

Howick Road North Construction Project (Parmango Rd to Ridglands Rd)



Vegetation, Flora, Fauna and Environmental Considerations Report

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EXECUTIVE SUMMARY

The survey has been undertaken in accordance with the Environmental Protection Authority (EPA) Technical Guidance, Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia (2016) as part of the application to Clear Native Vegetation for a 6.19 km section of road upgrades. Total area of 18.97 hectares, 5.3 hectares of which is native vegetation. The permit area is along Howick Road Reserve (between Ridglands road and Parmango road). The existing road is a gravel road within a 100 metres wide road reserve. The total cleared road width is currently 18 metres. The Shire is applying to clear 25m wide along the 6.19km section of road, however this is unlikely to be all cleared.

Introduction

The Shire of Esperance plans to upgrade Howick Road from the Fisheries to Coolinup road over a 3 year period. One section has already been done CPS7185. This is a major transport route to the Beaumont CBH grain receival facility and thus gets a high amount of trucks and other traffic.

The survey is part of our compliance obligations for the purpose of clearing native vegetation to construct the road. Howick road is approximately 85km east of Esperance, on the south coast of Western Australia. The Shire of Esperance has applied for a 25m wide clearing footprint area. The current road is 18m wide and the gazetted road reserve is 100m. The survey is restricted to an area 5m either side of the existing road alignment.

The survey has been undertaken in accordance with the Environmental Protection Authority (EPA) Technical Guidance, Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia (2016).



Figure 1: Location of Project area

BACKGROUND

The road construction project has the potential to affect a number of possible environmental factors. These include;

- Threatened Flora (TF) and Priority Flora (PF) within a twenty kilometre radius.
- Threatened Ecological communities (TEC) specifically the EPBC listed 'Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia'
- Carnaby's Cockatoo

Scope

The flora survey is in two parts being;

1. A desktop study for the purposes of gathering background information on the target area, and;
2. Reconnaissance survey to understand the likely presence of vegetation communities and flora species identified from the background study, define flora and vegetation units, their condition and potential impacts.

The survey involves low intensity sampling of flora to produce a species list (Appendix 1), and maps of vegetation types and condition.

Catchment landscape context

Climate

The climate is Mediterranean with cool wet winters and dry warm summers. The site receives an average annual rainfall of about 400 mm (DAFWA 2002).

Geology

The site consists of:

- thin and deep Tertiary marine sediments of the Pallinup formation overlying Proterozoic granite and gneiss
- gneiss bedrock and partially dissected Tertiary marine sediments and alluvium over shallow granite and gneiss b
- Quaternary Aeolian sands over Tertiary Sediments of the Pallinup formation

Soils

Soils consist of three individual subsystems;

Scaddan 9 Subsystem - Alkaline grey shallow sandy duplex soils and grey shallow sandy duplex soils with minor saline wet soils

Scaddan 10 Subsystem - Alkaline grey shallow sandy duplex soils and associated calcareous loamy earths

Condingup 1 Subsystem (245Co_1): Gently undulating plain with subdued sandsheets and dunes. Aeolian sands / Pallinup formation. Pale deep sands and associated grey deep sandy duplex soils (some gravelly).

Vegetation

The site consists of the following Beard vegetation associations:

IBRA Subregion	Association	Description
Recherche	516	Shrublands; mallee scrub, black marlock
Recherche	47	Shrublands; tallerack mallee-heath
Recherche	931	Medium woodland; Yate

Land Use

The site is located within the Howick Shire Road Reserves. It is surrounded by mixed cropping and grazing land as well as an unallocated Crown Land Reserve R31798. At the southern end of the project area is Nature Reserve 32128.

METHODOLOGY

Desktop study

A desktop study of existing geospatial information was undertaken prior to the site visit as part of the level 1 survey. This included using a Geographical Information System (GIS) to review existing site digital orthophotos, geology, morphology, wetlands, native and planted vegetation, IBRA classification, Threatened Flora (TF), Priority Flora (PF) and Threatened Ecological Communities (TEC's). WALGA's Environment Planning Tool was also used and this report has been added as an Appendix.

State and Commonwealth database searches for potential DRF, PF, and Threatened Ecological Communities (TEC), within a twenty kilometre buffer of the survey sites was undertaken as part of the desktop study. Additional liaison with the Esperance DPaW District Flora Officer was conducted to further refine conservation values of interest and to define the twenty kilometre buffer due a lack of DRF and PF data across the District.

Field investigation

The preliminary field survey was conducted on 6 December 2017. The survey effort comprised of driving slowly down Howick Road with frequent stops and transects by foot into the roadside vegetation. Each time there was a visible change in vegetation structure, condition or composition it was noted and a foot traverse was undertaken noting species present at the site and taking herbarium specimens. A portable field herbarium was established and a preliminary species list developed.

The Esperance Shire provided coordinates for each site which were uploaded from GIS into a Garmin GPSmap64 unit and a field aerial photo map was used to navigate to different habitat areas.

A list of TF and PF within a ten kilometre radius of each site was used in the field along with a Threatened and Priority Flora field manual provided by the Esperance DPaW District Flora Officer. A combination of local botanical knowledge, botanical field guides, the DPaW Esperance District Herbarium and Florabase were used to prepare a plant species lists for each site (Appendix 1). Specific habitats that were likely to contain Priority flora species were extensively searched.

Ecological impacts were listed as being present or absent, and take into account both negative and positive impacts on the vegetation. They included clearing, artificial water way construction, fire, regeneration, waterlogging, senescence, weeds, erosion, sedimentation, rabbits, dieback, and illegal dumping of rubbish.

The condition of vegetation is a subjective assessment of how healthy the vegetation is at the time of the survey. This was based on the amount of dead or dying plants throughout the stratum compared to the amount of living plants and weed cover. This was categorized as "Excellent," "Very Good," "Good," "Degraded," or "Completely Degraded." The categories are derived from Keighery 1994, and outlined in further detail in Appendix 2.

The survey determined which areas were potentially the nationally listed threatened ecological community (TEC) Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia by using the key diagnostic characteristics as defined in the Approved Conservation Advice for the TEC. According to this document;

A patch must include the following key diagnostic characteristics to be considered the ecological community:

- 1) Occurs within the Southeast Coastal Floristic Province (*sensu* Hopper and Gioia, 2004; relating to south west Australian phytogeographic boundaries. Includes the islands of the Recherche Archipelago).

AND

2a) Characterised by Proteaceae species having 30% or greater cover of Proteaceae species across all layers where these shrubs occur (crowns measured as if they are opaque),

OR

2b) Two or more diagnostic Proteaceae species are present that are likely to form a significant vegetative component when regenerated.

This shapefile data has been forwarded to Department of Biodiversity Conservation and Attactions, Species and Communities branch and Esperance District.

All field data collected relating to vegetation type, condition, transect coverage, and photo points have been collated into GIS shapefiles and used as part of the analysis. Mapping of site area vegetation type and condition were collated and recorded as polygon shapefiles and attributed with area and perimeter parameters.

Findings from the desktop study and field survey were reviewed against whether each site would affect any of the following environmental values:

- The presence or absence of TF, PF and TEC's and
- The area and condition of remnant vegetation.

RESULTS

Desktop study

The Declared and endangered flora list (DEFL) database search and liaison with the Esperance DPaW District Flora Officer resulted in several known Priority Flora species and sites within a twenty kilometre radius of each site (Table 1). Appendix 3 provides a description of each priority conservation status. The site had 20 Priority Flora species and 1 Threatened Flora species recorded within a twenty kilometre radius of the survey area.

Taxon	TF	P1	P2	P3	P4
<i>Acacia nitidula</i>			2		
<i>Anigozanthus bicolor ssp. minor</i>	2				
<i>Davesia pauciflora</i>				1	
<i>Darwinia sp. Mt Burdett</i>					2
<i>Eucalyptus sweedmannii</i>		1			
<i>Goodenia laevis laevis</i>				1	
<i>Grevillea baxteri</i>					2
<i>Hibbertia hamata</i>				2	
<i>Isopogon alpicornis</i>				1	
<i>Kennedia beckxiana</i>					2
<i>Lepyrodia fortunata</i>		1			
<i>Lambertia echinata ssp. echinata</i>	1				
<i>Lasiopetalum parviflorum</i>				1	
<i>Leucopogon florulentus</i>				2	
<i>Leucopogon remotus (sp. South Coast)</i>		2			
<i>Melaleuca eximia</i>			1		
<i>Myoporum turbinatum</i>					4
<i>Myoporum velutinum</i>	5				
<i>Scaevola archeriana</i>		1			
<i>Spyridium mucronatum ssp. multiflorum</i>			1		

Table 1: Priority flora sites within a 20 km radius

RESULTS

Threatened Ecological Communities

The site intersected the EPBC listed Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia Threatened Ecological Community Likely to occur shapefile and Beard vegetation units also confirm this.

Field Flora Survey (TF and PF)

One species of Priority four flora was found during the survey 1.8km southeast of Ridglands Road (GPS 33.62789S, 122.663778233E). 3 individual *Grevillea baxteri* plants are likely to be taken as part of this clearing permit. The population extends into the adjacent bushland however a full count was not completed during field survey.



3 individual *Grevillea baxteri* (P4) plants are likely to be taken as part of this clearing permit

Threatened Ecological Communities

37% of the project area met the EPBC listed Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia Threatened Ecological Community diagnostic characteristics and condition thresholds.



Figure 3: Yellow indicates location of Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia Threatened Ecological Community within project area (Pink). This consists of 37% of the project area.

Kilometres SE from Ridglands Road	Notes	Vegetation Condition (Kieghery Scale)	Meets TEC definition (Y/N)	Vegetation Description	Species Present
0-3km		Very Good	No	Eucalyptus woodland over mixed melaleuca shrubland, with scattered <i>Banksia media</i> and <i>Hakea laurina</i>	<i>Eucalyptus eremophila</i> , <i>Melaleuca societalis</i> , <i>Banksia media</i> , <i>Acacia glaucoptera</i> , <i>Callitris</i> sp. <i>Hakea laurina</i>
3-3.2km		Very Good	Yes – east side only	<i>Banksia armata</i> dominated shrubland	<i>Banksia armata</i> , <i>Allocasurina humilis</i> , <i>Cassytha</i> sp. <i>Callitris roei</i> , <i>Eucalyptus plurocarpa</i> , <i>Acacia myrtifolia</i> , <i>Lasiopetalum</i> sp. <i>Beaufortia schaeuri</i> , <i>Halgania anagalloides</i> var. Southern, <i>Melaleuca calycina</i> , <i>Melaleuca podiocarpa</i> , <i>Hakea denticulate</i> , <i>Cooperookia strophiolata</i> , <i>Gastrolobium</i> sp.
3.2-3.4		Very Good	No – not 30% proteaceae cover	<i>Hakea laurina</i> over <i>Melaleuca shrubland</i>	<i>Grevillea nudiflora</i> , <i>Melaleuca pulchella</i> , <i>Acacia</i> sp. <i>Melaleuca uncinata</i> , <i>Hakea laurina</i> , <i>Banksia armata</i>
3.4-3.9		Very Good		Eucalypt over melaleuca shrubland	
3.9-4	Old gravel pits	Good - degraded			
4.4km	Saline creek	Poor		Yate woodland	

4.5-4.8			Yes	Hakea shrubland	<i>Hakea ruscifolia</i> , <i>Billardiera fusiformis</i> , <i>Hakea trifurcata</i> , <i>Leptospermum</i> <i>spinescens</i> , <i>Grevillea nudiflora</i> , <i>Verticordia</i> <i>sp.</i> <i>Davesia apiculata</i> , <i>Beaufortia schaeuri</i> , <i>Petrophile</i> , <i>Hakea</i> , <i>Synaphea</i> , <i>Calothamnus</i> <i>quadrifidus</i> , <i>Hakea corymbosa</i>
4.8-5.2	Pinus pinaster on south side of road – Carnabys feeding habitat	Good	Yes	Banksia speciosa woodland	<i>Banksia speciosa</i> , <i>Meleuca striata</i> , <i>Adenanthos cunneatus</i> , <i>Hakea corymbosa</i> , <i>Grevillea baxteri</i> (P4)
5.3-6.1		Very Good	Yes	Nuytsia floribunda and tallerack over mixed heath	<i>Nuytsia floribunda</i> , <i>Eucalyptus pleurocarpa</i> , <i>Banksia repens</i> , <i>Anigozanthos rufus</i>

Table 1.

Notes taken in the field

Photos from Field work



33°36'50.778"S 122°39'1.049"E - *Banksia armata* dominated shrubland



33°36'54.059"S 122°39'4.229"E - *Banksia armata* dominated shrubland



Old gravel pits



33°37'13.6619"S 122°39'27.827"E – Old gravel pits good condition



33°37'38.7179"S 122°39'57.023"E – *Banksia speciosa*, note *Pinus pinaster* growing along farm boundary. Due to the width of existing road reserve there will be minimal impact on Carnaby's cockatoo feeding habitat.



33°37'38.7179"S 122°39'57.0239"E – *Banksia speciosa* mixed heath



33°37'40.589"S 122°39'59.441"E - *Nuytsia floribunda* over mixed heath

Desktop Assessment Report for Native Vegetation Clearing Application

Report generated: Wed Nov 29 12:56:19 EST 2017

Please complete the details below:

Applicant:

Your reference:

Property: 1930(L169) RIDGELANDS RD, CONDINGUP, 6450 (PIN: 992848)

1303(L170) PARMANGO RD, CONDINGUP, 6450 (PIN: 992857)

Lot 0 , , 0 (PIN: 11644423)

LGA: ESPERANCE, SHIRE OF

Proposed Clearing: 39.38 hectares _____ trees

Purpose:

Land Tenure:

Buffer distance: 20km

Notes

- This report is designed for Local Government (LGA) Strategic Purpose Permit holders and to support Local Governments with native vegetation clearing permit applications.
- This report is a desktop study and does not replace a site assessment
- The information generated in this report is correct to the best of WALGA's knowledge. WALGA takes no responsibility for decisions made using this report.
- Further information on how to interpret the datasets is available in the [Explanatory Notes](#).
- Further information about the clearing principles is available from the [Department of Environment Regulation \(DER\) "A guide to the assessment of applications to clear native vegetation"](#).

Interpreting this report

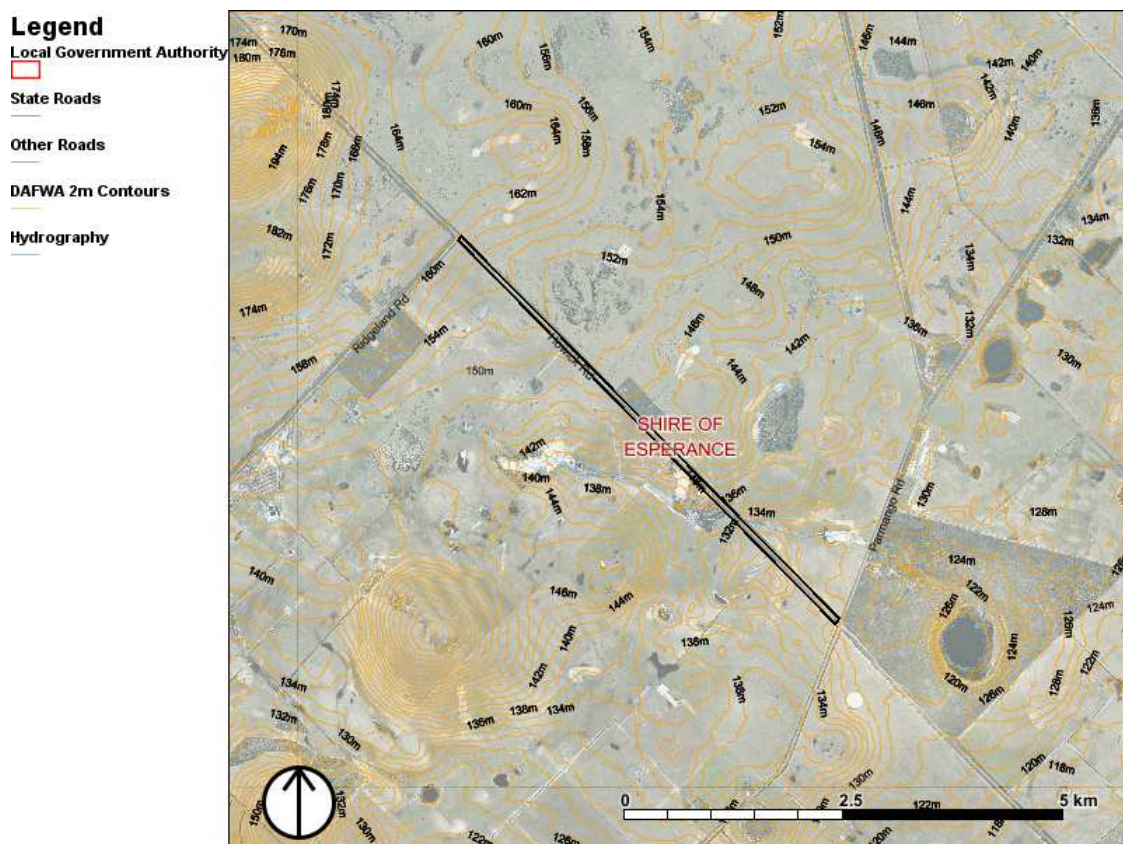
- This report will assist the user to determine if the proposed clearing is 'at variance', 'may be at variance', 'not likely to be at variance' or 'not at variance' to any of the clearing principles contained Schedule 5 of the Environmental Protection Act 1986 (EP Act).
- If using this report to complete an assessment as part of your desktop study under your Strategic Purpose Permit and an 'at variance' result is produced, you may refer your application to DER for clarification. Please use the template referral email located here (link to the template I have prepared). Please note that the Strategic Purpose Permit applies to clearing that is 'not at variance' or 'not likely to be at variance' to any of the clearing principles proposed clearing that 'may be at variance' or 'is at variance' will need to be referred to DER for review.

- If using this report as supporting information for a clearing permit application, please email this report, a covering sheet and accompanying shapefile with the application form and [payment](#) to the [DER](#)
- If you are unsure about the levels of variance identified in this report and require further clarification, please seek further advice from DER by submitting a [referral form](#) via [email](#) or alternatively phone (08) 9333 7469.
- The 'may be at variance' and 'at variance' levels determined in this report identifies that a clearing principle requires further attention. A more detailed assessment (including a site visit may be required) and further identification of impacts may alter the variance levels. If you wish to seek clarification on the altered variance level, please seek advice from your Local Government Environment Team in the first instance and DER through the [referral request](#).
NB: Any actions you take should be accounted for and recorded. This information should be provided in your annual report and is subject to DER auditing.

Distance and area calculations are performed using the following map projection:
EPSG:28351

1 Background details

1.1 Site details



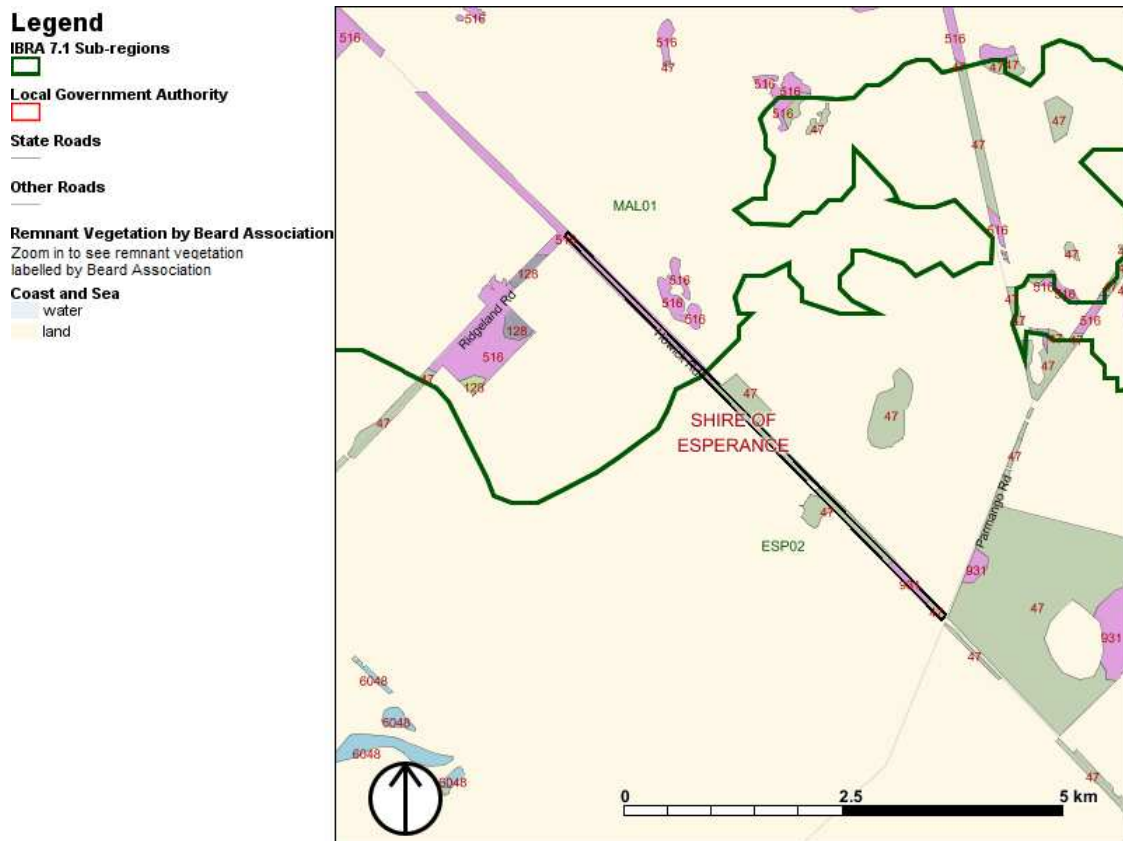
Property:

1930(L169) RIDGELANDS RD, CONDINGUP,
6450 (PIN: 992848)

1303(L170) PARMANGO RD, CONDINGUP,
6450 (PIN: 992857)
Lot 0 , , 0 (PIN: 11644423)

Local Government Authority: ESPERANCE, SHIRE OF
DER Region: SOUTH COAST
DPaW District: ESPERANCE
LCDC: ESPERANCE
GPS coordinates lat/long: 33.6148S,122.6504E
Environmentally Sensitive Area: null
EPA Position Statement No.2 Area: y
EPA Red Book Area: null
Country Areas Water Supply Act 1947 - Clearing Control Catchment: No
Rights in Water and Irrigation Act 1914 area: No
Clearing Area (ha): 39.38

1.2 (Principle (e)) Mapped vegetation description



Interim Biogeographic Regionalisation for Australia (IBRA) region:
Mallee / Eastern Mallee(MAL01) - 13.20 ha
Esperance Plains / Recherche(ESP02) - 26.18 ha

Beard vegetation associations:

IBRA Subregion	Association	Rarity %	Area (ha)
Eastern Mallee	516	48.68	12.98
Recherche	931	42.06	3.96
Recherche	516	36.79	0.55
Recherche	47	15.06	1.68

1.3 Geoscientific information

Rainfall (mm):	488, 506
Evapotranspiration (mm):	375, 378, 377
Elevation (topographic contours) m:	144, 156, 158, 146, 148, 150, 152, 154, 130, 132, 134, 136, 138, 140, 142
Geology:	<p>Dunes, sandplain with dunes and swales; may include numerous interdune claypans; residual and aeolian sand with minor silt and clay; aeolian red quartz sand, clay and silt, in places gypsiferous; yellow hummocky sand 7.96 ha</p> <p>Sand or gravel plains; quartz sand sheets commonly with ferruginous pisoliths or pebbles, minor clay; local calcrete, laterite, silcrete, silt, clay, alluvium, colluvium, aeolian sand 14.40 ha</p> <p>Weakly to moderately deformed and recrystallised granite; even grained or porphyritic 17.02 ha</p>
Soils:	<p>Esperance 6 Subsystem (245Es_6): Red-brown to grey brown alluvial sands. - 3.96 ha</p> <p>Condingup 1 Subsystem (245Co_1): Gently undulating plain with subdued sandsheets and dunes. Aeolian sands / Pallinup formation. Pale deep sands and associated grey deep sandy duplex soils (some gravelly). Shrubland of <i>Banksia speciosa</i> and associated mallee heath - 9.03 ha</p> <p>Scaddan 9 Subsystem (246Sc_9): Soil complex, S1 + S2. - 7.36 ha</p> <p>Scaddan 10 Subsystem (246Sc10): Slightly elevated gently undulating plain. Tertiary marine sediments / Prot. granite & gneiss. Alkaline grey shallow sandy duplex soils & calcareous loamy earths. Mallee shrubland / <i>Melaleuca</i> species with <i>E. occidentalis</i> woodland in Swamps. - 19.04 ha</p>

1.4 Other Considerations

Department of Aboriginal Affairs heritage sites:No

Time Constraints (please complete)

Funding (Y/N):

Seasonal (Y/N):
 Hazard Reduction (Y/N):
 Other:

2 Assessment of clearing principles

2.1 Identified Potential Impacts Summary

Desktop assessment against clearing principles:

■ Likely to be at variance
 ■ May be at variance
 ■ Not likely to be at variance

Clearing Principle	Impact	Reason	Action Required
Principle (a) - High biodiversity	■	Principle (b) red impact. Principle (e) red impact.	
Principle (b) - Significant habitat for fauna	■	Specially Protected Fauna within 20km.	
Principle (c) - Habitat for rare flora	■	Declared Rare Flora within 20km.	Ground survey for vegetation condition and tree hollows in the application area may raise flag status.
Principle (d) - Habitat for TECs	■	Threatened Ecological Community (buffer) within 20km.	
Principle (e) - Significant remnant in an extensively cleared area	■	Beard association less than 30% extent remaining within IBRA regions.	
Principle (f) - Growing in association with a watercourse or wetland	■	Application area is within 200m of a Dept of Water mapped natural hydrographic feature.	
Principle (g) - Likely to cause appreciable land degradation	■		
Principle (h) - Impacts to conservation area	■		
Principle (i) -	■	Application area > 5ha	

Deterioration in the quality of surface or underground water

and:
is within 200m of a Dept of Water mapped natural hydrographic feature.

The following section lists the data used to inform the assessment against clearing principles. Further information might be available for your application site in specific project reports or site specific assessments that you might like to attach to this desktop assessment.

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

Specially Protected Fauna

The following fauna record counts have been located within 20km of the application area:

Class	Rank	No. records
BIRD	EN	4
REPTILE	P3	1

Key to conservation status ranking:

EX = Presumed Extinct

EN = Endangered

CR = Critically Endangered

VU = Vulnerable

P1-5 = Priority 1 to 5 fauna

Priority Fauna

The following priority fauna records have been located within 20km of the application area:

SOURCE_ID	Class	Rank	Certainty	Distance (m)
16230	REPTILE	P3	Certain	13047

Specially Protected Flora

The following flora record counts have been located within 20km of the application area:

ConsStatus	WARank	No. records
Priority 1		1
-	VU	1
Priority 3		3
Priority 4		25
-	EN	1

Key to the Conservation Status:

CR - Critically Endangered

EN - Endangered

VU - Vulnerable

1 = Priority 1: Poorly Known Taxa

2 = Priority 2: Poorly Known Taxa

3 = Priority 3: Poorly Known Taxa

4 = Priority 4: Rare Taxa

Priority Flora

The following priority flora records have been located within 20km of the application area:

Popn Id	Priority	Proximity (m)
100420	Priority 4	8486
100419	Priority 4	8588
109379	Priority 4	10376
109380	Priority 4	10578
100416	Priority 4	10584
100410	Priority 4	10609
100409	Priority 4	10864
100411	Priority 4	11007
100414	Priority 4	11081
100413	Priority 4	11156
100417	Priority 4	11425
100412	Priority 4	11713
100415	Priority 4	11733
89056	Priority 4	11765
86888	Priority 4	12275
100406	Priority 4	12591
89055	Priority 4	13537
100403	Priority 4	14020
100404	Priority 4	14119
109351	Priority 4	14146
100402	Priority 4	14285
89054	Priority 4	15182
109353	Priority 4	15406
88615	Priority 3	15631
100423	Priority 4	16123
100422	Priority 4	16124
96620	Priority 1	16606
90510	Priority 3	17490
88604	Priority 3	18575

Threatened Ecological Communities

The following threatened ecological community records have been located within 20km of the application area:

Ranking	Count
Priority 3	928

Priority Ecological Communities

The following priority ecological community records have been located within 20km of the application area:

Record ID	Ranking	Proximity (m)
16808	Priority 3	0
11777	Priority 3	0
8739	Priority 3	0
6713	Priority 3	0
5984	Priority 3	0
5792	Priority 3	0
12502	Priority 3	0
6056	Priority 3	0
8738	Priority 3	298
12935	Priority 3	302
5983	Priority 3	709
8736	Priority 3	1416
5937	Priority 3	1625
12937	Priority 3	1729
7172	Priority 3	1732
13653	Priority 3	1777
12473	Priority 3	1913
16807	Priority 3	1979
6481	Priority 3	2109
12936	Priority 3	2139
11778	Priority 3	2160
6106	Priority 3	2177
5793	Priority 3	2264
5798	Priority 3	2372
14031	Priority 3	2381
5815	Priority 3	2451
7175	Priority 3	2460
6709	Priority 3	2471

6105	Priority 3	2560
6850	Priority 3	2794
5799	Priority 3	2799
14113	Priority 3	2924
6856	Priority 3	2929
12335	Priority 3	2979
13771	Priority 3	2986
14112	Priority 3	3103
5754	Priority 3	3190
14527	Priority 3	3231
14033	Priority 3	3280
6540	Priority 3	3300
5800	Priority 3	3337
15006	Priority 3	3366
6849	Priority 3	3387
6712	Priority 3	3432
6612	Priority 3	3586
6482	Priority 3	3589
6215	Priority 3	3638
6541	Priority 3	3660
6062	Priority 3	3686
6641	Priority 3	3704
14032	Priority 3	3833
7147	Priority 3	3854
6483	Priority 3	3865
8740	Priority 3	3953
15854	Priority 3	4004
14111	Priority 3	4164
12337	Priority 3	4173
16809	Priority 3	4200
5795	Priority 3	4228
16994	Priority 3	4280
14161	Priority 3	4305
6714	Priority 3	4312
6214	Priority 3	4432
13856	Priority 3	4486
6848	Priority 3	4512
15427	Priority 3	4550

16549	Priority 3	4561
12019	Priority 3	4564
5856	Priority 3	4566
11572	Priority 3	4566
12016	Priority 3	4575
8185	Priority 3	4578
16806	Priority 3	4580
12933	Priority 3	4589
6213	Priority 3	4607
7161	Priority 3	4723
15896	Priority 3	4820
6549	Priority 3	4838
7747	Priority 3	4905
6480	Priority 3	4926
7162	Priority 3	4949
12934	Priority 3	5094
8184	Priority 3	5111
11908	Priority 3	5112
6057	Priority 3	5160
7746	Priority 3	5185
6502	Priority 3	5218
6711	Priority 3	5242
8643	Priority 3	5301
5939	Priority 3	5355
6710	Priority 3	5382
12896	Priority 3	5400
7163	Priority 3	5451
6503	Priority 3	5466
8737	Priority 3	5541
5938	Priority 3	5598
7024	Priority 3	5631
13770	Priority 3	5635
5751	Priority 3	5646
6611	Priority 3	5680
5857	Priority 3	5726
14978	Priority 3	5805
5905	Priority 3	5905
7148	Priority 3	5936

5794	Priority 3	6006
12014	Priority 3	6010
6104	Priority 3	6155
8168	Priority 3	6197
12956	Priority 3	6317
12017	Priority 3	6332
7023	Priority 3	6380
12951	Priority 3	6400
5906	Priority 3	6410
5904	Priority 3	6434
6063	Priority 3	6445
7173	Priority 3	6479
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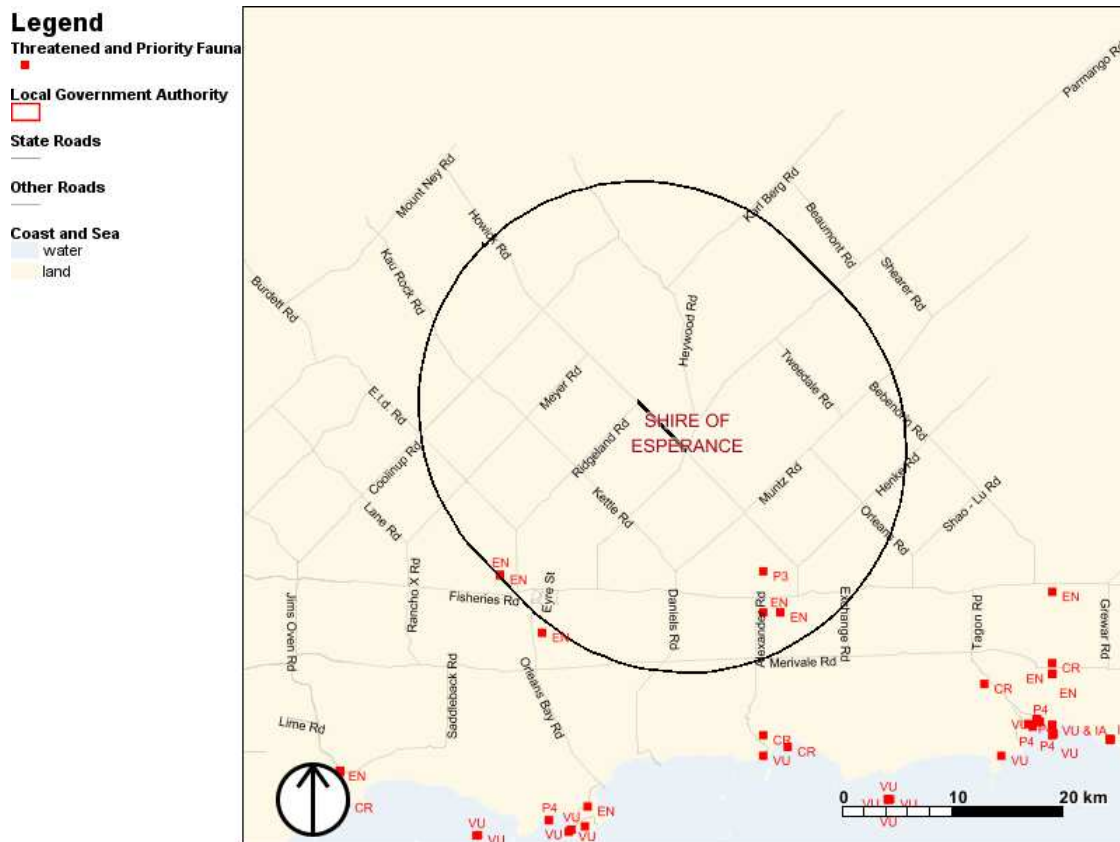
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11579	Priority 3	19927
14518	Priority 3	19951
7708	Priority 3	19954
7013	Priority 3	19959
15570	Priority 3	19965

Apiary Sites

The following apiary site records have been located within 20km of the application area:

2.2 Principle (b) Native vegetation should not be cleared if it comprises the whole or part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.



Specially Protected Fauna

The following fauna records have been located within 20km of the application area:

SOURCE_ID	Class	Rank	Certainty	Distance (m)
16873	BIRD	EN	Certain	16277
16872	BIRD	EN	Certain	17010
10284	BIRD	EN	Certain	19887
10283	BIRD	EN	Certain	19887

Key to conservation status ranking:

EX = Presumed Extinct

EN = Endangered

CR = Critically Endangered

VU = Vulnerable

IA = migratory birds protected under an international agreement

Ecological linkages and vegetation connectivity

The application area is within a Regional Ecological Linkage. Regional Ecological Linkages should be maintained wherever possible.

The application area is within the following South Coast Macro Corridor Project Zones (area in ha):

Zone C 25.11 ha

Strategic Zone B 14.27 ha

Ecological linkages for the surrounds of the application area:

Legend

Local Government Authority



State Roads

Other Roads

South Coast Macro Corridor Zones

Strategic Zone A

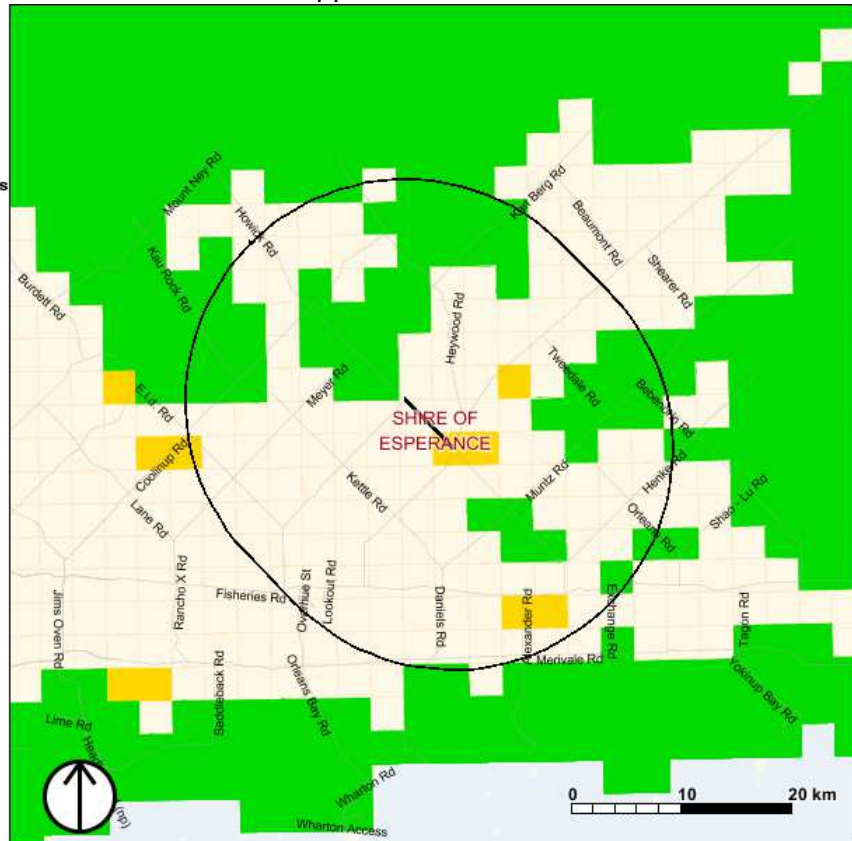
Strategic Zone B

Zone C

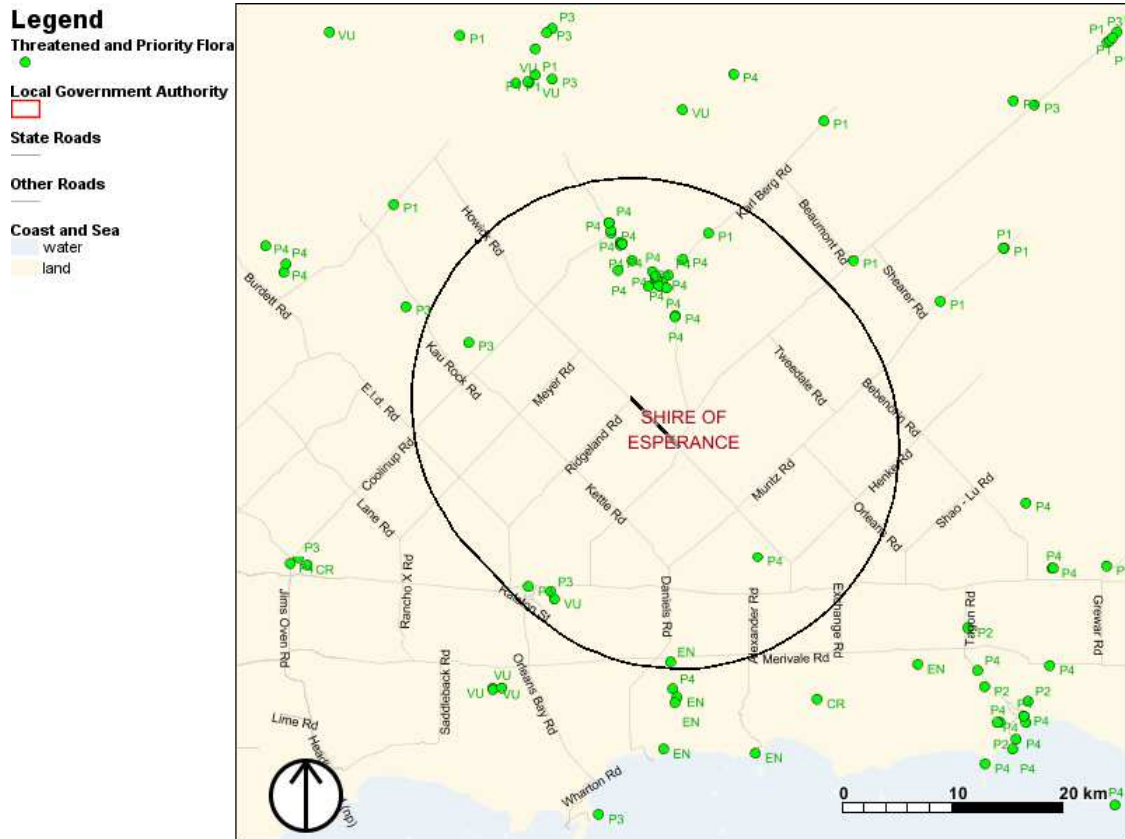
Coast and Sea

water

land



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



Specially Protected Flora

The following flora records have been located within 20km of the application area:

Popn Id	WA Rank	Proximity (m)
89828	VU	17793
109809	EN	19459

Key to the Conservation Status:

- CR - Critically Endangered
- EN - Endangered
- VU - Vulnerable
- EX - Extinct

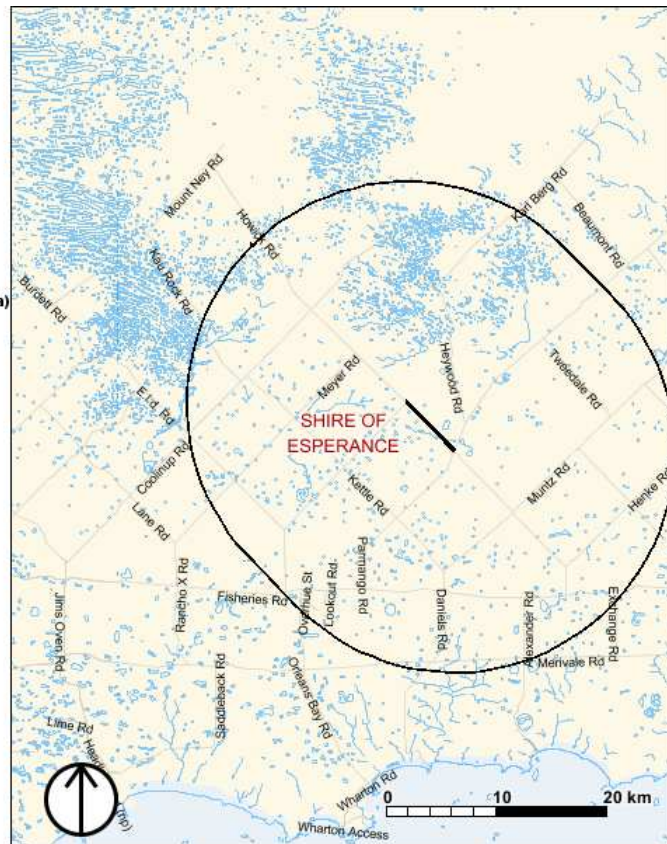
2.4 Principle (d) Native vegetation should not be cleared if it comprises the whole or a part or, or is necessary for the maintenance of, a threatened ecological community.

Threatened Ecological Communities

No threatened ecological community records were located within 20km of the application area.

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

- Legend**
- Local Government Authority
 -
 - State Roads
 -
 - Other Roads
 -
 - Hydrography
 -
 - Coast and Sea
 - water
 - land
 - Lakes, Waterbodies and Reservoirs (Geoscience Australia)
 - Perennial
 - Non-perennial
 - Dam or Reservoir



4.69ha of the application area is in or within 200m of a Dept of Water mapped natural hydrographic feature.

The site is in or within 20 km of the following Geoscience Australia mapped lakes (distance from the application area):

- Unnamed lake 220 - 16742m
- Unnamed lake 217 - 14679m
- Unnamed lake 216 - 7923m
- Unnamed lake 215 - 14996m
- Unnamed lake 214 - 12793m
- Unnamed lake 213 - 14030m
- Unnamed lake 212 - 11647m
- Unnamed lake 211 - 8419m
- Unnamed lake 210 - 14799m
- Unnamed lake 219 - 10803m
- Unnamed lake 218 - 17460m
- Unnamed lake 230 - 11344m
- Unnamed lake 231 - 10294m
- Unnamed lake 226 - 15430m
- Unnamed lake 225 - 16563m
- Unnamed lake 228 - 16381m
- Unnamed lake 227 - 17155m

Unnamed lake 222 - 15013m
Unnamed lake 221 - 9443m
Unnamed lake 224 - 16274m
Unnamed lake 223 - 14541m
Unnamed lake 229 - 17875m
Unnamed lake 200 - 19109m
Unnamed lake 202 - 19187m
Unnamed lake 201 - 19683m
Unnamed lake 204 - 19709m
Unnamed lake 203 - 19615m
Unnamed lake 206 - 16545m
Unnamed lake 205 - 19131m
Unnamed lake 208 - 19553m
Unnamed lake 207 - 14005m
Unnamed lake 209 - 18228m
Unnamed lake 78 - 16309m
Unnamed lake 79 - 16699m
Unnamed lake 76 - 16624m
Unnamed lake 77 - 9979m
Unnamed lake 75 - 8155m
Unnamed lake 74 - 11261m
Unnamed lake 73 - 8007m
Unnamed lake 72 - 9749m
Unnamed lake 71 - 18353m
Unnamed lake 70 - 18843m
Unnamed lake 87 - 12203m
Unnamed lake 88 - 14474m
Unnamed lake 89 - 8658m
NERIDUP SWAMP - 7762m
Unnamed lake 84 - 12258m
Unnamed lake 83 - 6608m
Unnamed lake 86 - 15095m
Unnamed lake 85 - 18030m
Unnamed lake 80 - 16393m
Unnamed lake 82 - 7238m
Unnamed lake 81 - 19892m
Unnamed lake 98 - 15360m
Unnamed lake 99 - 19318m
Unnamed lake 93 - 7953m
Unnamed lake 92 - 9313m
Unnamed lake 91 - 8412m
Unnamed lake 90 - 16721m
Unnamed lake 97 - 11200m
Unnamed lake 96 - 8865m
Unnamed lake 95 - 19673m
Unnamed lake 94 - 19200m
Unnamed lake 109 - 12660m

Unnamed lake 108 - 17163m
Unnamed lake 105 - 7157m
Unnamed lake 104 - 9419m
Unnamed lake 107 - 9601m
Unnamed lake 106 - 18575m
Unnamed lake 101 - 16217m
Unnamed lake 100 - 15864m
Unnamed lake 103 - 15678m
Unnamed lake 102 - 11505m
Unnamed lake 110 - 8340m
Unnamed lake 199 - 18752m
Unnamed lake 30 - 15322m
Unnamed lake 189 - 12087m
Unnamed lake 31 - 17063m
Unnamed lake 188 - 16361m
Unnamed lake 289 - 17029m
Unnamed lake 288 - 17191m
Unnamed lake 287 - 14750m
Unnamed lake 190 - 15272m
Unnamed lake 290 - 11532m
Unnamed lake 291 - 19724m
Unnamed lake 193 - 18269m
Unnamed lake 37 - 17484m
Unnamed lake 194 - 7713m
Unnamed lake 36 - 12539m
Unnamed lake 39 - 9764m
Unnamed lake 191 - 15902m
Unnamed lake 38 - 15758m
Unnamed lake 192 - 6858m
Unnamed lake 197 - 11615m
Unnamed lake 33 - 17879m
Unnamed lake 198 - 15264m
Unnamed lake 32 - 14874m
Unnamed lake 195 - 12895m
Unnamed lake 35 - 15322m
Unnamed lake 196 - 8464m
Unnamed lake 34 - 19887m
Unnamed lake 41 - 8240m
Unnamed lake 178 - 17638m
Unnamed lake 42 - 8230m
Unnamed lake 177 - 15945m
Unnamed lake 40 - 18191m
Unnamed lake 179 - 17684m
Unnamed lake 277 - 11435m
Unnamed lake 276 - 11823m
Unnamed lake 279 - 15711m
Unnamed lake 278 - 7183m

Unnamed lake 283 - 16700m
Unnamed lake 284 - 13572m
Unnamed lake 285 - 18760m
Unnamed lake 286 - 15212m
Unnamed lake 280 - 18499m
Unnamed lake 281 - 17683m
Unnamed lake 282 - 12200m
Unnamed lake 180 - 8417m
Unnamed lake 49 - 17490m
Unnamed lake 181 - 4776m
Unnamed lake 48 - 17824m
Unnamed lake 182 - 13654m
Unnamed lake 47 - 18773m
Unnamed lake 183 - 7972m
Unnamed lake 46 - 5402m
Unnamed lake 184 - 15395m
Unnamed lake 45 - 13864m
Unnamed lake 185 - 11370m
Unnamed lake 44 - 10657m
Unnamed lake 186 - 17292m
Unnamed lake 43 - 8905m
Unnamed lake 187 - 15680m
Unnamed lake 50 - 17120m
Unnamed lake 169 - 18444m
Unnamed lake 51 - 19852m
Unnamed lake 168 - 7033m
Unnamed lake 52 - 5763m
Unnamed lake 167 - 12049m
Unnamed lake 53 - 7633m
Unnamed lake 166 - 11166m
Unnamed lake 8 - 19983m
Unnamed lake 7 - 10141m
Unnamed lake 6 - 15250m
Unnamed lake 5 - 16997m
Unnamed lake 4 - 15343m
Unnamed lake 3 - 15813m
Unnamed lake 2 - 19102m
Unnamed lake 1 - 16662m
Unnamed lake 55 - 8148m
Unnamed lake 175 - 7854m
Unnamed lake 54 - 15852m
Unnamed lake 176 - 8275m
Unnamed lake 57 - 5831m
Unnamed lake 173 - 17490m
Unnamed lake 56 - 18989m
Unnamed lake 174 - 18631m
Unnamed lake 59 - 16231m

Unnamed lake 171 - 6768m
Unnamed lake 58 - 10949m
Unnamed lake 172 - 18256m
Unnamed lake 9 - 11900m
Unnamed lake 170 - 19420m
Unnamed lake 60 - 19551m
Unnamed lake 159 - 16509m
Unnamed lake 63 - 19255m
Unnamed lake 156 - 9759m
Unnamed lake 64 - 15236m
Unnamed lake 155 - 17725m
Unnamed lake 61 - 18683m
Unnamed lake 158 - 10725m
Unnamed lake 62 - 10549m
Unnamed lake 157 - 7874m
Unnamed lake 68 - 14329m
Unnamed lake 162 - 15160m
Unnamed lake 67 - 8861m
Unnamed lake 163 - 7812m
Unnamed lake 66 - 17904m
Unnamed lake 164 - 12384m
Unnamed lake 65 - 9485m
Unnamed lake 165 - 16484m
Unnamed lake 160 - 17834m
Unnamed lake 69 - 19368m
Unnamed lake 161 - 16772m
Unnamed lake 249 - 16959m
Unnamed lake 247 - 13291m
Unnamed lake 248 - 16329m
Unnamed lake 245 - 18706m
Unnamed lake 246 - 17763m
Unnamed lake 243 - 9713m
Unnamed lake 244 - 19199m
Unnamed lake 146 - 8486m
Unnamed lake 147 - 1206m
Unnamed lake 144 - 4889m
Unnamed lake 145 - 14993m
Unnamed lake 148 - 17235m
Unnamed lake 149 - 6706m
Unnamed lake 150 - 5570m
Unnamed lake 154 - 7176m
Unnamed lake 153 - 12616m
Unnamed lake 152 - 8441m
Unnamed lake 151 - 16172m
Unnamed lake 253 - 11551m
Unnamed lake 252 - 13343m
Unnamed lake 251 - 17493m

Unnamed lake 250 - 11176m
Unnamed lake 236 - 17826m
Unnamed lake 237 - 11028m
Unnamed lake 238 - 18295m
Unnamed lake 239 - 13033m
Unnamed lake 232 - 10686m
Unnamed lake 233 - 14431m
Unnamed lake 234 - 16570m
Unnamed lake 235 - 12206m
Unnamed lake 133 - 9831m
Unnamed lake 134 - 7541m
Unnamed lake 135 - 15800m
Unnamed lake 136 - 4121m
Unnamed lake 137 - 12805m
Unnamed lake 138 - 15608m
Unnamed lake 139 - 9314m
Unnamed lake 141 - 9046m
Unnamed lake 140 - 15688m
Unnamed lake 143 - 15294m
Unnamed lake 142 - 10286m
Unnamed lake 240 - 18716m
Unnamed lake 242 - 13912m
Unnamed lake 241 - 16646m
Unnamed lake 267 - 18298m
Unnamed lake 268 - 16485m
Unnamed lake 265 - 14184m
Unnamed lake 266 - 8416m
Unnamed lake 269 - 15874m
Unnamed lake 128 - 19366m
Unnamed lake 129 - 14191m
Unnamed lake 126 - 9828m
Unnamed lake 127 - 7759m
Unnamed lake 124 - 12569m
Unnamed lake 125 - 15327m
Unnamed lake 122 - 15050m
Unnamed lake 123 - 10503m
Unnamed lake 10 - 14342m
Unnamed lake 132 - 15735m
Unnamed lake 11 - 6465m
Unnamed lake 131 - 17582m
Unnamed lake 12 - 19560m
Unnamed lake 130 - 14896m
Unnamed lake 13 - 16060m
Unnamed lake 14 - 8451m
Unnamed lake 15 - 18583m
Unnamed lake 16 - 17213m
Unnamed lake 17 - 8473m

Unnamed lake 271 - 16785m
Unnamed lake 18 - 728m
Unnamed lake 270 - 17024m
Unnamed lake 19 - 19429m
Unnamed lake 275 - 15398m
Unnamed lake 274 - 16959m
Unnamed lake 273 - 11650m
Unnamed lake 272 - 16683m
Unnamed lake 254 - 10702m
Unnamed lake 255 - 9996m
Unnamed lake 256 - 17036m
Unnamed lake 257 - 19866m
Unnamed lake 258 - 12950m
Unnamed lake 119 - 16221m
Unnamed lake 259 - 7549m
Unnamed lake 115 - 14908m
Unnamed lake 116 - 5321m
Unnamed lake 117 - 19044m
Unnamed lake 118 - 14564m
Unnamed lake 20 - 16084m
Unnamed lake 111 - 7269m
Unnamed lake 112 - 17850m
Unnamed lake 113 - 11231m
Unnamed lake 114 - 13554m
Unnamed lake 23 - 9649m
Unnamed lake 24 - 7269m
Unnamed lake 21 - 19854m
Unnamed lake 121 - 7001m
Unnamed lake 22 - 11102m
Unnamed lake 120 - 7799m
Unnamed lake 27 - 17691m
Unnamed lake 28 - 12596m
Unnamed lake 25 - 9451m
Unnamed lake 26 - 15927m
Unnamed lake 260 - 15928m
Unnamed lake 29 - 16791m
Unnamed lake 262 - 16677m
Unnamed lake 261 - 14287m
Unnamed lake 264 - 15752m
Unnamed lake 263 - 18938m

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

Acid Sulphate Soil No
Risk:

Groundwater 7000-14000mg/l - 39.38 ha

Salinity (Total Dissolved Solids):

Hydrogeology:

Rocks of Low Permeability, Fractured and Weathered Rocks - Local Aquifers, Granitoid - 39.38 ha

Soils:

Esperance 6 Subsystem (245Es_6): Red-brown to grey brown alluvial sands. - 3.96 ha

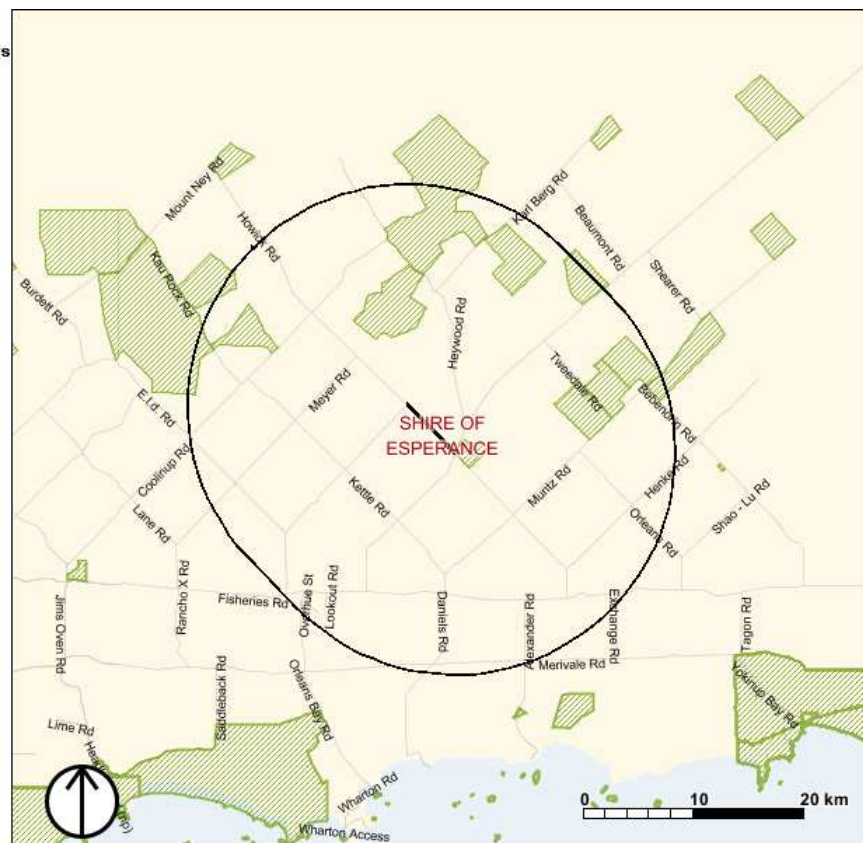
Condingup 1 Subsystem (245Co_1): Gently undulating plain with subdued sandsheets and dunes. Aeolian sands / Pallinup formation. Pale deep sands and associated grey deep sandy duplex soils (some gravelly). Shrubland of *Banksia speciosa* and associated mallee heath - 9.03 ha

Scaddan 9 Subsystem (246Sc_9): Soil complex, S1 + S2. - 7.36 ha

Scaddan 10 Subsystem (246Sc10): Slightly elevated gently undulating plain. Tertiary marine sediments / Prot. granite & gneiss. Alkaline grey shallow sandy duplex soils & calcareous loamy earths. Mallee shrubland / *Melaleuca* species with *E. occidentalis* woodland in Swamps. - 19.04 ha

2.8 Principle (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.

- Legend**
- DPaW Managed Lands and Waters
 - Local Government Authority
 - State Roads
 - Other Roads
 - Coast and Sea
 - water
 - land

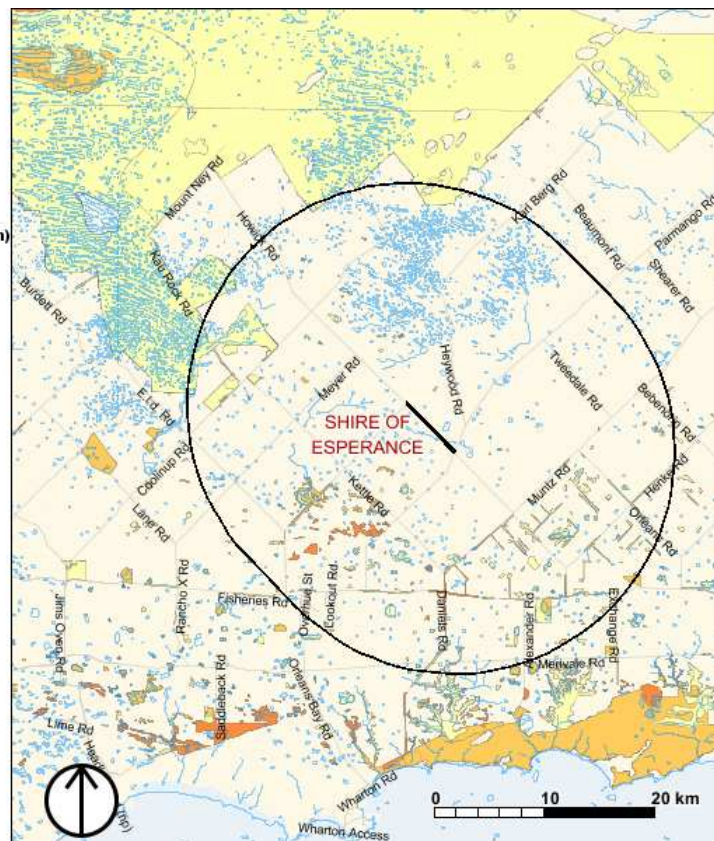


Estate: R 32129:Nature Reserve:Class A - 13824m
 R 32780:Nature Reserve:Class A - 18870m
 R 32784:Nature Reserve:Class A - 18400m
 R 32777:Nature Reserve:Class A - 18343m
 R 32130:Nature Reserve:Class A - 6239m
 R 32783:Nature Reserve:Class A - 12018m
 R 32131:Nature Reserve:Class A - 17731m
 R 32128:Nature Reserve:Class A - 94m
 R 32779:Nature Reserve:Class A - 12920m

DAFWA Covenants: Agreement To Reserve File:941696V01P03 - 14923m
 Remnant Vegetation Protection Scheme (CC) File:970490V01P01 - 381m
 Soil Conservation Notice File:950057V01P09 - 14362m

2.9 Principle (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.

- Legend**
- Local Government Authority
 - State Roads
 - Other Roads
 - Hydrography
 - GDE, Reliant on subsurface groundwater (vegetation)**
 - Identified in previous study - fieldwork
 - Identified in previous study - desktop
 - High potential for GW interaction
 - Moderate potential for GW interaction
 - Low potential for GW interaction
 - No ecosystems analysed
 - Coast and Sea**
 - water
 - land



For surface water features affected by clearing area see 2.6 Principle (f).

The site is within the following Groundwater Dependent Ecosystems - reliant on subsurface groundwater:

Medium woodland; yate, Low potential for GW interaction - 3.96 ha

Shrublands; tallerack mallee-heath, Low potential for GW interaction - 1.68 ha

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

The site is within the following DAFWA Land Quality flood risk categories:

2 - 7.36 ha

0 - 32.02 ha

3 Planning instruments and other relevant matters

The site is within the following EPA Policy Areas:

Environmental Protection of Native Vegetation (Agricultural Area) (2000) 39.38 ha

The site overlies or is adjacent to the following local planning scheme zones:

Local road -

Agriculture - general -

©Western Australian Land Information Authority (2017):

Cadastral/Property boundaries

Hydrography lines

Crown Reserves

Roads

Local Government Administrative Boundaries

