cleared for urban development and are under development pressure (Brown *et al.*, 2009). The proposed clearing will lead to the fragmentation of this linkage with a width of approximately 40 metres of cleared vegetation approximately 390 metres long proposed to be cleared at the northern entrance (Figure 1), and the widening of the existing southern entrance from approximately 10 metres of cleared vegetation to between 25 and 100 metres of cleared vegetation (Figure 1).

A total of eight conservation significant ecological communities have been recorded within the local area. The whole extent of vegetation within the application area was inferred to be three Priority 3 Ecological Communities (PECs):

- Northern Spearwood shrublands and woodlands (SCP 24) of which approximately 7 per cent of the application area is mapped as;
- Coastal shrublands over shallow sands, southern Swan Coastal Plain (SCP 29a), of which approximately 45 per cent of the application area is mapped as; and
- Acacia shrublands on taller dunes, southern Swan Coastal Plain (SCP 29b), of which approximately 48 per cent of the application area is mapped as (Mattiske Consulting, 2013).

These ecological communities are geographically restricted with three mapped occurrences of SCP 29a, totalling 13.38 ha, two mapped occurrences of SCP 29b, totalling 40.74 ha, and 37 occurrences of SCP 24 totally 1,009 ha.

The application area contains suitable habitat for priority flora species, high floristic diversity, habitat for a wide range of fauna species, including conservation significant fauna, and forms part of an ecological linkage. The application area also comprises vegetation that is representative of PECs. Based on the above information the proposed clearing is at variance with this principle.

It was determined that the clearing of 11 per cent of the recorded population of *Conostylis bracteata* was not considered significant, particularly given the flora survey noted this species was common throughout vegetation community S2 and present in all communities except for S5. The potential impacts to conservation significant species in adjacent vegetation was determined

to be suitably mitigated through the installation of fencing to prevent unauthorised access and measures outlined in the CEMP to minimise impacts to adjacent vegetation. Additionally, the offset site has high floristic diversity and contains conservation significant species, and the acquisition and vesting of this land into conservation estate was considered to be appropriate in counterbalancing the potential impacts to conservation significant species from the proposed clearing.

Although the application area has a high level of fauna diversity and contains significant habitat for fauna, the offset site is a large parcel of land in Very Good to Excellent vegetation condition (Keighery, 1994), contiguous with Yanchep National Park. This parcel of land is assumed to also have a high level of fauna diversity, which combined with the rehabilitation of adjacent degraded areas and mitigation strategies outlined in Section 3, was determined to be sufficient to mitigate a portion of the impacts of clearing on fauna diversity.

Two of the inferred Priority Ecological Communities within the application are not represented in the offset site, with SCP 24 an inferred community at both locations. The inferred presence of two ecological communities with higher conservation status at the offset site, namely Tuart Woodlands and Banksia Woodlands of the Swan Coastal Plain, was determined to be of a higher conservation outcome, despite the two Priority Ecological Communities not being represented. The offset site was endorsed as being suitable by DPLH, DBCA and the EPA (Strategen-JBS&G, 2020a).

The 1.77 ha of vegetation that was not encompassed by the MRS amendment boundary (and therefore the NPO), has a range of environmental values. The only residual impacts assessed as not being mitigated by the NPO were the impacts to the two inferred PEC's not represented at the offset site. As the land acquisition associated with the NPO exceeded the required area by 3.3 ha, it is considered appropriate that this additional area be used to offset the residual impacts not mitigated through the NPO. Based on the 1:1.5 ratio outlined in the State Planning Policy 2.8 (WAPC, 2010) which was applied in determining the NPO offset, a total of 2.655 ha of the additional land acquired would need to be allocated to offset the residual impacts associated with this application

(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 at variance with this principle

Based on available information, the application area was determined to be suitable for a range of fauna species. The application area lies within the City of Joondalup's Coastal bushland zone, which has been identified as an important habitat for a variety of reptile species (City of Joondalup, 2014). A fauna survey undertaken in adjacent areas identified a range of species, including 44 vertebrate and 48 invertebrate species (Natural Area, 2019). This survey also confirmed the presence of conservation significant fauna (Quenda (*Isoodon fusciventer*), Priority 4), and species identified as locally significant (Government of Western Australia, 2000):

- Collared Sparrowhawk (*Accipiter cirrocephalus*);
- New Holland Honeyeater (*Phylidonyris novaehollandiae*);
- Variegated Fairy-wren (*Malurus lamberti*);
- White-breasted Robin (*Eopsaltria georgiana*);
- White-browed Scrubwren (*Sericornis frontalis*);
- White-cheeked Honeyeater (*Phylidonyris niger gouldii*); and
- White-winged Fairy-wren (*Malurus leucopterus*).

The White Breasted Robin, White-browed Scrubwren, a *Malurus* wren and a medium sized *Accipiter* raptor were observed within the application area and surrounding vegetation during a site inspection undertaken by DWER staff (DWER, 2020).

A NatureMap report generated for the local area indicated that 485 fauna species have been recorded in the local area, of which 38 are considered conservation significant (DBCA, 2007-). The application area was determined to be unsuitable for 30 conservation significant fauna species based on vegetation type, landscape position and behaviour of fauna. The application area was determined to be suitable, but not likely to be significant for five conservation significant species:

- crested tern (*Thalasseus bergii*);
- flesh-footed shearwater, fleshy-footed shearwater (*Ardenna carneipes*);
- fork-tailed swift (*Apus pacificus*);
- osprey, eastern osprey (*Pandion cristatus*); and
- peregrine falcon (*Falco peregrinus*).

These species may utilise the vegetation within the application area but have a wide distribution, and the removal of 4.47 ha of vegetation was determined as unlikely to be considered significant habitat.

The application area was determined to be suitable, and potentially significant for three species:

- Carnaby's Cockatoo (*Calyptorhynchus latirostris*);
- Graceful Sun Moth (*Synemon gratiosa*); and
- Quenda (*Isoodon fusciventer*)

Almost the entirety of remnant vegetation within the application area has been mapped as requiring investigations into foraging potential for Carnaby's cockatoo. The predominant foraging species identified within the application area is *Banksia sessilis*, which is noted as an important foraging species, particularly in the Gngangara Sustainability Strategy area in which the application area is located (Valentine and Stock, 2008; Groom *et al.* 2011). Other species noted within the application area that may provide very marginal foraging habitat including *Acacia saligna* and *Allocasuarina* spp., however based on records of utilisation of the

species it was not considered significant (Valentine and Stock, 2008). The flora and vegetation survey undertaken in 2013 identified 3 vegetation types with *Banksia sessilis*, totalling 1.825 ha within the study area (Mattiske Consulting, 2013). A survey to confirm the extent of foraging habitat was undertaken in 2014 and identified approximately 0.43 ha of foraging habitat within the application area, which was consistent with the habitat assessment undertaken in 2008 by Western Wildlife (Strategen, 2014; Western Wildlife, 2008). This area was used to determine the impacts of the proposed clearing on Carnaby's cockatoos in the supporting information for this clearing application, and in a referral under the *EPBC Act* (Strategen-JBS&G, 2020b). The determination of the referral under the *EPBC Act* was that the proposed clearing was "Not a Controlled Action". Public submissions have raised concerns that areas within the application area that are not identified as suitable foraging habitat within the supporting documentation have foraging value, with observation of Carnaby's foraging in other areas (Submission, 2020). A site inspection undertaken by DWER staff determined that approximately 1.32 ha of vegetation within the application area has *Banksia sessilis*, in varying densities, with areas outlined in the supporting documentation having a higher proportion of *Banksia sessilis*.

There is a confirmed breeding site for Carnaby's cockatoo 3.8 kilometres from the application area and a confirmed night roosting site 4.5 kilometres from the application area. Based on the proximity of this area to breeding and night roosting sites and its location within the Swan Coastal Plain, an important foraging area, the application contains significant foraging habitat. Part of the NPO includes the rehabilitation of areas adjacent to the development area. The incorporation of plantings of suitable foraging species is essential so as to not reduce the foraging capacity of the local area for these populations. The applicant has advised that a priority in the rehabilitation works in adjacent areas will be to incorporate *Banksia sessilis* in vegetation types in which it naturally occurs (Strategen, 2020c). The offset site contains suitable foraging and breeding habitat for black cockatoos.

There is a known population of Graceful Sun Moth within the application area and surrounds. This moth is associated with *Lomandra maritima*, which was recorded predominately in the mapped heathland communities, although the plant species was also associated with the more open shrubland communities (S2 and S4) (Mattiske Consulting, 2013). The Graceful Sun Moth is currently categorised as a Priority 4 conservation significant fauna species; it was listed an Endangered species in 1997, however was delisted in 2012 (WA) and 2013 (Cwlth) after extensive survey efforts. Surveying in 2009 and 2010 confirmed the presence of this species within the area. The dispersal of this species is very limited, with dispersal across unsuitable habitat extremely uncommon (TSSC, 2013). It was determined that, due to the width of the new entrance road, the proposed clearing is likely to lead to the fragmentation of this population. The applicant has advised that *Lomandra maritima* will be considered for use in the rehabilitation works in areas adjacent to the application area (Strategen-JBS&G 2020d). The offset site purchased as part of the NPO also has the presence of *Lomandra maritima*, although the presence of the Graceful Sun Moth at this site had not been confirmed (DWER, 2020).

The application area forms part of the Gnangara Sustainability Strategy Ecological Linkages, a conceptual linkage of areas of vegetation throughout the Gnangara groundwater system (Brown *et al.*, 2009). The application area forms part of 14 kilometres of semi-continuous vegetation along the foreshore from Hillarys to Mindarie. Vegetation along the coastline forms an essential part of this conceptual linkage and coastal linkages are a priority for nature conservation in the area (Brown *et al.*, 2009). A high proportion of these coastal vegetation complexes have been cleared for urban development and are under development pressure (Brown *et al.*, 2009). The proposed clearing will lead to the fragmentation of this linkage with a width of approximately 40 metres of cleared vegetation approximately 390 metres long proposed to be cleared at the northern entrance (Figure 1), and the widening of the existing southern entrance from approximately 10 metres of cleared vegetation to between 25 and 100 metres of cleared vegetation (Figure 1). The disruption of vegetation along this area may impact the movement of species through the landscape, which has the potential to reduce gene flow and create inbreeding depression, reducing the resilience of species.

As a large remnant patch of vegetation, the application area provides habitat for species that require larger space requirements. It is a well-studied theory that larger patch sizes have higher diversity and are more resilient to change (MacArthur & Wilson, 1967; e.g. Lawrence *et al.* 2018). Public submissions have highlighted that this portion of remnant coastal vegetation is one of the widest in Perth, and that small shy birds such as wrens, which aren't common in the Perth Metropolitan Region, need larger patches of undisturbed remnant vegetation to exist, such as the vegetation within the application area (Public Submission, 2020). This large remnant patch of vegetation is likely to contain significant habitat for fauna.

Based on the above information, the proposed clearing is at variance with this principle. Although the application area was determined to contain significant habitat for fauna, the offset site is a large parcel of land in Very Good to Excellent vegetation condition (Keighery, 1994) which is contiguous with Yanchep National Park. This parcel of land is assumed to also have a high level of fauna diversity, which combined with the rehabilitation of adjacent degraded areas and measures outlined in Section 3, was determined to be sufficient to mitigate a proportion of the impacts of the proposed clearing on fauna habitat. The offset was endorsed by DPLH, DBCA and the EPA as being suitable to mitigate the environmental impacts of the proposed clearing within the MRS amendment boundary (Strategen-JBS&G, 2020a). However, onsite mitigation will be required for the disruption of the ecological linkage and habitat fragmentation due to the two road entrances associated with early works.

The impacts on habitat fragmentation through the creation of one road entrance and the widening of a second has been assessed. While it is considered that the rehabilitation along the batters of the roads with locally endemic species will reduce the impacts of habitat fragmentation and provide additional environmental value to the application area post-construction, the two roads, including a dual carriageway, along with three pedestrian pathways will result in habitat fragmentation and disrupt ecological linkage values of the area. Mitigation measures to be implemented for the purpose of minimising the impact of ecological linkage disruption on fauna are described under Section 3.

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

Proposed clearing may be at variance with this principle

Two flora species listed as threatened under the *Biodiversity Conservation Act 2016* have been recorded within the local area, *Marianthus paralius* (Endangered) and *Eucalyptus argutifolia* (Vulnerable). It was determined that the habitat is likely to be suitable for *M. paralius* with coastal heathland community H1 consistent with habitat description outlined in the conservation advice (TSSC, 2018). The habitat was also determined to be likely suitable for *E. argutifolia*, however, the application area is approximately 7 kilometres south of the southernmost population of this species. Both species are conspicuous, perennial species which would have likely been identified in previous survey efforts. A total of five flora and vegetation surveys have been undertaken within the application area in the last 20 years; with three undertaken after the listing of *M. paralius* in 2006 (TSSC, 2018). Survey efforts in adjacent vegetation have also not located the species (Natural Area, 2019).

It was raised in public submissions that these areas have been thoroughly surveyed for flora by volunteers, who have also not recorded this species (Submission, 2020). Based on the level of surveying, it is not likely that this species is present within the application area. However, the application area is consistent with habitat defined as critical to the survival of the species as it is an “area of similar habitat surrounding and linking populations (these providing potential habitat for population expansion and for pollinators), additional occurrences of similar habitat that may contain undiscovered populations of the species or be suitable for future translocations”, and the nearest population is less than 2 kilometres north of the application area (DEC, 2009). Approximately 0.66 ha of the area proposed to be cleared is mapped as coastal heathland.

The federal conservation advice notes that the current management actions as “liaise with City of Joondalup to protect the remnant vegetation on which the species occurs” and recommended management actions as “protect the sites containing populations as well as other potential critical habitat from urban development by seeking to have remnant areas included in the reserve system” (TSSC, 2018).

Based on the presence of critical habitat for Threatened flora species, the proposed clearing may be at variance with this principle. It was determined that the rehabilitation portion of the NPO be considered suitable to mitigate the impacts of the proposed clearing on critical habitat for *M. paralius*, with current areas nominated for rehabilitation to include at least the equivalent amount of heathland area as that proposed to be cleared.

(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

Two state listed threatened ecological communities that have been recorded within the local area, namely *Banksia attenuata* woodlands over species rich dense shrublands, and *Callitris preissii* (or *Melaleuca lanceolata*) forests and woodlands of the Swan Coastal Plain.

Callitris preissii was noted during a site inspection undertaken by DWER staff, however they were isolated, immature individuals that did not form a floristic community (DWER, 2020). Based on previous flora surveys, the application area does not have vegetation consistent with either of these ecological communities.

Based on the above, the proposed clearing is not likely at variance with this principle.

(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

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). The Environmental Protection Authority (EPA) has a modified objective to retain at least 10 per cent of the pre-clearing extent of vegetation complexes for defined constrained areas (intensely developed), namely the Perth and Bunbury Metropolitan Region (EPA, 2008).

In assessing the risk of further loss and subsequent cumulative effects, consideration has been given to the extent of native vegetation remaining and what is currently managed as conservation estate. As indicated in Table 1, the current remnant vegetation extent for the Swan Coastal Plain Interim Biogeographic Regionalisation for Australia (IBRA) bioregion and the Quindalup vegetation complex is over the 30 per cent threshold.

The local area retains 21 per cent of the original vegetation extent, which is above the 10 per cent objective for the Perth Metropolitan Region. The majority of the areas of remnant vegetation in the local area exist as small fragments, with six areas over 100 ha. There is a larger proportion of remnant vegetation within the local area (compared to that which remains with the City of Joondalup) due to the large portions of Bush Forever sites to the north of the application area, within the City of Wanneroo (Burns Beach Bushland and Neerabup National Park).

Table 1: Vegetation representation statistics (Government of Western Australia, 2018)

	Pre-European (ha)	Current Extent (ha)	Remaining (%)	Current Extent in DBCA Managed Lands	
				(ha)	(%)
IBRA Bioregion					
Swan Coastal Plain	1,501,209.19	587,889.09	39.2	195,834.88	33.3
Swan Coastal Plain Vegetation Type					
Quindalup Complex	54,573.87	33,011.64	60.49	4,917.93	9.01
Local Government Area (LGA)					
City of Joondalup	9,802.67	1,158.34	11.82		
Quindalup Complex within the LGA	2,444.69	319.00	13.05		
Local Area					
10 kilometre radius	17,474.84	3,677.51	21.04		

Although the vegetation extent within the local area and vegetation complex is above the EPA's recommended 10 per cent threshold for the Perth Metropolitan Region, it was determined that the application area is located in an area of vegetation that is considered a significant remnant. Large patches of remnant vegetation, such as Ocean Reef Foreshore that the proposed clearing is located in, are important for providing core habitat areas necessary to support species that cannot persist in smaller areas, as outlined in Principle (b) (Kitchener *et al.* 1982; DER, 2014). Additionally, the application area provides an important ecological linkage in the Perth Metropolitan Region, as outlined in Principle (b), which will be interrupted as a result of the proposed clearing.

It was determined that the land acquisition of a large patch of remnant vegetation contiguous with Yanchep National Park was suitable to mitigate the impacts of reducing the extent of a large patch of remnant vegetation, however, offsite mitigation cannot address the issue of ecological linkage fragmentation associated with the proposed clearing. Mitigation measures to be implemented for the purpose of minimising the impact of the proposed clearing on ecological linkage function are described under Section 3.

(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

No wetlands or watercourses are associated with the application area. The closest wetland is Lake Joondalup, a Wetland of National Importance, located 4.6 kilometres east of application area.

Based on the above, the proposed clearing is not likely to be at variance with this principle.

(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

As described under section 2, the application area has five soil subsystems mapped within the application area (Schoknecht *et al.*, 2004). Based on the mapped land degradation risk, the application area has a moderate to high wind and water erosion risk, and water repellence risk (van Gool *et al.*, 2005).

Erosion and the importance of native vegetation in dune stabilisation was discussed in the management plan of the surrounding areas (Natural Area, 2019). The development of infrastructure, such as hardstands and buildings may not necessarily mitigate the impacts of water erosion on the application area and surrounding land. In winter, when there is higher rainfall and wind speeds, the likelihood of land degradation increases.

Based on the above information, the proposed clearing may be at variance with this principle. The applicant has advised that the clearing will be undertaken no more than one month prior to the commencement of works, which will reduce the risk of wind and water erosion. Other measures which are to be included in the Construction Environmental Management Plan (CEMP) include:

- dust suppression measures to avoid erosion and impacts to surrounding vegetation
- stockpiling protocols to avoid dust/ spread of weeds etc. into surrounding areas
- maximum timeframes for exposed sand surfaces (i.e. areas will not be left cleared and undeveloped for an extended period of time).

Based on the mitigation measures outlined above, the CEMP requirements outlined in the NPO, and the inclusion of a wind erosion management condition on the permit to reduce time periods in which cleared areas can remain undeveloped, the risk of land degradation will be minimised appropriately.

(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.

Proposed clearing is at variance with this principle

A portion of the application area was previously part of Bush Forever Site 325 until the gazettal of Metropolitan Region Scheme Amendment 1270/41, which zoned areas to facilitate the development of the Ocean Reef Marina, and included the removal of 25.96 ha of Bush Forever (WAPC, 2016). Bush Forever Site 325 is approximately 10 kilometres of semi-continuous coastal

vegetation from Hillarys to Burns Beach. The northern end of Bush Forever Site 325 is located approximately 380 metres from Bush Forever Site 322, which forms a further 4 kilometres of coastal native vegetation. Although the application area is no longer part of the Bush Forever Site, the proposed clearing may impact this adjacent conservation area through weed and disease invasion, unauthorised access, accidental clearing and erosion impacts. A 0.13 ha portion of the application area is still zoned as Bush Forever Site 325; the clearing of this vegetation will impact the environmental values of this conservation area.

The application area forms part of the Gnangara Sustainability Strategy Ecological Linkages, a conceptual linkage of areas of vegetation throughout the Gnangara groundwater system. The corridor that falls within the application area is defined as regionally significant but not continuous. Vegetation along the coastline forms an essential part of this conceptual linkage and coastal linkages are a priority for nature conservation in the area (Brown *et al.*, 2009). A high proportion of these coastal vegetation complexes have been cleared for urban development and are under development pressure (Brown *et al.*, 2009). The proposed clearing will lead to the fragmentation of this linkage with a width of approximately 40 metres of cleared vegetation approximately 390 metres long proposed to be cleared at the northern entrance (Figure 1), and the widening of the existing southern entrance from approximately 10 metres of cleared vegetation to between 25 and 100 metres of cleared vegetation (Figure 1).

The proposed clearing will decrease the area to perimeter ratio of the adjacent conservation areas. This is an important consideration given that part of the NPO requirements were a suitable offset site with a better area to perimeter ratio. This highlights the importance of edge effects on conservation areas, with an increase in weed abundance and diversity, changes to adjacent vegetation composition, and potential further human impacts such as rubbish dumping and unauthorised access more likely with a lower area to perimeter ratio.

Based on the above information, the proposed clearing is at variance with this principle. The applicant has advised that an additional 3.3 hectares of land has been acquired to mitigate minor clearing not within the scope of the NPO. Based on the 1:1.5 ratio outlined in the State Planning Policy 2.8 and used for the NPO, 0.195 ha of the addition 3.3 ha will need to be set aside to offset the impacts of clearing Bush Forever (WAPC, 2010). The 0.13 ha of Bush Forever proposed to be cleared will be rehabilitated following batter construction.

As outlined in Section 3, appropriate mitigation measures have been put in place to minimise the impacts of the proposed clearing on adjacent conservation areas. The indirect impacts such as weed invasion and erosion to the adjacent conservation area will be mitigated with requirements outlined in the CEMP. The CEMP will be prepared and approved by the relevant authorities prior to the commencement of clearing which will further outline measures to minimise the impacts of clearing on the adjacent Bush Forever areas. These measures are outlined in the Planning Instruments and other relevant matters section and in the NPO (Strategen-JBS&G, 2020a).

The issue of ecological linkage disruption with the creation of one road entrance and the widening of a second was assessed. It was determined that habitat fragmentation would impact on the environmental values of the surrounding Bush Forever Site 325, with impacts to fauna as outlined in Principle (b). It has been advised that the rehabilitation along the batters of the roads with locally endemic species will reduce the impacts of habitat fragmentation and provide additional environmental value to the application area post-construction. However, two roads, including a dual carriageway, and three pedestrian pathways will still fragment the habitat and disrupt ecological linkage values of the area. Mitigation measures to be implemented for the purpose of minimising the impact of the proposed clearing on ecological linkage function are described under Section 3.

(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 not likely to be at variance with this principle

As discussed in principle (f), there are no wetlands or watercourses mapped within the application area. Based on the size of the application area and the coastal location, the proposed clearing is not likely to cause the deterioration in the quality of surface or underground water.

Based on the above, the proposed clearing is not likely to be at variance with this principle.

(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 not likely to be at variance with this principle

Based on the size of the application area and the coastal location, the proposed clearing is not likely to cause, or exacerbate the incidence or intensity of flooding. Given this, the proposed clearing is not likely to be at variance with this principle.

Planning instruments and other relevant matters.

The proposed clearing is part of a wider development of the area for the Ocean Reef Marina, a development encompassing 42 ha of land. A Metropolitan Region Scheme (MRS) amendment (1270/41) was initiated in 2014 and gazetted in November 2019 (WAPC, 2016). This amendment included the rezoning of areas to facilitate the development, including the excision of 26.26 ha of Bush Forever Site 325. One of the outcomes of this amendment was the requirement of a Negotiated Planning Outcome (NPO), including an offset site and rehabilitation of adjacent vegetation. Approximately 1.77 ha of remnant vegetation within the application area does not fall within the MRS amendment boundary and is therefore not encompassed by the NPO. In the process of the MRS amendment, the development was referred to the Environmental Protection Authority (EPA), which determined that the amendment did not require formal assessment, and that the terrestrial aspects could be managed through other processes, predominately through the NPO (Strategen-JBS&G, 2020b). The marine component of this development was assessed by the EPA (EPA, 2019).

The Development has been subject to five Aboriginal heritage surveys, which did not identify any registered sites within the application area (Strategen-JBS&G, 2020b), with the nearest registered site located 840 metres south of the application area.

The clearing permit application was advertised on the DWER website on 1 February 2020 with a 21 day submission period. Five public submissions were received during this time period, raising issues outlined in Table 2 (Submission, 2020). One public submission was received after the closing date.

Table 2: Issues raised in public submissions (Submission, 2020).

Comment	Principle	Response
Habitat fragmentation, destruction of an ecological corridor with three access roads. No means to address this.	(a), (b), (e), (h)	The NPO outlines this impact and notes that it has been minimised as far as practicable through the retention of vegetation to the east of the application area, the avoidance of areas of excellent vegetation to the northeast of the existing boat harbour and a decrease in the broader proposal area from earlier proposed designs. The issues of impacts to ecological linkage were assessed and it was determined that the optimum measure would be to not restrict movement through the landscape and utilise measures to reduce vehicle speed and increase driver awareness to minimise the risk of vehicle strike on fauna.
High degree of genetic diversity between populations of Quandongs (<i>Santalum acuminatum</i>); the population at Ocean Reef is significant.	(a)	Published literature of the genetic diversity of <i>Santalum acuminatum</i> indicated that the species has low genetic diversity (Fuentes-Cross, 2015).
<i>Nitraria billardiarei</i> , <i>Dipolaena angustifolia</i> amongst other species are considered locally significant.	(a)	Local significance of species was considered in the assessment of principle (a).
Priority flora <i>Hibbertia leptotheca</i> (previous <i>Hibbertia spicata</i> var. <i>leptotheca</i>) was not recorded in the most recent flora survey, occurs within the area.	(a)	Although not recorded in the most recent survey, the records from previous surveys indicate that this species is not within the application area, it occurs within the vegetation proposed to be retained to the east of the application area.
Flora survey inadequate – short time frame, species recorded previously (<i>Hibbertia leptotheca</i>) not recorded. 88 native plants recorded; City of Joondalup records (since redacted) listed ~ 140 native species.	(a)	The redacted number of species recorded in the area could not be verified. Other surveys in adjacent coastal foreshore land (e.g. Natural Area, 2019) recorded a similar number of species to the 2013 survey. Overall, the application was determined to contain high floristic biodiversity.
There are significant remnants of priority ecological communities within the application area.	(a)	This was identified as one of the key impacts in the NPO; the offset site and rehabilitation was determined to be suitable in offsetting these impacts. This NPO was endorsed by DBCA, DPLH and the EPA. Approximately 1.77 ha of inferred priority ecological communities lie outside the NPO extent and this has been addressed through the additional area of land acquired at the offset site.
'Biodiversity' has only been assessed in terms of flora and floristic communities; fauna and fungi have not been recently assessed, or assessed at all. Biodiversity has only been assessed as desktop studies or adjuncts to the flora surveys Biodiversity is more than vegetation.	(a), (b)	The assessment has assumed that a high biodiversity (including fauna and fungi) exists in the application area; however the acquisition of an offset site of high conservation value was determined to mitigate the impacts of the proposed clearing, as endorsed by DBCA, DPLH and the EPA.
Age of the surveys mean current values have not been assessed; 2013 for flora and 2008 for low intensity (level 1) fauna. Based on the age of survey (and lack of certain aspects of biodiversity assessed) an accurate assessment of biodiversity cannot be made.	(a), (b)	There have been five flora surveys within the application area in the last 20 years. Based on the age of the fauna survey, a high diversity of fauna in the application area has been assumed (precautionary principle).
The offset site has no mention of Graceful Sun Moth; was not listed when the assessment was undertaken for the offset site (2002). Graceful Sun Moth and the impacts of the clearing on this species has not been addressed.	(b)	Graceful Sun Moth is now listed as Priority 4 after extensive survey efforts identifying significant areas of suitable habitat and areas containing the species. This species occurs in association with <i>Lomandra maritima</i> , which was noted at the offset site, however no detailed survey has been undertaken. The impacts to this species has been addressed under principle (b)
Areas outside of the mapped "potential feeding habitat" for Carnaby's have been observed with Carnaby's feeding; the areas as mapped feeding habitat do not align with the flora survey for <i>Banksia sessilis</i> extent.	(b)	Site inspection undertaken by DWER identified areas outside the "potential Carnaby's feeding habitat" which contained foraging species (<i>Banksia sessilis</i>), although at lower densities. The offset site contains larger areas of higher quality foraging (<i>Banksia</i> woodland). The issue of depletion of foraging habitat for breeding individuals will be addressed in the rehabilitation portion of the NPO, with <i>B. sessilis</i>

As a known breeding site is in close proximity to the application all foraging habitat needs to be considered, not just high quality habitat.		plants incorporated into the planting list for landscaping and rehabilitation incorporating <i>B. sessilis</i> a priority of the rehabilitation plan (where it's naturally occurring).
No plan for fauna relocation.	(b)	Based on the small extent and low intensity of clearing associated with this application, it was determined that fauna relocation measures were not required, and that directional clearing permit conditions will be imposed to allow for fauna movement during clearing.
Works in the colder months are likely to lead to a higher impacts on reptiles who are aestivating.	(b)	The proposed clearing of 4.47 ha for early works is planned to be undertaken in the colder months; the majority of clearing for the wider development will subsequently be likely to occur during a time that has less of an impact on aestivating reptiles.
Light pollution during works and the impacts on invertebrate fauna.	(b)	Light pollution has been raised as an impact that will be addressed in the Construction Environmental Management Plan.
Timing of works having a higher impact on invertebrates that are more active following rainfall.	(b)	The proposed clearing of 4.47 ha for early works is planned to be undertaken in the wetter months; the majority of clearing for the wider development will subsequently be likely to occur during a time that has less of an impact on invertebrates.
Impacts on listed flora and fauna and requires referral	(b), (c)	No flora listed as Threatened under the <i>EPBC Act</i> have been recorded within the application area; no referral was required. Relevant referral has been submitted for Carnaby's cockatoo. Whimbrel (<i>Numenius phaeopus</i>), outlined in a submission, is listed as Marine and Migratory under the <i>EPBC Act</i> . It is uncommon in the south of Australia and is typically found in tidal mudflats and mangrove; the habitat at Ocean Reef is not typically where this species would occur and the proposed clearing is not likely to cause a significant impact on this species.
<i>Marianthus paralius</i> – habitat within the application area is suitable, however it has not been recorded. Rigorous survey recommended.	(c)	As outlined in the decision report, it was determined that the level of surveying within the application area is suitable to determine the presence or absence of this species. Vegetation proposed to be cleared within this clearing permit application that may be classified as critical habitat for this species is 0.66 ha; an area greater than 0.66 ha of this vegetation type is proposed to be rehabilitated.
Due to the topography and distance from the coastline there are concerns with wind erosion, and the impacts on Bush Forever	(g)	Appropriate mitigation strategies have been proposed to minimise wind and water erosion. These are outlined in the avoidance and minimisation measures in Section 3 and outlined in the CEMP requirement below and in Section 4.
Erosion not addressed – clearing exposes coastal dunes winds which are highest during the time of the proposed clearing. Impacts of erosion on Bush Forever not addressed	(g), (h)	Appropriate mitigation strategies have been proposed to minimise wind and water erosion. These are outlined in the avoidance and minimisation measures in Section 3 and outlined in the CEMP requirement below and in Section 4. The CEMP will also address the issues of erosion on adjacent land.
Impacts to bush forever site not addressed, particularly weed invasion, erosion issues and habitat fragmentation	(h)	Mitigation measure to prevent weed invasion will be outlined in the CEMP and in standard permit conditions. Habitat fragmentation and erosion issues addressed above.
Clearing of area not removed from Bush Forever (0.13 ha)	(h)	An additional 3.3 hectares of land has been acquired at the offset site to mitigate potential impacts such as this. The clearing of these areas for road batters, which will be rehabilitated in addition to the 5 ha outlined in the NPO.
Offset site not assessed for Carnaby's feeding	Other - offset	Not formally assessed, although a site inspection undertaken by DWER identified foraging and breeding habitat, sightings of Carnaby's cockatoo and evidence of feeding.
Inadequacy of the offset, does not provide the same environmental values; not like for like: <ul style="list-style-type: none"> - biodiversity, ecological linkage and geoheritage values - Priority ecological communities are being cleared that are not represented in the offset 	Other – offset	Offset approved by the EPA, DPLH and DBCA; it was determined to be as like as practicable and have a higher environmental value compared to the application area. Rehabilitation <i>in situ</i> was incorporated to mitigate impacts that are not suitably addressed in the offset.
No management of the offset site in place (illegal dumping amongst other issues).	Other – offset	Not within the Department's scope of this assessment.
Offset site is adjacent to a proposed major road-building project (Whiteman – Yanchep Highway) – not secure land.	Other - offset	Site has been purchased and is awaiting vesting to the conservation estate.

Offset in Yanchep however City of Joondalup meeting minutes refers to offset adjacent to site (Council Meeting, February 2020).	Other – offset	Likely a miscommunication in the council meeting; offset is in Carabooda (adjacent to Yanchep), rehabilitation is adjacent to the Ground Works site. Cannot locate record of this in referenced report.
Disregard for the value of the area because of the small size of the clearing application – the permit is for preliminary works for a much larger development and should be assessed on this scale. Assessment at these levels is a piecemeal approach.	Other	The Environmental Protection Authority determined the terrestrial portion of the Ocean Reef Marina did not need assessment under Part V, predominately due to the assessment of environmental values during the MRS Amendment and the NPO that resulted from that amendment. The NPO considers the majority of the development area and the appropriate mitigation measures for this area.
Concerns with the adequacy of seed collection for revegetation – A significant proportion of the seed is not likely suitable for revegetation of the areas to be revegetated (<i>Acacia rostellifera</i> and <i>Spinifex longifolius</i>).	Other	Both species have been removed from the revegetation and rehabilitation plan lists.
Disregard for the efforts volunteers have put into the area	Other	The efforts of volunteers is not directly addressed in the 10 clearing principles. The condition of the vegetation may be higher due to these efforts leading to a higher environmental value, and higher value of the offset provided.
City of Joondalup have not signed off on permit.	Other	City of Joondalup have provided DWER with a letter of authority.
Not to cause any ground disturbance until a Coastal Process and Wrack Management Plan has been submitted and approved as per Ministerial Statement 1107.	Other	Ministerial Statement 1107 relates to the marine component of the development. “The terrestrial components of the development are being progressed through a Metropolitan Region Scheme Amendment and are not being addressed through this ESD” (Environmental Scoping Document) (EPA, 2015).
Unsure as to the total area to be cleared of the two clearing permits submitted simultaneously (CPS 8787/1 and 8788/1).	Other	A maximum of 8.37 ha is proposed to be cleared. 4.47 ha (revised from 6.35 ha (CPS 8788/1)) plus 3.9 ha (CPS 8787/1).
City of Joondalup state that the application area is 7.38 ha, when it is 6.3 ha (Council Meeting, February 2020)	Other	The clearing application was for 6.35 ha within a 7.38 ha envelope. This has since been revised to 4.47 ha within a 5.17 ha envelope.
Offsets: 7.38 ha (2.38 + 5 ha) of offsets for 34.9 ha to be cleared. Offsets are conditional upon future subdivision approval, may be unavailable.	Other	The submitter has misread the information, 26 ha (greater than the 22.7 ha required) of land is being purchased as an offset (as opposed to 2.38 ha outlined by the submitter) and 5 ha rehabilitated. In determining the total area to be cleared, the submitter has added the total area of the two applications (8787/1 and 8788/1). There is significant overlap in the application area, with almost the entirety of 8788/1 falling within the application area of 8787/1. In addition, a purpose permit outlines the maximum amount of vegetation to be cleared within an envelope; at most 4.47 ha will be cleared within a 5.17 ha envelope. An offset has been purchased.
Community value of the area not recently assessed	Other	Community values of the area is not assessed under the 10 clearing principles.
Marinas nearby are not at capacity – the need for more facilities is not needed	Other	The need for facilities is not assessed under the 10 clearing principles.
Aboriginal significant of species within the application area; particularly <i>Nitraria billardierei</i> and <i>Santalum acuminatum</i>	Other	Aboriginal significance of plants not within the Department’s scope of assessment.
Self-authorisation by the City of Joondalup to approve this project under a loophole in their own Planning and Development Regulations. This loophole should be addressed and closed by DWER.	Other	Addressing this issue is not within the Department’s scope of assessment.
Rehabilitation of areas the City should be managing anyway – a loophole in the system where they may use self-degraded lands as offsets in the future.	Other	Addressing this issue is not within the Department’s scope of assessment.

A Direct Interest Letter was sent to both the City of Joondalup and the Department of Planning, Lands and Heritage (DPLH). The City of Joondalup support the approval pending the following conditions:

- A Construction Management Plan shall be submitted to, and approved by the City which include details on how it proposes to manage:

- All forward works for the site
 - Bushfire risk, including APZ around the temporary site office
 - Delivery and storage of material and equipment to site
 - The parking arrangements for contractors and subcontractors
 - The management of dust
 - The management of noise
 - Construction signage
- Works shall be undertaken in accordance with this Plan

DPLH do not object to the clearing proposal, however it recommends:

- The rehabilitation strategy as defined in the NPO is prepared and approved by the responsible authority.
- The revegetation of the battering within Bush Forever (0.13 ha) is with locally endemic species.
- A construction management strategy is prepared and implemented to protect the surrounding Bush Forever area and considers matters such as, but not limited to, dust, accidental clearing, weed invasion, drainage, erosion, dieback and other disease spread, access and fencing, waste, noise, light, stockpiling and machinery storage.

DPLH also note the following:

- The development application submitted to WAPC notes the need for a construction management strategy, however to date, this has not been submitted.
- The rehabilitation component of the Negotiated Planning outcome (NPO) entails the preparation and implementation of a rehabilitation strategy. This was to be prepared and submitted following the gazettal of the MRS amendment. This strategy has not been received by DPLH.
- Most of the implementation of the rehabilitation strategy will be after construction, however actions such as seed collection and any plant translocations as outlined in the NPO need to be considered early in the development of the Marina, preferably prior to clearing, to ensure the future rehabilitation is a success.

As such, a rehabilitation strategy has not been submitted to DWER or DPLH for review, however specifications are outlined in the NPO (Section 4).

The CEMP will be prepared on the award of the construction contract (Strategen-JBS&G, 2020d). In addition to the measures outlined by the City of Joondalup and recommended by DPLH, the NPO outlines that the CEMP will include:

- contractor site inductions regarding environmental protection and management
- clear demarcation of clearing boundaries using GPS coordinates and flagging tape (or similar)
- designation of laydown/ works areas (inclusive of spoil stockpiles and access tracks) with
- access to the surrounding Bush Forever site restricted
- weed and hygiene controls for equipment and personnel such as clean-on-entry points
- dust suppression measures to avoid erosion and impacts to surrounding vegetation
- stockpiling protocols to avoid dust/ spread of weeds etc. into surrounding areas
- maximum timeframes for exposed sand surfaces (i.e. areas will not be left cleared and undeveloped for an extended period of time)
- waste management
- accurate and well-maintained clearing records during and post clearing (Strategen-JBS&G, 2020a)

One record of an incident relating to the clearing of native vegetation has been recorded within the application area. A 5 – 6 metre wide firebreak was slashed within the area by DPLH, which also impacted on *Grevillea* sp. Ocean Reef (Priority 1). DPLH have committed to revegetating these areas and Strategen-JBS&G have advised that these areas will not be encompassed in the areas of rehabilitation planned as part of the NPO (Strategen-JBS&G, 2020e). An area DPLH have committed to rehabilitate is within the clearing envelope for this application; it is recommended that the proponent consult with DPLH on the best environmental outcome moving forward.

4. Negotiated Planning Outcome (NPO)

One of the outcomes of the MRS amendment process was the requirement for a NPO (Strategen-JBS&G, 2020a). This NPO outlined the key impacts to Bush Forever Site 325:

- clearing of 16.79 ha of vegetation in varying condition from Degraded to Excellent,
- removal of Priority 3 flora species *Conostylis bracteata*,
- clearing of vegetation in association with inferred Priority Ecological Communities (PECs),
- partial interruption of north-south linkage values,
- loss of habitat for fauna species, and
- potential for indirect impacts on the remaining BF 325 through introduction and spread of weeds, dust generation during earthworks and increased incidence/frequency of fire.

The NPO included measures to mitigate and offset the impacts of the removal of 26.26 ha native vegetation from Bush Forever Site 325. This included the requirement for mitigation and minimisation measures, the acquisition of land and the rehabilitation of areas adjacent to the development. Approximately 1.77 ha of remnant vegetation does not fall within the MRS boundary.

The western 22.7 ha of Lot 51 Walding Road, Carabooda was identified as a suitable offset site (Figure 2). An additional 3.3 ha was secured to mitigate any additional minor clearing to areas outside the development envelope, with a total of 26 ha of land acquired. The 53 ha Lot has approximately 48 ha of remnant vegetation and is located adjacent to Yanchep National Park a

Class A nature reserve. It is planned to be vested into conservation estate. It was determined by the applicant that the offset site meets or partially meets the site selection criteria as outlined by the State Planning Policy 2.8 – Bushland Policy for the Perth Metropolitan Region (WAPC, 2010; Strategen-JBS&G, 2020a).

As the land acquisition associated with the NPO exceeded the required area by 3.3 ha, it is considered appropriate that this additional area be used to offset the residual impacts not mitigated through the NPO. Based on the 1:1.5 ratio outlined in the State Planning Policy 2.8 (WAPC, 2010) which was applied in determining the NPO offset, a total of 2.655 ha of the additional land acquired would need to be allocated to offset the residual impacts associated with this application i.e. impacts to areas outside the MRS amendment boundary. If this additional area is utilised to mitigate these impacts, 0.645 ha of additional land acquired at the offset site would remain unallocated.

The acquisition of this land as an offset was endorsed by the EPA, DBCA and DPLH (Strategen-JBS&G, 2020a). The area contains similarities in floristic community types, however is not “like for like”; it was determined to be as similar as practicable. It was determined that the offset site has higher environmental values due to the presence of conservation significant flora and the presence of Threatened Ecological Communities (TECs). The application area and surrounding vegetation also contains conservation significant flora species, with DWER determining that the offset site and development area have similar environmental values with respect to conservation significant flora. A site inspection undertaken by DWER staff also identified the presence of high quality black cockatoo foraging and breeding habitat, however this has not been quantified (DWER, 2020). The site inspection also noted *Lomandra maritima*, indicating that the site may be suitable habitat for the Graceful Sun Moth, however this has not been quantified (DWER 2020).

The rehabilitation of 5 ha of adjacent bushland in Degraded or Good condition, to a Very Good condition state (Keighery, 1994) was accepted as part of the NPO. The details of this rehabilitation will be outlined in a Rehabilitation Plan. The completion criteria for the rehabilitation plan includes weed coverage, plant density and species richness equivalent to areas considered to be in Very Good vegetation condition (Keighery, 1994; Strategen-JBS&G, 2020a). Monitoring will continue for a minimum 5 years, or until completion criteria are achieved (Strategen-JBS&G, 2020a). This rehabilitation plan focuses on the areas to the east of the application area to improve the quality of the vegetation that will provide ecological linkage between remnant vegetation to the north and south of the application area. The plan will include the incorporation of black cockatoo foraging species as a priority within areas which naturally contain those species, to ensure the quantity of foraging habitat for the local breeding and roosting populations is not diminished medium to long term (Strategen-JBS&G, 2020f). The plan also includes the rehabilitation of a wide range of habitat and vegetation types, including a greater proportion of heath vegetation than is proposed to be cleared. This rehabilitation will potentially provide suitable habitat for *Marianthus paralius*.



Figure 2: Land acquisition site, Carabooda

6. References

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- Strategen-JBS&G (2020b) Supporting Documentation for Native Vegetation Clearing Permit – Purpose Permit: Early Works. Report prepared for DevelopmentWA, 10 January 2020.
- Strategen-JBS&G (2020c) Email correspondence from applicant indicating black cockatoo foraging species within the rehabilitation area will be a key priority. Received by DWER on 18 March 2020 (DWER Ref: A1877800).
- Strategen-JBS&G (2020d) Email correspondence from applicant indicating that *Lomandra maritima* will be considered for suse in revegetation. Received by DWER 13 March 2020 (DWER Ref: A1876546).
- Strategen-JBS&G (2020d) Email correspondence from applicant indicating that a Construction Management Plan will be prepared when construction contract is awarded. Received by DWER 18 March 2020 (DWER Ref: A1878730).
- Strategen-JBS&G (2020e) Email correspondence from applicant indicating that NPO outcome rehabilitation will not overlap with DPLH rehabilitation areas. Received by DWER on 13 March 2020 (DWER Ref: 1876546).
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- Western Wildlife (2008) Ocean Reef Marina Redevelopment Level 1 Fauna Assessment 2008, report prepared for SMEC Australia Ltd, 29 November 2008.

5. GIS Datasets

Publicly available GIS Databases used (data.wa.gov.au):

- Aboriginal Heritage Places (DPLH-001)
- Black Cockatoo Breeding Sites – Buffered (DBCA-063)
- Cadastre Address (LGATE-002)
- Carnaby's Cockatoo Areas requiring investigation as feeding habitat in the Swan Coastal Plain (SCP) IBRA Region (DBCA-057)
- Contours (DPIRD-073)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Flood Risk (DPIRD-007)
- Geomorphic Wetlands, Swan Coastal Plain (DBCA-019)
- Groundwater Salinity Statewide (DWER-026)
- IBRA Vegetation Statistics
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Regional Parks (DBCA-026)
- Regional Scheme – Special Areas (DPLH-022)
- Soil and Landscape Mapping – Best Available
- Soil and Landscape Quality – Wind Erosion Risk (DPIRD-016)
- Soil and Landscape Quality – Water Erosion Risk (DPIRD-013)
- Soil and Landscape Quality – Waterlogging Risk (DPIRD-015)
- Soil and Landscape Quality – Water Repellence Risk (DPIRD-014)
- Soil and Landscape Quality – Subsurface Acidification Risk (DPIRD-011)
- Soil and Landscape Quality – Phosphorus Export Risk (DPIRD-010)
- Soil and Landscape Quality – Salinity Risk (DPIRD-009)

Restricted GIS Databases used:

- Black Cockatoo Roost Sites
- Black Cockatoo Records
- ICMS (Incident Complaints Management System)– Points and Polygons
- Gnarara Mound Ecological Linkages (GSS Ecological Linkages)
- SCP Vegetation Complex Statistics
- Threatened Flora (TPFL)
- Threatened Flora (WAHerb)
- Threatened Fauna
- Threatened Ecological Communities and Priority Ecological Communities
- Threatened Ecological Communities and Priority Ecological Communities (Buffers)