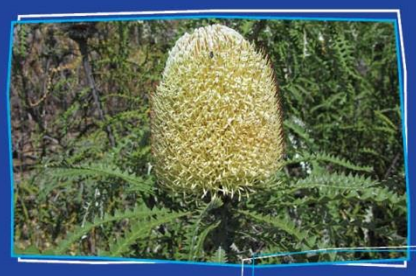
Vegetation, Flora, Fauna and Environmental Considerations, and Targeted Flora Report

Shire of Esperance Strategic Purpose Permit 20/21
Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade



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1 Executive Summary

This 'Vegetation, Flora, Fauna and Environmental Considerations and Targeted Flora Report' 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 the Department of Water and Environmental Regulations (DWER) to clear 5.3 ha of native vegetation in a 21.3 ha footprint, for the purposes of widening Henkes Rd, following multiple safety incidents and realigning the poorly designed Howick road - Henke road intersection which does not meet current road design standards.

2 Introduction

The Shire of Esperance endeavors to maintain a high level of road safety, being proactive in identifying high risk road designs and progressively upgrading them. The Shire of Esperance manages the largest road network of any local government in Western Australia, encompassing a total of 4 593 km of road. The Shire of Esperance is submitting 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade' project as Site B under the '2021 Strategic Purpose Permit' (Figure 1), for the purpose of road widening. Recently there has been more than one truck rollover on this road, related to the narrow width of the road and the large nature of haulage vehicles using the site. Two vehicles cannot currently safely pass. The road widening process will allow the road's running surface to be widened to 8 m. To complete these works, native vegetation up to 2 m from the current road footprint on both sides of the road is required to be cleared, increasing the active road footprint to 24 m. To mitigate impact of clearing vegetation, where feasible clearing will not occur to the full permitted width, conserving vegetation. In addition, the oddly shaped intersection at the intersection of Howick and Henke roads will be upgraded to meet current road safety design specifications for intersections.

The proposed works are located ~91 km east of Esperance, within the Shire of Esperance managed road reserve of Henkes Rd. Specifically, it is located on Henkes Road between Howick Road and Orleans Road, at straight line kilometre (SLK) 2.95 to 11.05 (Main Roads 2020). A point within the proposed clearing permit area is -33.702300 S, 122.815900 E (UTM Zone 51 H, GDA94).

Figure 1. Location of "Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade' clearing permit application, submitted under the Shire of Esperance's '20/21 Strategic Purpose Permit'.

3 Environmental Background

3.1 Scope

The removal of native vegetation to resheet the existing road the potential to affect a multiple environmental factors.

Possible impacts include;

- Threatened Flora (TF) and Priority Flora (PF).
- Threatened fauna, specifically, potential feeding, nesting and roosting habitat of endangered Carnaby's Black Cockatoo, *Calyptorhynchus latirostris.*
- Threatened Ecological communities (TEC) and Priority Ecological Communities (PEC), specifically the Environmental Protection and Biodiversity Conservation (EPBC) Act 1999 listed 'Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia' (Kwongkan) TEC.

Assessing these impacts involves two approaches; desktop study and field survey. The desktop study gathered background information on the target area. The field survey allows for detailed understanding of vegetation communities, targeted flora surveys for possible TF or PF, environmental condition, presence of PEC and TEC, and overall potential impact of clearing.

3.2 Catchment

'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade' is present within the Alexander River catchment area. It is located approximately 16-40km from the coast.

3.3 Climate

The Esperance climate is described as Mediterranean, characterised by cool wet winters and dry warm summers (BoM 2020). The area receives an average annual rainfall of 618 mm.

3.4 Geology

Three geological units were identified within 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade', by Schoknecht et al. (2004). They are described as:

- Sand or gravel plains.
- Quartz sand sheets commonly with pebbles or minor clay.
- Local calcrete, laterite, silcrete, silt, clay, alluvium, colluvium and Aeolian sand.

3.5 Soils

The soil of 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade' is predominantly red-brown to grey brown alluvial sands (Schnoknecht et al. 2004). Within the area, there has been four other soil types recorded. These include:

- Grey deep sandy duplex soils and pale deep sands with minor shallow gravel and grey non-cracking clays.
- Shallow grey-brown duplex soils developed over spongelite.
- Gravelly yellow mottled duplex soils.
- Pale deep sands and associated grey deep sandy duplex soils (some gravelly).

3.6 Topography

During the field survey, topography was observed to be dominated by Gently undulating plain with internally drained swamps. Using Schnoknect et al. (2004), the project topography is mapped at a fine scale, traversing five topographic areas. These include:

- Level plain with occasional subdued sandsheets
- Gently undulating sandsheet and minor subdued dunes with swales and soaks
- Gently inclined to moderately inclined hillslopes
- Level plain with numerous internally drained swamps
- Gently undulating plain with subdued sandsheets and dunes

3.7 Vegetation

The site is located within the Interim Biogeographic Regionalisation for Australia (IBRA; Thackway & Cresswell 1995) Esperance Plains region (Esp2) and Recherche sub-region. The Esp2 region is described as "Proteaceae Scrub and Mallee heaths on sandplain overlying Eocene sediments, rich in endemics. Herbfields and heaths (rich in endemics) on abrupt granite and quartzite ranges that rise from the plan. Eucalyptus woodlands occur in gullies and alluvial foot-slopes".

Beard (1973) mapped three vegetation associations (VA), 4801, 516 and 1047, within the 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade' (Table 1). All VA's broadly match the vegetation community mapping identified at a local level (Section 5.1.1). VA 516 and 1047 are considered widespread in the Esp2 IBRA region and Shire of Esperance area, with 40% remaining for VA 516 and 60% for 1047 of pre-Euoropean distributions. Additionally, both are considered well represented in the conservation estate. However, VA 4801 has been extensively cleared, with less than 10% remaining of pre-European extent in both the Esp2 IBRA region and Shire of Esperance. Only 3.32% of this VA is conserved in the conservation estate.

Table 1. Vegetation associations mapped by Beard (1973) within the 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade', and statistics on pre-European remaining areas. Nt. Acronyms used include Interim Biogeographic Regionalisation of Australia (IBRA), Esperance Plains region (Esp2), local government area (LGA) and International Union of Conservation Nature (IUCN).

Vegetation Association			
Name	4801	516	1047
Description	Shrublands; heath with scattered Nuytsia floribunda on sandplain	Shrublands; mallee scrub, black marlock	Shrublands; Eucalyptus incrassata mallee-heath
Area mapped within site (ha)	2.85	5.89	4.00
Pre-European extent in IBRA region ESP2 (%)	11.17	68.96	85.22
Pre-European extent in LGA (%)	11.17	44.92	84.96
Current extent conserved in IUCN area (%)	29.72	44.36	64.47

3.8 Land use

The area directly included in the clearing permit application 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade' is currently intact and vegetated 100 m wide road reserve, managed by the Shire of Esperance. There has been historical gravel extraction in the road reserve. The current road footprint occupies 20 m. Agricultural land surrounds the road reserve. The area is within rural zoning.

4 Methodology

4.1 Desktop study

A desktop study was completed prior to any site visit. Geographical Information System (GIS) review existing

- Existing site digital orthophotos, as sourced from LandGate (Howick 2018).
- Western Australian Local Government Association's (WALGA) 'Local Government Mapping (LGMap 2020)' program was used to assess spatial information of geology, topography, soil profiles, native and planted vegetation, water bodies and Interim Biogeographical Regionalisation for Australia (IBRA; Thackway & Cresswell 1995) classification system.
- Data provided by Department of Biodiversity, Conservation and Attractions (DBCA) and Western Australian Herbarium in July/August 2020 was used to assess threatened flora (TF), priority flora (PF), and threatened (TEC) and priority (PEC) ecological communities within 20 km radius of the site. Specifically, spatial data included;

- WAHerb extract (DBCA 2020f).
- Threatened and Priority Reporting (TPFL; DBCA 2020d).
- Esperance District Threatened Flora (DBCA 2020b).
- TEC and PEC 'Likely to Occur' buffer and boundary areas (DBCA 2020e).
- Department of Agriculture, Water and the Environment Protected Matters Search Tool
- Index of Biodiversity Surveys for Assessment (IBSA).

- To assess fauna, the following databases were searched with a 20km buffer from the center of the site (33.7023 S,122.8159 E);
  - Department of Biodiversity, Conservation and Attractions (DBCA) and Western Australian Museum (WAM) NatureMap data portal
  - DBCA Threatened and Priority Fauna database
  - BirdLife Australia's Atlas and Birdata datasets
  - Department of Agriculture, Water and the Environment Protected Matters Search Tool
  - Atlas of Living Australia database
  - Index of Biodiversity Surveys for Assessment (IBSA).

4.2 Field investigation: possible ecological impacts

The site was initially inspected on 01/09/2020, by the Shire of Esperance's Environmental Officers Katie White and Sophie Willsher. An assessment of possible ecological impacts included historical clearing, artificial water way constructions, impact of fire regimes, regeneration from disturbance, waterlogging, senescence, weeds, erosion, sedimentation, invasive fauna, *Phytophthora cinnamomi* Dieback, and illegal dumping of rubbish.

Vegetation community was also assessed during the field survey. Broad vegetation types defined by structure and composition were recorded and described. Condition of vegetation was assessed using Keighery (1994) categories, as 'Excellent', 'Very Good', 'Good', 'Degraded' or 'Completely Degraded'. This illustrates how healthy vegetation is, determined by number of dead or dying plants, weed cover and other forms of degradation. Additionally, possible environmentally sensitive areas, such as wetlands or granite, were noted. Overall, an assessment of environmental impacts to Department of Water and Environmental Regulation's (DWER) biodiversity values were inspected and valued.

Only a very basic fauna survey was conducted as per EPA (2020) guidelines. Observations of fauna presence, such as call sounds, footprints and scats were also noted, and the area assessed for suitability of endangered Carnaby's Black Cockatoo (*Calyptorhynchus latirostris)* feeding, roosting and nesting habitat. Additionally, species that corresponded with suitable habitat within 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade' identified in the desktop 20 km radius search were assessed, including Southern Death Adder (*Acanthophis antarcticus*).

4.3 Field investigation: Assessing Threatened and Priority Ecological Communities

The vegetation community of 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade' was assessed for the presence a TEC or PEC, specifically the Environmental Protection and Biodiversity Conservation Act 1999 listed 'Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia (Kwongkan)' TEC. The presence of Kwongkan was identified using diagnostic characteristics defined in the 'Approved Conservation Advice for Kwongkan (Commonwealth of Australia 2014)' as;

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

PEC's do not have published approved conservation advice. Comparison of the vegetation community occurred using 'Priority Ecological Communities for Western Australia Version 30 (DBCA 2020a)' definitions.

4.4 Field Investigation: Targeted flora survey

The targeted flora survey was undertaken following the Environmental Protection Authority's (EPA) 'Technical Guidance, Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia (2016)'. The entirety of the proposed impact area was surveyed on foot in mid-spring, between 05/10/2020 and 08/10/2020 by Katie White and Sophie Willsher, Shire of Esperance's Environmental Officers. Due to the timing, the majority of species were flowering, decreasing the likelihood of missing species. The road was used as a continuous transect. Vegetation up to 2 meters from the edge of the existing road's back-slope was assessed to accurately cover the 24 m width proposed clearing permit area. Suitable associated habitat for TF or PF identified in the desktop study were particularly focused on, and extensively searched.

Due to the high diversity and complexity of Esperance's flora, all species were recorded to compile an incidental species list (Appendix 8.1, Table 6). All species unknown in the field were collected and identified exsitu, using keys, WA Herbarium's Florabase (DBCA 2020c), manuals and Esperance District Herbarium, to ensure no TF or PF were missed. Material was collected under Katie White's Regulation 61, Biodiversity Conservation Regulations 2018 Licence for Flora Taking, FT61000029, and Sophie Willsher's; FB2000278. Any species that were unable to be identified were submitted to the WA Herbarium for identification.

Over the course of the 2020 wildflower season, surveyors re-familiarised themselves with key taxonomic indicators and associated habitat, by visiting verified populations of *Stachystemon vinosus.* For other PF or TF species identified in the desktop survey as possible to occur, scans of pressed specimens from the local Esperance District Herbarium were taken into the field. Any flora thought to be TF or PF was formally collected, counted and mapped using a Panasonic FS-G1 Toughpad with the program ROAM or a GPS Garmin GPS64. Specimens were then lodged with the WA Herbarium for formal verification. When PF were confirmed, TPFL forms were completed and submitted to the DBCA's district Conservation Officer, and Species and Communities Branch.

5 Results and Discussion

5.1 Ecological Impact

5.1.1 Vegetation Communities

Ten vegetation communities were identified within 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade', as defined by structure and composition (Table 1; Figures 13-21; Appendix 8.1). It is believed that the Beard (1973) vegetation associations identified in Section 3.6 are an appropriate match for nine of the ten vegetation types observed. Only vegetation type four did not align with any of the three VA Beard (1973) identified in the survey area, being more similar to VA 16 'low forest; bushy yate (Eucalyptus cornuta) & Bald Island marlock (E. lehmanni)'. Beard's (1973) descriptions are very broad, and the decision to associate vegetation types within 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade' with a VA is subjective.

Vegetation type one matches the description for Beard's VA 4801, a VA which has been extensively cleared across the Esp02 IBRA region. Less than 4% of the remaining extent of VA 4801 is conserved

within the WA reserve system. VA 4801 occupies a 2.956 ha footprint of 'Site B – Henkes Rd Resheet, between Howick Rd and Orleans Rd'.

Table 2. Vegetation communities identified within proposed 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade' project area.

Type	Description	Figure	Beard Vegetation Association	Area (ha)	Diversity (native species)
A	Scattered Nuytsia floribunda with dense Allocasuarina and Melaleuca shrubland.	13	4801	3.733	80
B	Semi-open to dense *Eucalyptus angulosa* with mixed and diverse low shrubland of Proteaceous sp., dominated by Hakea species, with scattered Allocasuarina sp..	14	1047	2.866	118
C	Open tall Eucalyptus/Mallee Woodland with scattered *Banksia media*, and diverse low shrubland and dense sedgeland under-story.	15	516	5.782	98
D	Yates woodland with *Melaleuca calycina.*	16	More similar to 16: Low forest; bushy yate.	0.28	20
E	Dense *Eucalyptus angulosa* with dominant *Banksia armata* and *Hakea cormybosa* and mixed low shrubland.	17	1047	0.211	52
F	Disturbed gravel pits forming a mix of regenerating *Banksia armata* (possibly vegetation type E) and Tall Mallee (possibly vegetation type C), with dense Cyathostemon sp..	18	516 or 1047. Difficult to say due to previous disturbance from gravel extraction.	3.858	72
G	Mixed tall and low Eucalyptus woodland with dense and highly mixed mid-story, dominated by *Hakea cinerea* and *Cyathostemon ambiguus.*	19	1047	2.426	112
H	Dense/closed tall Eucalyptus and *Hakea laurina* woodland with semi-open shrubland *of Exocarpus sparteus* and Hakea sp, with dense Cyperaceae sedgeland under-story.	20	516	0.552	65
I	Mixed dense *Acacia cyclops*, *Eucalyptus angulosa* and Allocasuarina shrubland with Cyperaceae sedgeland and no Proteaceae species.	21	1047	0.577	40
J	Closed Mallee woodland with dense *Hakea corymbosa* mid-story and dense sedge under-story.	22	1047	0.576	62
K	Allocasuarina shrubland with Nuytsia and Anarthria sedgeland.	23	4801	0.628	62

5.2 Vegetation Condition

The majority of vegetation at 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade' is in good, very good or excellent condition. However, some areas sections of vegetation were found to be in poor condition mostly due to the invasion of African Love Grass (*Eragrostis curvula*) and other agricultural weeds. The survey area included gravel pits where high levels of disturbance and dominance of disturbance opportunists Acacias was noted, such as *Acacia pycnantha*. There was no evidence of recent fires within the proposed clearing permit area.

Table 3. Vegetation conditions within proposed 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade' project area, and the proposed amount of vegetation to be cleared (ha), footprint of each vegetation condition class (ha) and proportion that each vegetation condition class occupies within the entire clearing footprint (%).

Vegetation Condition	Amount of vegetation to be cleared (ha)	Footprint (ha)	Area proportion of entire footprint (%)
Excellent	0.551	3.99	19.7
Very good	0.88	5.95	29.5
Good	1.53	6.7	33.0
Poor	0.514	2.40	11.9
Degraded	0.27	1.1	5.4

There was varying levels of weed invasion across the entirety of the proposed 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade' area. Invasive plant species were found across the majority of the survey area, however the burden of these species on the natural vegetation varied from moderate to high between sections. Overall, 35 invasive species were identified within the project area (Appendix 8.1). Of these, the most extensive and of serious concern were Golden Wattle (*Acacia pycnantha*) and African Love Grass (*Eragrostis curvula*). High weed burden was most notable at the start of the project area (east from the Henkes and Howick Rd intersection) and in the immediate road reserves adjacent to property driveways. However, because these driveways are already cleared areas, the weed burden here is not of high concern. It is highly likely that proposed works will increase the distribution of weeds and degrade vegetation along the entire road reserve where works occur. Ideally, regular wash downs during the course of works to remove weed seeds or follow up herbicide control of invasive species needs to occur. However, this will be extremely expensive to employ contractors and mobilise equipment, which may not be feasible with given budgets.

5.3 *Phytophthora* dieback

Vegetation types two, five, seven and ten contain large amounts of vegetation susceptible to *Phytophthora cinnamomi* dieback, most notably Proteaceae and Ericaceae species. Very limited data collection on the presence of *P.a cinnamomi* Dieback has been conducted on roadsides in Western Australia. Dieback Information Delivery and Management System (DIDMS; GAIA Resources, SCNRM & State NRM 2020) data shows no records of *P. cinnamomi* or other *Phytophthora* sp. sample results in the immediate area. However, the presence of dead *Banksia media, Hakea laurina* and other Proteaceeous plants was noted during the survey in vegetation types B, C, E, and H is likely an indicator of *P. cinnamomi* presence. This was not comprehensively mapped or sampled, but was visually observed to only occur in clustered locations scattered throughout the site. Proposed works will

be conducted using appropriate hygiene measures to limit spreading of the disease, including clearing in dry conditions and clean down of vehicles and machinery before entering the site. However, there is always a possibility that proposed works will extensively spread *P. cinnamomi* dieback along Henkes Rd due to proposed works.

Figure 2. Potential signs of dieback, including dead *Banksia* sp., observed in vegetation type B at 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade'.

5.4 Threatened and Priority Ecological Communities

The desktop study identified the Environmental Protection and Biodiversity Conservation (EPBC) Act 1999 listed threatened ecological community (TEC) 'Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia (Kwongkan)' directly within 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade' project area. No other TEC's or priority ecological communities (PEC's) were identified by the desktop study as being within 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade' or within a 500 m buffer of the site.

Four vegetation communities met criteria to be considered as Kwongkan TEC, including vegetation type B, E, G and K (Table 2). However, due to weed invasion and disturbance from nearby gravel extraction, only areas within these vegetation communities in very good or excellent condition were considered as TEC (Figure 3). In total, 0.915 ha of vegetation within a 5.42 ha footprint was considered as Kwongkan TEC, present within 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade' area.

The vegetation community described as 'Swamp Yate, *Eucalyptus occidentalis*, woodlands in seasonally inundated clay basins in the South Coast of Western Australia' is listed as a PEC (DBCA 2020a). Vegetation type D is similar to this description within 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade' (Table 2) and is likely to meet the definition of this PEC when in very good to excellent condition with an intact mid-story. Within the survey area, 0.156 ha of vegetation was identified as Swamp Yate vegetation in very good condition.

Figure 3. Vegetation communities of vegetation type two, five, seven and ten in very good condition within 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade' project met the criteria to be classified as threatened ecological community (TEC) 'Proteaceae Dominated Kwongkan Shrublands of the Southeast Coastal Floristic Province of Western Australia (Kwongkan)'. Vegetation type four when in very good condition met criteria to be classified as priority ecological community (PEC) as 'Swamp Yate, *Eucalyptus occidentalis*, woodlands in seasonally inundated clay basins in the South Coast of Western Australia'.

5.5 Threatened and Priority Flora

Three threatened flora (TF) and 25 priority flora (PF) were recorded within a 20 km radius of the proposed impact site (Table 4; DBCA 2020f, DBCA 2020d, DBCA 2020b). Of these, 15 PF species had suitable known associated habitat that corresponded with vegetation communities and soil type of 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade' project.

Table 5. Threatened or priority flora identified by the desktop study to be present within a 20 km radius of 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade' project area, using Threatened and Priority Flora Reporting (TPFL; DBCA 2020d), WA Herbarium (DBCA 2020f) and Esperance District Threatened Flora (DBCA 2020b).
Nt. Acronyms used in the table include priority flora (P), threatened flora (TF), Biodiversity Conservation (BC) Act 2018, Environmental Protection and Biodiversity Conservation (EPBC) Act 1999, critically endangered (CN) and endangered (EN).

Species	Conservation Status	Associated Habitat	Likely to occur
Acacia nitidula	P3	Granitic sandy gravelly soils and amongst granite boulders. Associated species include *Hakea trifurcata, Beaufortia micrantha, Conostylis bealiana,* and *Isopogon formosus.*	Possible

Acacia euthyphylla	P3	Grey/white sand and clay loams along margins of salt lakes & marshes, seasonal swamps. Associated with Myrtaceous shrublands and Mallee woodlands.	Unlikely
Anigozanthos bicolor subsp. *minor*	TF	Prefers sandy, well-watered sites. Mostly associated with granite boggy ephemeral pools.	No
Calectasia jubilaea	P2	Associated with open heath with *Eucalyptus.* Grows on grey sandy loam plains. Present on unnamed reserve corner of Muntz and Howick Road.	Yes
Daviesia pauciflora	P3	Various habitats including flats. Associated with deep sands, white or grey sand over laterite or limestone.	Yes
Eucalyptus sweedmaniana	P2	Prefers coastal habitat. Only recorded from a very small population in Cape Arid National Park.	No
Eucalyptus creta	P3	Preferring a heavy brown clay loam, noted for its sunken hollows known as crab holes; not swampy but holds water well after prolonged rainfall. Mostly associated with north-west area of 20 km radius.	No
Eucalyptus litorea	P3	Grows on dunes around coastal salt lakes. Only known populations are within Cape Arid National Park.	Unlikely
Gonocarpus pycnostachyus	P3	Grows in a variety of habitats including disturbed firebreaks, wet depressions and on granite rocks. Prefers deep sand or clay soils.	Possible
Grevillea baxteri	P4	Prefers shrubby heathland with an acid sandy soil usually overlaying heavier soils. Associated with highly diverse Proteaceous shrublands.	Yes
Hibbertia hamata	P3	Recorded in a variety of habitats including hillsides, inland granite outcrops, low shrubland, bare areas and heath. Grows in grey sand over granite. Associated species include *Caustis dioica, Verticordia* sp.*, Chamelaucium axilare* and *Allocasuarina sp.*. Distributed in the Condingup sub-coastal area.	Yes
Isopogon alcicornis	P3	Grows in sandy soils and skeletal loam on granite. Occupies various habitats including sandhills, salt lakes and sandplains. Previously recorded on Muntz Road, near Tweedale Road.	Yes
Kennedia beckxiana	P4	Grows in sand and loam on granite hills and outcrops. Previously recorded in the area.	Possible

Lambertia echinata subsp. *echinata*	CN	Below and between rock outcrops, slopes, hill crests. Grows in gravelly sandy loam, brown sandy loam, white-grey sand, granite, laterite. Only associated with Cape Arid National Park.	Unlikely
Lasiopetalum parvuliflorum	P3	Grows along creeks and seasonal swamps in sand and gravelly loam. Mostly recorded in the Wellstead/Bremer region, with only one record in Esperance, on granite, between Howick Hill and Howick Rd.	Unlikely
Lepidium pseudotasmanicum	P4	Various habitats including creeks and sites with loam, granite or sandy soils. Distribution scattered across WA.	Possible
Melaleuca dempta	P3	Associated with Hakea and Melaleuca dominated shrublands. Present on range of soil types including loams, clay, salt pans. Mostly associated with various wet areas.	Unlikely
Melaleuca viminea subsp. *appressa*	P2	Shallow sand over clay, near creeks or wet depressions.	Unlikely
Microtis quadrata	P4	Widespread and various habitats and soil types, however mostly associated with wetter areas.	Possible
Myoporum velutinum	EN	Associated with creek banks. Grows in sandy soils.	Unlikely
Myriophyllum petraeum	P4	Strictly confined to ephemeral rock pools on granite outcrops.	No
Persoonia scabra	P3	Mixed habitats, observed mostly in Mallee woodlands. Associated with granite and limestone.	Possible
Scaevola archeriana	P1	Mallee woodlands with deep sands and dominance of Hakea sp., sandplains and road verges. Prefers sandy and sandy-clay loam soils	Possible
Spyridium mucronatum subsp. *multiflorum*	P2	Found in Mallee Woodlands, in gravelly loam or clay soils.	Possible
Stachystemon vinosus	P4	Various habitats including sandplains and rock crevices on breakaways. Prefers fine loamy sand and stony soils.	Possible
Stylidium roseonanum	P3	Prefers swamps. Mostly records occur in the west, towards Albany.	Unlikely
Verticordia verticordina	P3	Associated with heathlands. Preferes low lying sites, granite/sand and clay soils.	Yes

No TF species, but 3 PF species, *Grevillea baxteri* (P4), *Isopogon alcicornis* (P3), *Persoonia scabra* (P3) were located within the proposed clearing permit footprint (Sections 5.5.1; 5.5.2; 5.5.3). Queries of spatial datasets were requested specifically for these species, to interrogate impact of proposed works on species sustainability (DBCA 2020b; DBCA 2020f; DBCA 2020d, DBCA 2021). DBCA do not actively manage or monitor the majority of low priority species, due to their prevalence in the landscape relative to TF. There are 136 species recorded as priority three or four conservation

status within the Shire of Esperance boundaries (DBCA 2020b). It was noted that additional information on all species was located on file.

Numerous specimen's unknown to surveyors were collected and verified at the WA Herbarium as non-threatened species, such as *Gamochaeta calviceps* (Accession 8867; JW01421); *Millotia tenuifolia* var. *tenuifolia* (Accession 8867; JW01321); *Acrotriche cordata* (Accession 8867; JW01221). An unidentified Acacia was also found which was neither flowering or fruiting, the specimen was compared against herbarium specimens of *Acacia euthyphylla* (P3), and clear differences were found in the phyllodes. Phyllodes of this specimen had a prominent midrib which *A. euthyphylla* lacks.

5.5.1 *Grevillea baxteri,* Red tooth comb grevillea, Priority 4

Two specimens of *Grevillea baxteri* were sent to the WA Herbarium for identification confirmation at each of the populations found. Specimens were confirmed by Michael Hislop on 10/12/20 under Accession 8652 (KW087& KW090 specimens retained by WA Herbarium). Two Threatened and Priority Reporting Forms (TPFL) were completed and sent to Department of Biodiversity, Conservation and Attractions (DBCA) District Flora Conservation Officer and Species and Communities Branch on 15/01/21 (Appendix 8.5). If proposed works occur, 8 plants will be impacted upon, from an unknown total population size.

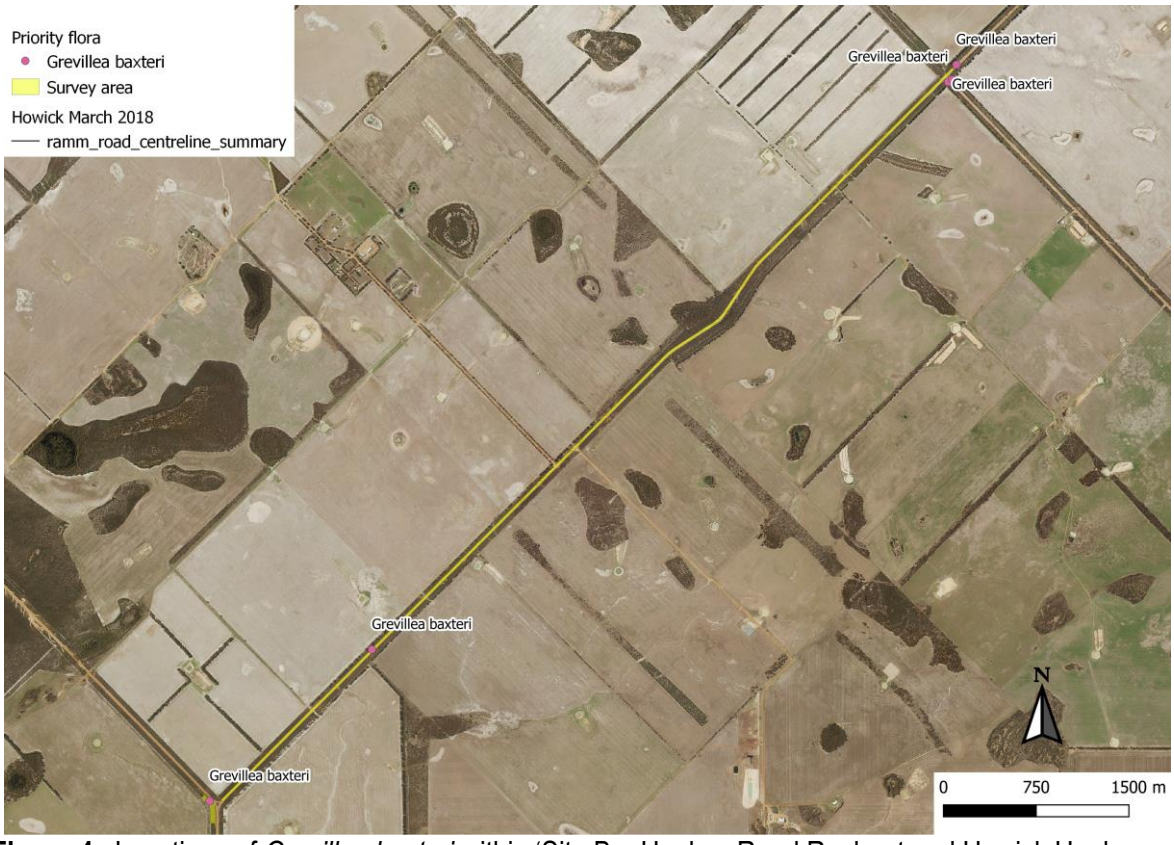

Figure 4. Locations of *Grevillea baxteri* within 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade'. There are 3 plants in the north near Orleans road, two plants at the middle, and 2 plants near the Howick-Henkes road intersection.

Figure 5. *Grevillea baxteri* specimen Accession 8652 KW090 from 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade'.

31 records were listed for *Grevillea baxteri* within the Shire of Esperance on DBCA (2020c) and a total of 47 populations were listed in a Threatened and Priority Flora database (DBCA 2021) and on file at DBCA from not yet databased TPFL forms (Table 6). Many of these records are very old with only brief description of locations, resulting in land tenure of many of these records being unknown, it is also difficult to say whether these past populations still exist. Significantly sized populations appear to exist in Cape Arid National Park and surrounding crown land. Other populations also exist in Shire of Esperance Road Reserves. A wide distribution of 200km throughout the shire was seen in these records, with previous distribution noting a variety of suitable environments, including heaths, banksia scrubland and open mallee (Makinson, 2000). Due to the wide distribution of the species throughout the Shire of Esperance and the healthy population within the Cape Arid National Park the Shire does not believe this project poses any significant risk to the species or the specimen in close proximity to the project area.

Table 6. *Grevillea baxteri* population data obtained from a DBCA (DBCA 2021b)

Locality	Date	Frequency	Tenure
4 miles S of Truslove.	19/04/1953		Unknown
SW of Island Bay Lake [Israelite Bay]	1/11/1954		National Park
29 miles SW of Mount Ragged	6/12/1960		Unknown
6.6 miles W of Israelite Bay settlement.	9/12/1960		National Park
550 mile peg between Esperance and Salmon Gums [Ca 4 km S of Grass Patch].	5/11/1962	Occasional	Road reserve
Near Mount Ragged, W of Israelite Bay	24/10/1963		National Park
Near Scaddan.	July 1963		Unknown
Ca 30 km W of Mount Ragged	10/09/1964		Misc Crown Land
Cape Arid septentrionalem versus [N of Cape Arid].	12/02/1966		
Prope Cape Arid, septentrionalem versus [Near Cape Arid, N of].	12/02/1966	Rare	National Park
31 miles N of Esperance	9/09/1966		Unknown
13 miles S of Gibson.	15/05/1968		Unknown
c. 8 km W of Israelite Bay, (Israelite Bay os c. 185 km E of Esperance) Eucla Division	1/10/1968		National Park
21 miles W of Israelite Bay	29/10/1969		National Park
39 miles S of Salmon Gums.	15/02/1970		Unknown
29 miles SW of Mount Ragged	19/10/1970		Unknown
14-16 miles W of Israelite Bay on track to Esperance	20/10/1970		National Park
Scaddan.	25/11/1970		Unknown
Ca 5 km directly ca NNW of Mt Arid.	30/06/1976	Frequent	National Park
On Fisheries Road, opposite Aroona Station, E of Esperance.	30/06/1976		Shire Road reserve
11 km by road N of Gibson.	2/07/1976	Frequent	Shire Road reserve
Ca 48 km NW of Point Malcolm.	20/09/1976		National Park
Scaddan	6/11/1978		Unknown
Near Boyatup Hill, ca 117 km E of Esperance.	13/05/1980		Misc Crown Land
7 km S of [The] Diamonds Hill, ca 37 km WSW of Israelite Bay, Cape Arid National Park.	6/11/1980	Scattered	National Park
6 km NE of Boyatup Hill	11/10/1983		Misc Crown Land
5 km E of Cape Arid National Park on Fisheries Road,	21/11/1986		National Park
19.4 km N along Mount Ragged track from junction with Fisheries Road, some 10 m off track	18/10/1987		Unknown

Along road to Cape Arid National Park, Esperance	30/09/1992		Shire road reserve
Speddingup, NSM Highway [Coolgardie-Esperance Highway]	26/09/1993		Unknown
Savages Road, 24 km NW of Condingup,	24/12/1995	Several plants	Shire road reserve
W of Cape Arid National Park boundary towards Esperance, Eyre District,	11/02/1998		National Park
Speddingup Wildflower Farm, Scaddan,	10/09/2000	common.	Private land
The Diamonds, N of Cape Paisley, Cape Arid National Park	21/09/2002	dominant.	National Park
Israelite Bay. N of Camp Ground. High heath on N track. Eyre	22/09/2002	abundant.	National Park
50 to 100 m E of West Kalgoorlie Esperance Railway between railway line and cleared farmland, 150 m S of Speddingup, 14.5 km N of Gibson	1/07/2003	50 plants adjacent to 200 m of track.	Shire road reserve
2km E of the main road N of Scaddan along Wilson Road; Scaddan Well	18/12/2004		Shire Road reserve
Corner of Wittenoom Hills Road and Scaddan Road, Esperance	6/08/2007	2-5 plants.	Shire road reserve
The Diamonds Hill	24/09/2007	6-20 plants.	National Park
Fisheries Road, on W boundary of Cape Arid National Park	4/11/2009		Shire Road reserve
0.2 km E of railway on Flemming Grove Road, Gibson	5/11/2009		C class reserve, for government purposes
On boundary of Cape Arid National Park, c. 2.5 km N of where Fisheries Road ends, 66 km E of Condingup	28/10/2013	200+ plants.	Misc Crown Land
Howick Rd, 600m SE of Parmango Rd (SW side of rd)	7/07/2016	2	Shire road reserve
Plowman Rd, 1.95km east of Wittenoom rd, NE road reserve	29/09/2020	1	Shire road reserve
Firebreak north of Cape Arid NP. North of Fisheries rd near junction of Grewar rd	26/05/2012	1	Unallocated Crown land
4km south of Scaddan	22/08/2002	4	Road Reserve - Main Roads
Boyatup Hill, Fisheries rd Entrance from Fisheries rd, N side of rd into gravel pit	16/11/2006	30+	Unallocated Crown land

5.5.2 *Persoonia scabra,* Priority 3

A specimen of *Persoonia scabra* was sent to the WA Herbarium for identification confirmation. The specimen were confirmed by Michael Hislop on 10/12/20 under Accession 8652 (KW089, specimen retained by WA Herbarium). A Threatened and Priority Reporting Form (TPFL) was completed and sent to Department of Biodiversity, Conservation and Attractions (DBCA) District Flora Conservation Officer and Species and Communities Branch on 15/01/21 (Appendix 8.5). If proposed works occur, 2 plants will be impacted upon, from a population total of 2.

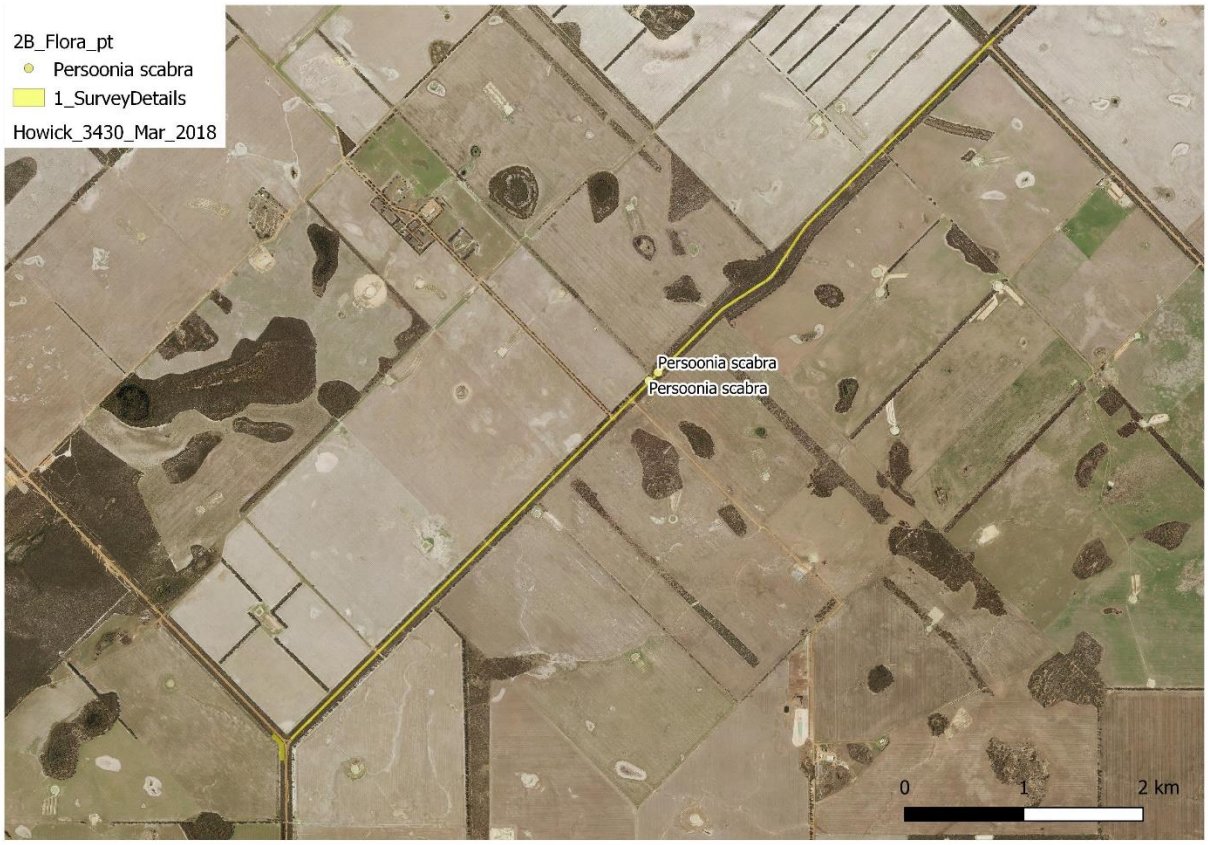

Figure 6. Locations of *Persoonia scabra* within 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade'.

Figure 7. *Persoonia scabra* specimen KW089 Accession 8652 from 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade'.

DBCA records have 19 collections of *Persoonia scabra* over a 300 km area including areas of the Great Western Woodlands. In addition to those in the database in 2020 the Shire of Esperance has collected *Personia scabra* at five additional locations in 2020, Boydells rd, Norwood rd (PERTH 09196412), Styles rd, and two collections from Dempster rd. Bringing the total number of known populations to 24.

Table 7. *Persoonia scabra* population data obtained from a DBCA (DBCA 2021b) as well as new Shire of Esperance population data.

Locality	Date	Frequency
Frank Hann National Park	4/08/1978	
72 km W of Salmon Gums	11/11/1979	
32 km NE of Swallow Rock, Frank Hann National Park, ca 84 km ENE of Lake King	1/08/1980	
42 km NE of Swallow Rock, Frank Hann National Park, ca 83 km NE of Lake King	21/08/1980	
12 km SW of Mount Buraminya, ca 40 km WNW of Mount Ragged	8/11/1980	
23.5 km due SSE of Kau Rocks, 3.1 km NE of intersection 3 on Condingup Road	2/09/1984	

35.5 km due ENE of Muckinwobert Rock 6.21 km NE of Melaleuca Road on West Point Road	30/09/1984	
5.5 km SW of Mount Ridley	7/12/1991	
W end of Dunns beach	2/12/1992	
26.5 km N of Condingup. Corner of Coolinup Road and Howick Road, NE of Esperance,	31/12/1995	
Location 1878 ~1.2km SE of Rhinds Rd - Dalyup rd intersection	21/09/1998	few
Reserve 24952	17/10/1998	
86.8 km E of Lake King General Store along Norseman Lake King track. Roe District	31/12/2001	15 plants noted.
4km south of Grass Patch	22/08/2002	5
New Island Bay, 2.5 km WSW of Hellfire Bay carpark, 1.8 km SE of Mt Le Grand summit, 7.4 km WSW of Lucky Bay campsite, Cape Le Grand National Park, 28 km SE of Esperance township, Esperance Plains IBRA bioregion	21/10/2011	occasional, 4 plants and 2 seedlings seen.
2.1 km W of Hellfire Bay carpark, 1.9 km SE of Mt Le Grand summit, 7.0 km WSW of Lucky Bay campsite, Cape Le Grand National Park, 29 km SE of Esperance township, Esperance Plains IBRA bioregion	26/11/2011	occasional, 1 plant seen.
Helms Forestry Reserve 23527, bushland slashed access track travelling SE to S boundary	2/01/2012	2-5 plants.
3.4 km NW from the northwestern boundary of Kau Rock Nature Reserve	3/11/2013	1 plant.
Cape Le Grand National Park, proposed Lucky Bay redevelopment site	15/09/2014	
On Norwood Road from intersection of Dempster Road to 20 m E, 28 km E of Scaddan, c. 50 km NNE of Esperance townsite	10/09/2019	> 3 plants.
Norwood and Dempster rd intersection	10/09/2020	3
Boydell rd	7/10/2020	5
Styles rd	16/10/2020	1
On Dempster Rd, sporadically scattered between 400 m north to 2.4 km north of Scaddan Rd and Dempster Rd intersection.	30/10/2020	
On Dempster Rd, ~3.1 km south of Norwood Rd on Dempster Rd.	30/10/2020	

5.5.3 *Isopogon alcicornis,* Elkhorn Coneflower, Priority 3

A specimen of *Isopogon alcicornis* was sent to the WA Herbarium for identification confirmation (KW088; Accession 8652 with specimen retained by WA Herbarium). It was confirmed by Michael Hislop on 10/12/20. A Threatened and Priority Reporting Form (TPFL) was completed and sent to Department of Biodiversity, Conservation and Attractions (DBCA) District Flora Conservation Officer and Species and Communities Branch on 15/01/21 (Appendix 8.5). If proposed works occur, 10 plants will be impacted upon, from a population total of 13.

Figure 8. *Isopogon alcicornis* specimen KW088 Accession 8652 from 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade'.

I. alcicornis, is a low growing shrub that persists in sandy soils, skeletal loam or granite. The sandy, gravel duplex soils of Henkes Rd make it an ideal habitat for the plant to grow. *I. alcicornis* is associated with Proteaceae heath, with 28 recorded locations over a distribution range of around 150km from Dalyup east to the Cape Arid region. Many recorded locations are very old and little work has been carried out on this species. Records from the Esperance Wildflower blogspot state both that the species is "in urgent need of further study," and would benefit from more frequent fire events. Henkes Rd matches the local observations of other *I. alcicornis* populations. It is a distinctive species and not often overlooked in surveys.

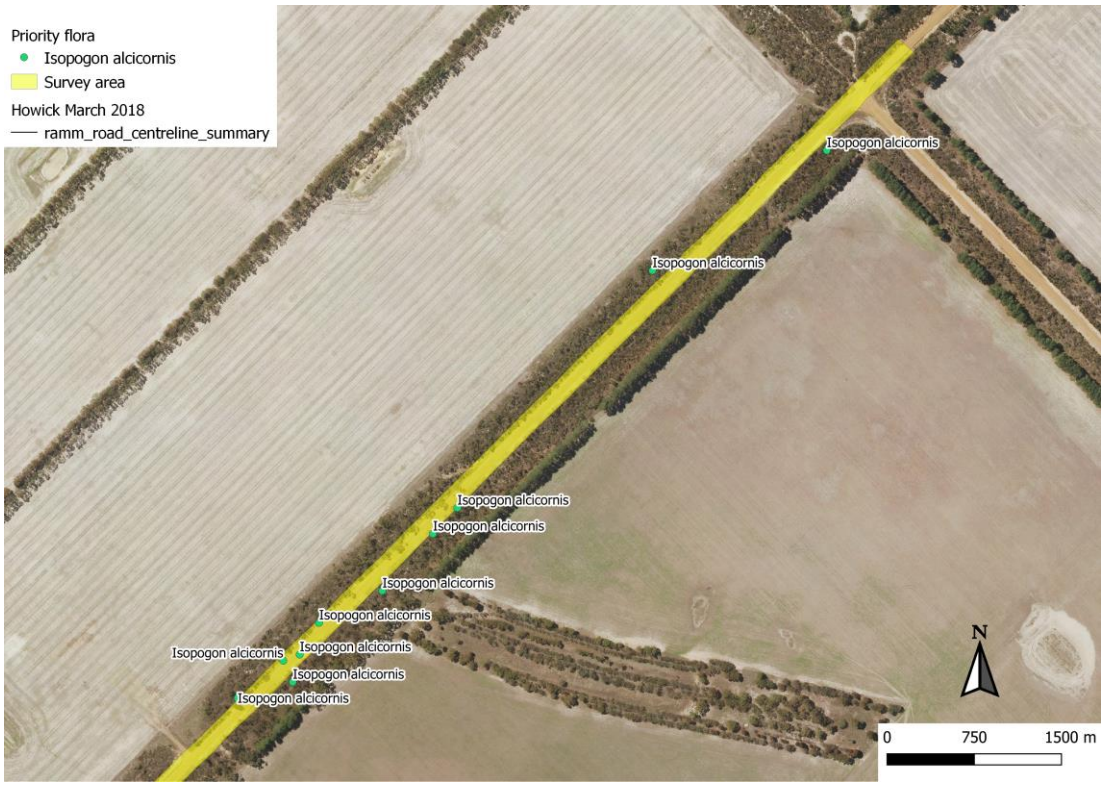

Figure 9. Locations of *Isopogon alcicornis* within 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade'.

Table 8. Compiled population data of *Isopogon alcicornis* and new populations discovered by the Shire of Esperance in the 2020 spring season (DBCA 2021).

Site Description	Date	Population Count
12 miles past (S of] Truslove	11/10/1931	
Between Truslove and Esperance, 12 miles past [S of] Truslove	11/10/1931	
(Prope) montem Baring [near Mount Baring]	12/02/1966	
NW of Dalyup, W of Esperance	25/02/1966	
Wittenoom Hills	9/06/1972	
Mount Burdett		

Mount Burdett, E side		
8 km E of Scaddan on Scaddan Road	20/08/1982	
Mallee Heath, 0.2 km SW of Tweedale Road on Muntz Road, reserve 31799. [Ca 15 km NNE of Howick Hill]	/10/1984	
31.1 km E of Scaddan on Norwood Road	5/09/1985	2 plants seen on 1 km walk.
Mount Burdett about 50 km NE of Esperance	26/11/1985	Scattered.
10 km N of Gibson	12/12/1985	Single plant.
8 km SE of Mount Ridley	24/03/1991	Plants spaced over a substantial area making them collectively common.
3.3km E of Esperance-Norseman Hwy on Scaddan East Rd; SE of Scaddan.	24/09/1992	1 plant only; S road reserve (15m wide).
Mt Burdett; Nature Reserve.	25/09/1992	1 plant only seen in 200m walk.
Mount Burdett Nature Reserve, on W slopes peripheral to rock outcrop	30/01/1993	30 only observed over 0.5 ha.
Mt Baring, Cape Arid National Park.	25/04/1993	Rare, 1 plant only seen.
20.7-22.2 km N of Fisheries Rd on Muntz Rd (=0.5-2 km SW of "Tweedale Rd" track) , ca. 32 km NE of Condingup. Beaumont Group Nature Reserve.	14/11/1993	Abundance: Occasional, scattered, 100+ plants.
13.5 km S of Mount Burdett	3/10/1995	Abundance: frequent.
2.3 km S of Speddington Road on rail line. Both sides adjacent salt lakes. NE of Esperance	3/03/2001	20+ plants.
50-100 m E of West Kalgoorlie Esperance Railway, between railway line and cleared farmland, 5.1 km S of Speddingup, 9.7 km N of Gibson	1/07/2003	c. 30 plants adjacent to 60 m of track.
NE of Esperance in vegetation off Scadden Road near junction with Dempster Road, DEFL pop 16 (10c)		
0.7-2 km SW of Tweedale Road on Muntz Road, both sides of road and up to 10 m from road edge	14/12/2007	about 40 plants.
On Eld Road c. 2.7 km E of junction with Burdett Road where Kau Rock Nature Reserve briefly meets with Eld Road	26/06/2013	6 - 20 plants.
Along a firebreak running E from Balladonia Road (5 km N of Fisheries Road), c. 59 km E of Condingup	28/10/2013	5 plants seen.

UCL. 2.6km north along Lake Tay Rd from Cascades Rd, then 1km north west along firebreak track.	11-Nov-20	50
UCL. Northover Soak.	17-Sep-20	10
Scaddan Road – 3.5km south of Green Rd	12-10-2020	12

5.6 Fauna

Within a 20 km radius of the 'Site B – Henkes Road Resheet', 137 fauna have previously been recorded. Of these, 16 species are threatened fauna, priority fauna and fauna protected under international agreement have been recorded (Table 9). Four species have suitable habitat within the proposed clearing permit area, including Carnaby's Cockatoo, Southern Death Adder, Dibbler and Western Ground Parrot.

Table 9. Potential threatened, priority and protected under international agreement fauna recorded within a 20 km radius of the proposed 'Site B – Henkes Road Resheet, between Howick Rd and Orleans Rd'.
Nt. Acronyms used include priority (P), threatened (T), and protected under international agreement (IA).

Scientific Name	Common Name	Conservation Status	Likelihood of occurring	Associated habitat
Acanthophis antarcticus	Southern Death Adder	P3	Yes	Associated with open woodland, scrub and heathland areas.
Actitis hypoleucos	Common Sandpiper	IA	No	Shorebird.
Calidris acuminata	Sharp-tailed Sandpiper	IA	No	Shorebird.
Calidris alba	Sanderling	IA	No	Shorebird.
Calidris ferruginea	Curlew Sandpiper	T	No	Shorebird.
Calidris ruficollis	Red-necked Stint	IA	No	Shorebird.
Calyptorhynchus latirostris	Carnaby's Cockatoo	T	Yes	Kwongkan shrub or heathland. Presence of Hakea, Banksia and Pine species indicate potential feeding habitat.
Carcharodon carcharias	Great White Shark	T	No	Lives in ocean.
Caretta caretta	Loggerhead Turtle	T	No	Lives in ocean.
Cereopsis novaehollandiae	Cape Barren Goose	T	No	Associated with offshore islands, improved pastures or clovers, salty ground with native succulents, camps on margins of dams, fresh or brackish swamps and lakes.

Hydroprogne caspia	Caspian Tern	IA	No	Shorebird.
Neophoca cinerea	Australian Sea Lion	T	No	Lives in ocean.
Oxyura australis	Blue-billed Duck	P4	No	Almost entirely aquatic, seldom seen on land.
Parantechinus apicalis	Dibbler	P4	Unlikely	Old-growth mallee heath. Only known mainland population found within Fitzgerald River National Park.
Pezoporus flaviventris	Western Ground Parrot	T	Highly unlikely	Associated with low heathland. Local knowledge is that only surviving populations are located in Cape Arid.
Pluvialis fulva	Pacific Golden Plover	IA	No	Shorebird.

5.6.1 Southern Death Adder, *Acanthophis antarcticus,* Priority 3 fauna

Southern Death Adders are known to inhabit a range of habitats including woodlands, shrublands, grasslands and coastal heathlands, showing a preference for deep leaf litter. All ten vegetation types at 'Site B – Henkes Road Resheet' are suitable habitat for the Southern Death Adder. The abundance of Proteaceae species in vegetation types B, E, G and J indicated suitable feeding habitat for small nectarivorous birds and mammals which are the potential prey of the Southern Death Adder. The recent fires in the proposed area means that leaf litter has built up, providing ideal burrowing habitat for the Southern Death Adder. No Southern Death Adders were observed within 'Site B – Henkes Rd Resheet'.

5.6.2 Carnaby's Black Cockatoo, *Calyptorhynchus latirostris*, threatened fauna

'Site B – Henkes Road Resheet' project area, could provide suitable foraging and roosting habitat for the Carnaby's Black Cockatoo. Large Pine and Tuart trees are present in the surrounding area, which means Carnaby's Black Cockatoo are likely to frequent the area by roosting in these trees. Several of the vegetation types have both the tall Eucalypts and Proteaceous shrubland required by the cockatoo (Table 2). Carnaby's Black Cockatoos forage on Proteaceae species nuts, such as Hakea or Banksia species. Vegetation types B, E, G and J, all classified as Kwongkan TEC, would likely provide foraging grounds. The pine trees present along the fencelines of bordering agricultural properties suggesting that this site is potential Carnaby's Black Cockatoo feeding habitat. During the flora survey, Black Cockatoos were observed feeding on a *Hakea cinerea* plant within the proposed permit area, meaning that the species is known to use the area.

5.6.3 Western Ground Parrot, *Pezoporus flaviventris*, threatened fauna

The Western Ground Parrot is associated with dense shrublands, typically formed by Proteaceae dominated Kwongkan coastal shrubland communities. Several vegetation types within 'Site B – Henkes Road Resheet' could be considered suitable habitat including:

- Vegetation type B - 'Semi-open to dense Eucalyptus angulosa with mixed and diverse low shrubland of Proteaceous sp., dominated by Hakea species, with scattered Allocasuarina sp.'
- Vegetation type E – 'Dense *Eucalyptus angulosa* with dominant *Banksia armata* and *Hakea cormybosa* and mixed low shrubland'

- Vegetation type G – 'Mixed tall and low Eucalyptus woodland with dense and highly mixed mid-story, dominated by *Hakea cinerea* and *Cyathostemon ambiguus',* and
- Vegetation type J – 'Closed Mallee woodland with dense *Hakea corymbosa* mid-story and dense sedge under-story.'

However the likelihood of Western Ground Parrot occurring within the proposed clearing permit area is unlikely as it is locally known that all remnant populations of the Western Ground Parrot are in Cape Arid National Park and this critically endangered bird is known from about 140 individuals.

5.6.4 Dibbler, *Parantechinus apicalis*, Priority 4 fauna

Dibblers, *Parantechinus apicalis,* habitat preferences have been characterised as long-unburnt heathland. Majority of the vegetation types within 'Site B – Henkes Road Resheet, between Howick Rd and Orlean Rd' fit this broad description, meaning they are potentially suitable habitat for Dibblers. However, it is highly unlikely that Dibblers currently inhabiting the area within the proposed clearing permit area as the only known surviving mainland population exists within Fitzgerald River National Park or other translocated populations within the Recherche Archipelago.

Other fauna observed during the survey include extensive rabbit diggings and large fox holes which were observed in the southern section of the survey area.

6 Conclusion; assessment of Department of Water and Environmental Regulations clearing principles

The 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade' project may be at variance to some of the clearing principles that the Department of Water and Environmental Regulations (DWER) assess applications, as listed under Schedule 5 of the Environmental Protection Act 1986 (DWER 2019).

Table 10. Shire of Esperance Assessment against Clearing Principles of the proposed 'Site B – Henkes Road Resheet, between Howick Rd and Orleans Rd'.

Assessment against Clearing Principles	Conclusion
Principle (a) Native vegetation should not be cleared if it comprises a high level of biological diversity.	Biodiversity at this site is high with only 272 native species across 10 vegetation communities.
Principle (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 indigenous to Western Australia.	The area contains foraging and roosting habitat for Carnaby's cockatoo but no nesting habitat. It may contain habitat for the Southern Death adder.
Principle (c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.	Two Priority 3 species *Isopogon alcicornis* and *Persoonia scabra* and one Priority 4 species *Grevillea baxteri* were recorded within the site, however the removal of these plants is unlikely to effect the existence of these species.
Principle (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.	Four vegetation communities met criteria to be considered as Kwongkan TEC, including vegetation type B, E, G and K. However only areas within these vegetation communities in

	very good or excellent condition were considered as TEC. In total, 0.915 ha of vegetation within a 5.42 ha footprint was considered as Kwongkan TEC. 0.156 ha of Vegetation type D meets the criteria for the PEC "Swamp yate *Eucalyptus occidentalis,* woodlands in seasonally inundated clay basins in the South Coast region"
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.	Some of the vegetation types in this application area are poorly conserved and much of their pre-european extent has been lost, however the 100m wide road reserve in this area will still be largely intact as continue to act as a significant remnant and wildlife corridor even with the road widening going ahead.
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.	Vegetation type D 'Yates woodland with *Melaleuca calycina*' is present within the site. This is a "wetland" only in extremely wet winters, and is not mapped by DWER as a wetland.
Principle (g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	Soil types in the area are unlikely to erode or become degraded due to this road widening.
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.	Clearing of the vegetation is unlikely to have an impact on the environmental values of any adjacent or nearby conservation area all over 7km away.
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.	Unlikely to have any impacts.
Principle (j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.	Unlikely to have any impacts.

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8 Appendix

8.1 Maps of vegetation communities identified in 'Site B – Henkes Road Resheet, between Howick Rd and Orleans Rd'

Figure 10. Map of vegetation types within the 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade' area, from SLK 2.95 km to ~6.17 km along Henkes Road. Map one of three.

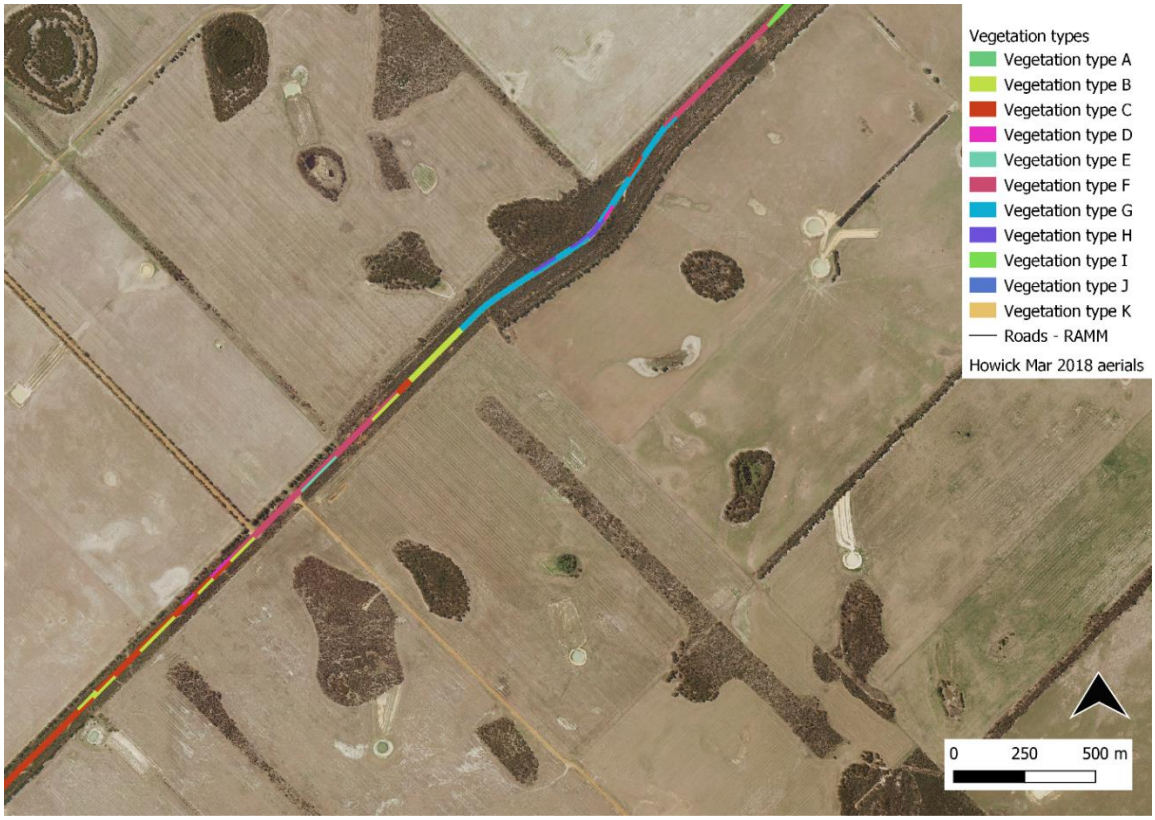

Figure11. Map of vegetation types within the 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade' area, from SLK ~6.17 km to ~9.30 km along Henkes Road. Map two of three.

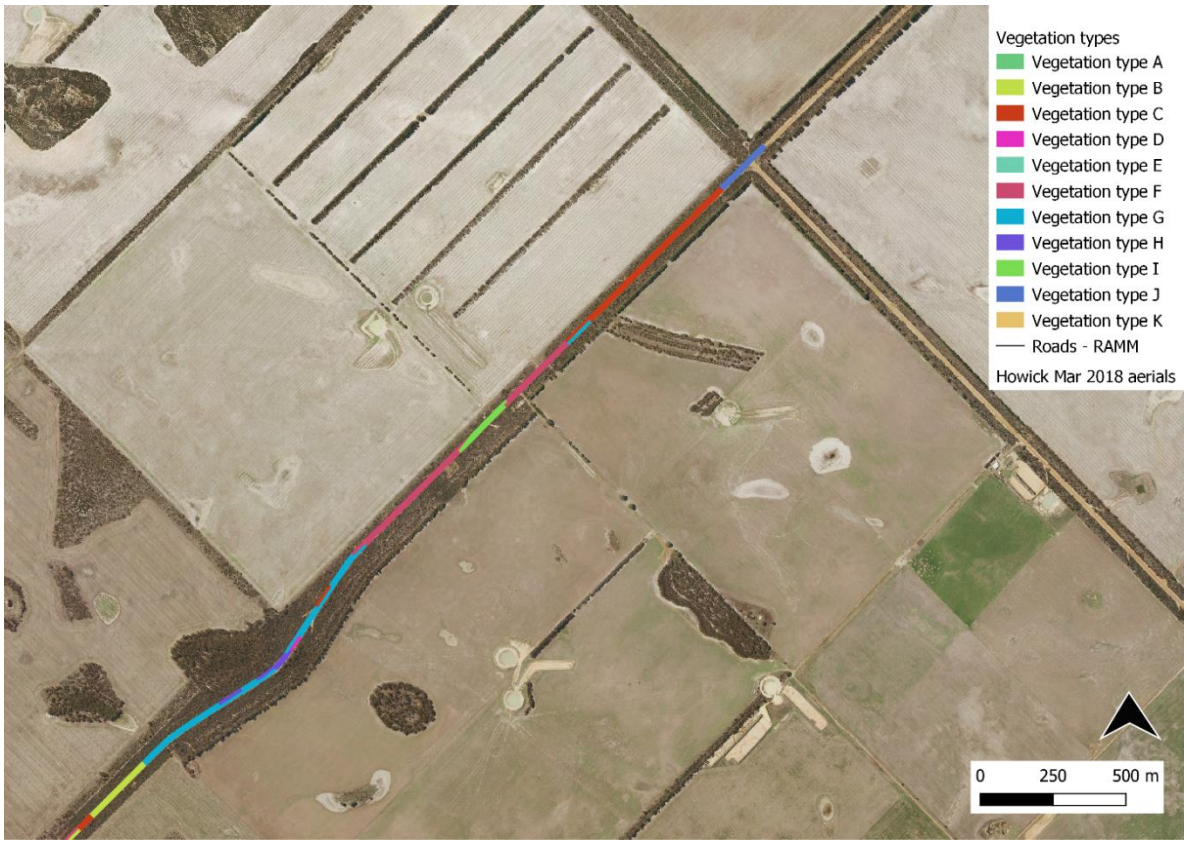

Figure 12. Map of vegetation types within the 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade' area, from SLK ~9.30 km to 11.05 km along Henkes Road. Map three of three.

8.2 Photos of vegetation communities identified in 'Site B – Henkes Road Resheet, between Howick Rd and Orleans Rd'.

Figure 13. Vegetation type A identified in 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade' project, described as 'Scattered *Nuytsia floribunda* with dense Allocasuarina and Melaleuca shrubland'.

Figure 14. Vegetation type B identified in 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade' project, described as 'Semi-open to dense *Eucalyptus angulosa* with mixed and diverse low shrubland of Proteaceous sp., dominated by Hakea species, with scattered Allocasuarina sp.'

Figure 15. Vegetation type C identified in 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade' project, described as 'Open tall Eucalyptus/Mallee Woodland with scattered *Banksia media*, and diverse low shrubland and dense sedgeland under-story.'

Figure 16. Vegetation type D identified in 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade' project, described as 'Yates woodland with *Melaleuca calycina.'*

Figure 17. Vegetation type E identified in 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade' project, described as 'Dense *Eucalyptus angulosa* with dominant *Banksia armata* and *Hakea cormybosa* and mixed low shrubland.'

Figure 18. Vegetation type F identified in 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade'project, described as 'Disturbed gravel pits forming a mix of regenerating *Banksia armata* (possibly vegetation type E) and Tall Mallee (possibly vegetation type C), with dense Cyathostemon sp.'.

Figure 19. Vegetation type G identified in 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade' project, described as 'Mixed tall and low Eucalyptus woodland with dense and highly mixed mid-story, dominated by *Hakea cinerea* and *Cyathostemon ambiguus.'*

Figure 20. Vegetation type H identified in 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade' project, described as 'Dense/closed tall Eucalyptus and *Hakea laurina* woodland with semi-open shrubland *of Exocarpus sparteus* and Hakea sp, with dense Cyperaceae sedgeland under-story.'

Figure 21. Vegetation type I identified in 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade' project, described as 'Mixed dense *Acacia cyclops*, *Eucalyptus angulosa* and Allocasuarina shrubland with Cyperaceae sedgeland and no Proteaceae species.'

Figure 22. Vegetation type J identified in 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade' project, described as 'Closed Mallee woodland with dense *Hakea corymbosa* mid-story and dense sedge under-story.'

Figure 23. Vegetation type K identified in 'Site B – Henkes Road Resheet and Howick Henkes Intersection upgrade' project, described as 'Allocasuarina shrubland with Nuytsia and Anarthria sedgeland'.

8.3 Maps of vegetation condition in 'Site B – Henkes Road Resheet, between Howick Rd and Orleans Rd'.

Figure 24. Vegetation condition across 'Site B – Henkes Road Sheet, between Howick Rd and Orleans Rd' project, ranging from poor to excellent condition, due primarily to degradation from weed invasion following gravel extraction. Map one of three.

Figure 25. Vegetation condition across 'Site B – Henkes Road Sheet, between Howick Rd and Orleans Rd' project, ranging from poor to excellent condition, due primarily to degradation from weed invasion following gravel extraction. Map two of three.

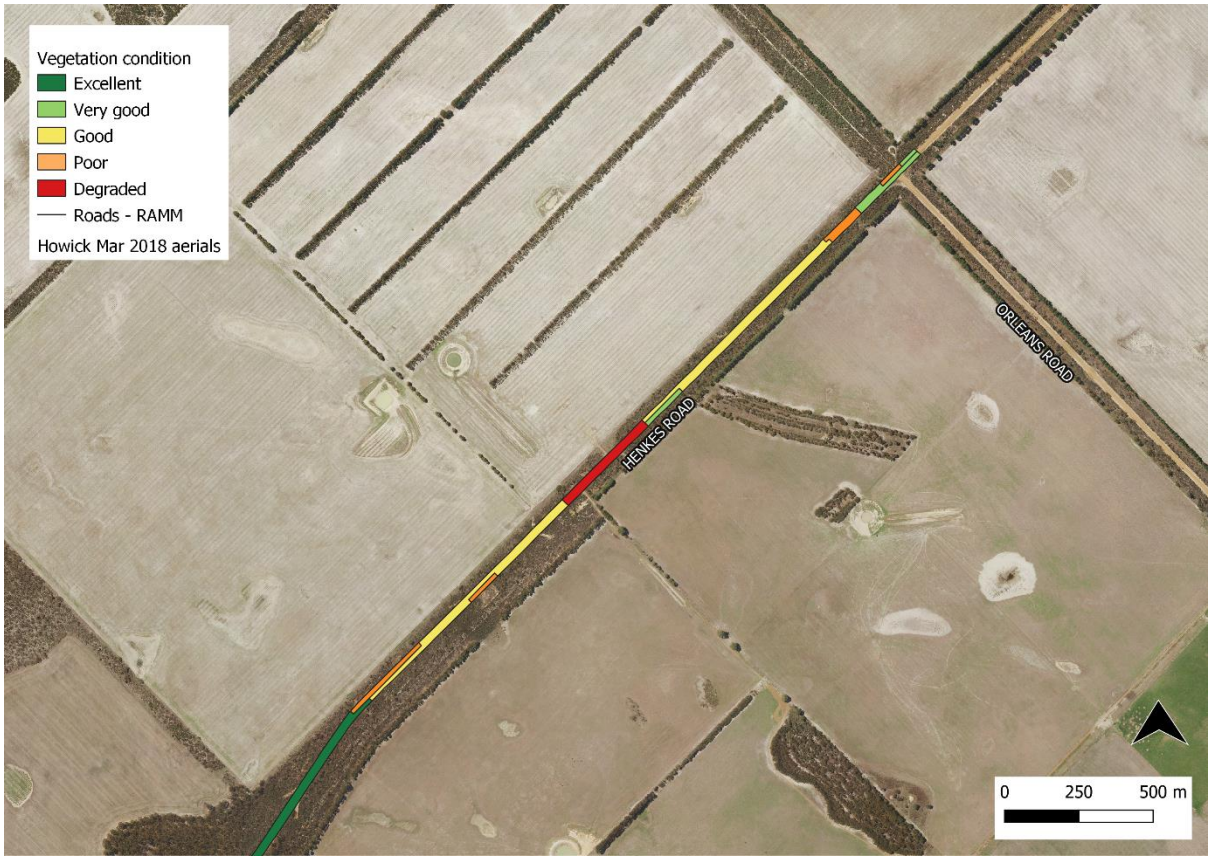

Figure 26. Vegetation condition across 'Site B – Henkes Road Sheet, between Howick Rd and Orleans Rd' project, ranging from poor to excellent condition, due primarily to degradation from weed invasion following gravel extraction. Map three of three.

8.4 Incidental species list

Table 11. Incidental species list 'Site B – Henkes Road Sheet, between Howick Rd and Orleans Rd' project

Family	Genus	Species	Weed	Cons Stat	Vegetation Type										
					A	B	C	D	E	F	G	H	I	J	K
Anarthriaceae	*Anarthria*	*humilis*				X									X
Anarthriaceae	*Anarthria*	*laevis*				X					X			X	
Anarthriaceae	*Anarthria*	*humilis*				X									X
Anarthriaceae	*Anarthria*	*laevis*				X					X			X	
Anarthriaceae	*Anarthria*	*scabra*			X	X	X					X			
Anarthriaceae	*Lyginia*	*barbata*				X	X		X						
Anarthriaceae	*Lyginia*	*imberbis*			X									x	X
Apiaceae	*Xanthosia*	*huegelii*					X			X	X				
Araliaceae	*Trachymene*	*pilosa*			X	X					X			X	X
Asparagaceae	*Lomandra*	*collina*									X	X			
Asparagaceae	*Lomandra*	*hastilis*												X	
Asparagaceae	*Lomandra*	*micrantha*				X									
Asparagaceae	*Lomandra*	*mucronata*										X			

Asparagaceae	*Thysanotus*	*patersonii*			X					X		X	X		
Asteraceae	*Arctotheca*	*calendula*	X		X	X	X	X	X	X	X		X	X	
Asteraceae	*Argentipallium*	*niveum*					X								
Asteraceae	*Blennospora*	*drummondii*				X									X
Asteraceae	*Conzya*	*sp.*	X				X								
Asteraceae	*Gamochaeta*	*calviceps*	X			X	X								X
Asteraceae	*Hyalosperma*	*demissum*													X
Asteraceae	*Hyalosperma*	*demissum*			X		X								
Asteraceae	*Hypochaeris*	*sp.*	X		X	X	X	X		X					X
Asteraceae	*Millotia*	*tenuifolia var. tenuifolia*				X									X
Asteraceae	*Olearia*	*sp. eremicola*													
Asteraceae	*Pseudognaphalium*	*luteoalbum*			X		X			X					
Asteraceae	*Pterochaeta*	*paniculata*			X										
Asteraceae	*Taraxacum*	*officinale*	X		X		X							X	
Asteraceae	*Ursinia*	*anthemoides*	X		X	X	X						X		
Asteraceae	*Vittadinia*	*gracilis*			X	X	X				X				
Boraginaceae	*Halgania*	*andromedifolia*				X	X		X		X	X			
Brassicaceae	*Raphanus*	*nigra*	X		X	X	X						X		
Brassicaceae	*Raphanus*	*raphanistrum*	X		X	X	X						X		
Campanulaceae	*Monopsis*	*debilis var depressa*	x			X	X						X		X
Caryophyllaceae	*Polycarpon*	*tetraphyllum*	x								X				
Casuarinaceae	*Allocasuarina*	*huegeliana*			X	X	X	X	X	X	X	X			
Casuarinaceae	*Allocasuarina*	*humilis*			X	X	X		X	X	X		X		X
Casuarinaceae	*Allocasuarina*	*lehmanniana ssp. ecarinata*									X				
Casuarinaceae	*Allocasuarina*	*thyoides*			x		X		X	X	X			X	X
Celastraceae	*Tripterococcus*	*brunonis*					X								
CentrolepidaceaeCentrolepis	*Centrolepis*	*polygyna*								X	X			X	
CentrolepidaceaeCentrolepis		*aristata*													
Cladoniaceae	*Cladia*	*ferdinandii*									X				
Crassulaceae	*Crassula*	*decumbens*			X		X			X	X		X		
Cupressaceae	*Callitris*	*drummondii*			X	X	X				X				
Cyperaceae	*Caustis*	*dioica*			X	X			X	X	X		X	X	X
Cyperaceae	*Chaetospora*	*curvifolia*													X
Cyperaceae	*Cyathochaeta*	*equitans*			X	X									
Cyperaceae	*Cyperaceae*	*sp.*			X	X							X		
Cyperaceae	*Cyperus*	*tenellus*	X		X		X								
Cyperaceae	*Ficinia*	*nodosa*						X							
Cyperaceae	*Gahnia*	*trifida*				X	X			X	X	X			

Cyperaceae	*Isolepis*	*marginata*			X		X			X	X		X		
Cyperaceae	*Lepidosperma*	*sp.*			X	X	X			X	X	X	X	X	
Cyperaceae	*Lepidosperma*	*sp.*						X		X				X	
Cyperaceae	*Mesomelaena*	*stygia ssp. stygia*					X				X				
Cyperaceae	*Mesomelaena*	*tetragona*			X	X								X	X
Cyperaceae	*Schoenus*	*breviculmis*				X									X
Cyperaceae	*Schoenus*	*caespititius*									X				
Cyperaceae	*Schoenus*	*laevigatus*													X
Cyperaceae	*Schoenus*	*subfascicularis*										X			
Cyperaceae	*Schoenus*	*sublaxus*				X					X				X
Cyperaceae	*Tricostularia*	*aphylla*			X	X									X
Dilleniaceae	*Hibbertia*	*gracilipes*			X	X	X		X	X	X	X	X	X	X
Dilleniaceae	*Hibbertia*	*racemosa*												X	
Dilleniaceae	*Hibbertia*	*verrucosa*			X	X				X					
Droseraceae	*Drosera*	*neesii*			X	X									X
Droseraceae	*Drosera*	*scorpioides*												X	X
Ericaceae	*Acrotriche*	*cordata*										X			
Ericaceae	*Andersonia*	*parvifolia*										X			
Ericaceae	*Leucopogon*	*carinatus*				X	X				X				
Ericaceae	*Leucopogon*	*sp. Coujinup*													
Ericaceae	*Lysinema*	*ciliatum*			X	X	X		X		X	X			
Ericaceae	*Lysinema*	*pentapetalum*													X
Ericaceae	*Styphelia*	*prostrata*				X			X	X	X			X	
Euphorbiaceae	*Euphorbia*	*terracina*	X			X	X								
Euphorbiaceae	*Monotaxis*	*paxii*				X	X				X	X		X	
Euphorbiaceae	*Stachystemon*	*virgatus*				X	X		X	X	X				
Euphorbiaceae	*Stachystemon*	*virgatus*					X				X				
Fabaceae	*Acacia*	*aemula*							X			X			
Fabaceae	*Acacia*	*cyclops*			X	X	X	X	X		X	X	X	X	X
Fabaceae	*Acacia*	*gonohphylla*					X				X				
Fabaceae	*Acacia*	*latipes ssp. latipes*				X	X			X	X	X			
Fabaceae	*Acacia*	*maxwellii*									X	X		X	
Fabaceae	*Acacia*	*myrtifolia*								X	X				
Fabaceae	*Acacia*	*nigricans*								X				X	
Fabaceae	*Acacia*	*pachyphylla*								X					
Fabaceae	*Acacia*	*pritzeliana*				X	X						X	X	
Fabaceae	*Acacia*	*pycnatha*	X							X	X			X	
Fabaceae	*Acacia*	*saligna*			X	X			X		X	X			
Fabaceae	*Acacia*	*sp.*					X								
Fabaceae	*Aotus*	*sp. Esperance*				X									X

Fabaceae	*Bossiaea*	*preissii*				X			X	X	X		X	X	
Fabaceae	*Chorizema*	*aciculare*				X	X		X	X	X	X	X		
Fabaceae	*Chorizema*	*obtusifolium*			X		X			X					X
Fabaceae	*Daviesia*	*dilatata*				X				X	X		X		
Fabaceae	*Daviesia*	*lancifolia*				X	X				X		X	X	
Fabaceae	*Daviesia*	*teretifolia*			X		X		X	X	X	X			
Fabaceae	*Dillwynia*	*sp. Mallee*										X			
Fabaceae	*Dillwynia*	*uncinata*				X	X			X	X	X			
Fabaceae	*Eutaxia*	*inuncta*										X		X	
Fabaceae	*Gompholobium*	*baxteri*													X
Fabaceae	*Gompholobium*	*knightianum*				X	X		X		X	X			
Fabaceae	*Gompholobium*	*marginatum*													
Fabaceae	*Jacksonia*	*veinosa*			X	X				X					X
Fabaceae	*Jacksonia*	*viscosa*				X									
Fabaceae	*Kennedia*	*sp. South coast*								X		X		X	
Fabaceae	*Lupinus*	*albus*	X			X									
Fabaceae	*Ornithopus*	*sativus*	x		X		X		X		X				X
Fabaceae	*Sphaerolobium*	*daviesioides*													
Fabaceae	*Templetonia*	*retusa*					X					X			
Fabaceae	*Templetonia*	*sulcata*					X						X		
Fabaceae	*Trifolium*	*sp.*	X			X									
Geraniaceae	*Erodium*	*cicutarium*	X		X	X	X				X	X			
Goodeniaceae	*Coopernookia*	*strophiolata*				X	X				X	X			
Goodeniaceae	*Dampiera*	*lavandulaceae*				X	X				X		X		
Goodeniaceae	*Dampiera*	*parvifolia*			X		X								X
Goodeniaceae	*Dampiera*	*sacculata*									X				
Goodeniaceae	*Goodenia*	*affinis*									X	X			
Goodeniaceae	*Goodenia*	*concinna*				X	X				X	X	X		
Goodeniaceae	*Goodenia*	*incana*						X						X	
Goodeniaceae	*Goodenia*	*pterigosperma*					X								
Goodeniaceae	*Lechenaultia*	*tubiflora*			X	X	X		X		X				X
Goodeniaceae	*Velleia*	*trinervis*				X		X	X	X	X				
Haemodoraceae	*Anigozanthos*	*rufus*													X
Haemodoraceae	*Conostylis*	*seorsiflora*												X	X
Halgoraceae	*Glisocharyon*	*angustifolium*					X		X	X	X	X	X	X	
Hemerocallidaceae	*Agrostocrinum*	*scabra*					X		X	X			X	X	
Hemerocallidaceae	*Dianella*	*brevicaulis*			X	X	X				X	X			
Hemerocallidaceae	*Johnsonia*	*acaulis*			X										X
Iridaceae	*Patersonia*	*lanata*			X	X	X							X	X
Iridaceae	*Patersonia*	*maxwellii*			X										

Iridaceae	*Patersonia*	*occidentalis*			X	X	X							X	
Iridaceae	*Romulea*	*rosea*	X		X				X						
Juncaceae	*Juncus*	*bufonius*	X		X		X						X		
Lamiaceae	*Microcorys*	*subcanescens*			X	X									X
Lauraceae	*Cassytha*	*racemosa*			X	X	X		X	X		X		X	
Loganiaceae	*Logania*	*buxifolia*									X	X			
Loganiaceae	*Logania*	*micrantha*				X									
Loganiaceae	*Phyllangium*	*divergens*			X										
Loranthaceae	*Nuytsia*	*floribunda*			X	X									X
Myrtaceae	*Beaufortia*	*empetrifolia*			X	X								X	X
Myrtaceae	*Beaufortia*	*schaueri*				X				X					
Myrtaceae	*Calothamnus*	*gracilis*			X	X	X		X	X	X				X
Myrtaceae	*Calothamnus*	*quadrifidus*			X										
Myrtaceae	*Calytrix*	*decandra*				X									X
Myrtaceae	*Calytrix*	*leschenaultii*								X	X				
Myrtaceae	*Conothamnus*	*aureus*			X	X	X								X
Myrtaceae	*Cyathostemon*	*ambiguus*			X	X	X	X	X	X	X	X	X	X	
Myrtaceae	*Darwinia*	*vestita*								X				X	X
Myrtaceae	*Eucalyptus*	*angulosa*			X	X	X		X		X	X		X	
Myrtaceae	*Eucalyptus*	*conglobata ssp. conglobata*					X					X			
Myrtaceae	*Eucalyptus*	*cooperiana*										X			
Myrtaceae	*Eucalyptus*	*extrica*			X	X	X		X	X	X		X		X
Myrtaceae	*Eucalyptus*	*gomphocephala*	X		X	X	X								
Myrtaceae	*Eucalyptus*	*leptocalyx*					X				X	X			
Myrtaceae	*Eucalyptus*	*micranthera*				X	X				X				
Myrtaceae	*Eucalyptus*	*occidentalis*						X				X			
Myrtaceae	*Eucalyptus*	*tumida*													
Myrtaceae	*Eucalyptus*	*uncinata*				X	X	X			X	X			
Myrtaceae	*Leptospermum*	*laevigatum*	X								X				
Myrtaceae	*Leptospermum*	*maxwellii*									X				
Myrtaceae	*Leptospermum*	*oligandrum*								X			X	X	
Myrtaceae	*Leptospermum*	*spinescens*									X				
Myrtaceae	*Melaleuca*	*brevifolia*								X	X				
Myrtaceae	*Melaleuca*	*calycina*					X	X			X	X			
Myrtaceae	*Melaleuca*	*cuticularis*								X		X			
Myrtaceae	*Melaleuca*	*glaberrima*								X		X			
Myrtaceae	*Melaleuca*	*pulchella*			X	X	X				X				X
Myrtaceae	*Melaleuca*	*rigidifolia*			X	X	X		X	X	X	X	X	X	X
Myrtaceae	*Melaleuca*	*scabra*													

Myrtaceae	*Melaleuca*	*striata*			X	X	X							X	X
Myrtaceae	*Melaleuca*	*suberosa*				X	X		X	X	X	X	X		
Myrtaceae	*Melaleuca*	*thapsina*									X	X			
Myrtaceae	*Melaleuca*	*tuberculata*				X	X	X		X					X
Myrtaceae	*Melaleuca*	*undulata*				X	X								
Myrtaceae	*Micromyrtus*	*elobata ssp. elobata*												X	
Myrtaceae	*Phymatocarpus*	*maxwellii*				X	X			X	X			X	
Myrtaceae	*Taxandria*	*spathulata*			X	X			X						X
Myrtaceae	*Verticordia*	*minutiflora*			X	X									X
Olacaceae	*Olax*	*benthamiana*									X				
Orchidaceae	*Caladenia*	*decora*				X			X						
Orchidaceae	*Caladenia*	*exstans*							X						
Orchidaceae	*Caladenia*	*flava*			X										
Orchidaceae	*Disa*	*bracteata*	X		X	X	X		X	X					
Orchidaceae	*Diuris*	*corymbosa*			X										
Orchidaceae	*Diuris*	*laxiflora*			X										X
Orchidaceae	*Elythranthera*	*brunonis*			X	X					X				X
Orchidaceae	*Microtis*	*media*			X	X	X			X					X
Orchidaceae	*Thelymitra*	*benthamiana*													
Orchidaceae	*Thelymitra*	*graminea*				X			X		X	X			
Orchidaceae	*Thelymitra*	*sp.*				X			X			X			
Pinaceae	*Pinus*	*pinaster*	X				X							X	
Pittosporaceae	*Billardiera*	*fusiformis*			X	X	X		X	X	X	X		X	X
Pittosporaceae	*Marianthus*	*bicolor*				X	X				X	X			
Poaceae	*Amphipogon*	*avenaceous*			X	X		X			X	X	X	X	
Poaceae	*Amphipogon*	*turbinatus*			X	X			X		X	X	X	X	X
Poaceae	*Austrostipa*	*airoides*									X			X	
Poaceae	*Austrostipa*	*elegantissima*									X				
Poaceae	*Austrostipa*	*semibarbata*										X			
Poaceae	*Austrostipa*	*variabilis*				X									X
Poaceae	*Avellinia*	*michelii*			X								X		
Poaceae	*Avena*	*fatua*	X			X	X								
Poaceae	*Briza*	*maxima*	X		X	X									
Poaceae	*Briza*	*minor*	X		X		X		X						X
Poaceae	*Ehrharta*	*calycina*	X				X						X	X	
Poaceae	*Ehrharta*	*longiflora*				X	X	X	X			X		X	
Poaceae	*Eragrostis*	*curvula*	X		X	X	X	X	X				X	X	
Poaceae	*Lolium*	*perenne*			X	X	X				X		X		
Poaceae	*Neurachne*	*alopecuroidea*			X	X	X		X	X			X	X	X
Poaceae	*Paspalum*	*vaginatum*	X				X								

Poaceae	*Pentaschistis*	*airoides*	X				X		X				X		
Poaceae	*Poaceae*	*sp.*				X			X						
Poaceae	*Triticum*	*aestivum*	X				X								
Polygalaceae	*Comesperma*	*volubilis*				X	X				X	X			
Polygonaceae	*Polygonum*	*aviculare*	X				X								
Primulaceae	*Lysimachia*	*arvensis*	X		X		X							X	
Proteaceae	*Adenanthos*	*cuneatus*			X	X									X
Proteaceae	*Banksia*	*armata*					X		X	X	X	X		X	
Proteaceae	*Banksia*	*media*					X				X			X	
Proteaceae	*Banksia*	*nivea*									X				
Proteaceae	*Banksia*	*obovata*				X									X
Proteaceae	*Banksia*	*obtusa*				X		X			X				
Proteaceae	*Banksia*	*pulchella*			X	X					X				
Proteaceae	*Banksia*	*repens*				X	X		X	X	X				X
Proteaceae	*Conospermum*	*leianthum ssp. leianthum*												x	
Proteaceae	*Grevillea*	*baxteri*		P4		X	X							X	X
Proteaceae	*Grevillea*	*nudiflora*				X					X				
Proteaceae	*Grevillea*	*pauciflora*					X	X			X	X			
Proteaceae	*Grevillea*	*plurijuga*				X	X				X	X	X		
Proteaceae	*Hakea*	*cinerea*			X	X	X	X			X			X	
Proteaceae	*Hakea*	*corymbosa*				X	X			X				X	
Proteaceae	*Hakea*	*denticulata*							X	X					
Proteaceae	*Hakea*	*laurina*					X	x			X	X			
Proteaceae	*Hakea*	*marginata*				X	X	X			X		X		
Proteaceae	*Hakea*	*nitida*			X		X			X	X	X	X	X	
Proteaceae	*Hakea*	*obliqua*				X	X		X	X	X			X	
Proteaceae	*Hakea*	*pandanocarpa*			X		X							X	X
Proteaceae	*Hakea*	*prostrata*			X	X	X		X	X	X			X	
Proteaceae	*Hakea*	*trifurcata*			X	X	X		X	X			X		X
Proteaceae	*Hakea*	*varia*					X	X		X	X		X		
Proteaceae	*Isopogon*	*alcicornis*		P3						X	X			X	
Proteaceae	*Isopogon*	*polycephalus*			X	X	X		X	X	X	X		X	X
Proteaceae	*Persoonia*	*scabra*		P3					X	X					
Proteaceae	*Petrophile*	*fastigiata*				X	X		X	X					
Proteaceae	*Petrophile*	*linearis*								X					
Proteaceae	*Petrophile*	*squamata ssp northern*									X				
Proteaceae	*Synaphea*	*media*				X	X		X	X	X		X		
Proteaceae	*Synaphea*	*obtusata*			X	X			X	X	X				
Ranunculaceae	*Muelenbeckia*	*adpressa*			X									X	

Restionaceae	*Chordifex*	*crispatus*			X	X								
Restionaceae	*Chordifex*	*laxus*												X
Restionaceae	*Hypolaena*	*fastigiata*			X	X				X				X
Restionaceae	*Lepidobolus*	*preissianus*					X		X					
Restionaceae	*Lepidobolus*	*sp.*												
Restionaceae	*Leptocarpus*	*crebriculmis*						X						
Restionaceae	*Lepyrodia*	*macra*			X									
Rhamnaceae	*Cryptandra*	*pungens*					X		X		X			
Rhamnaceae	*Spyridium*	*microcephalum*				X	X				X			
Rhamnaceae	*Stenanthemum*	*notiale*								X	X			
Rubiaceae	*Opercularia*	*vaginata*			X	X	X		X	X	X	X	X	X
Rutaceae	*Boronia*	*crassifolia*				X					X		X	
Rutaceae	*Cyanothamnus*	*ramosus ssp. anethifolius*			X	X				X	X			
Santalaceae	*Exocarpus*	*sparteus*				X	X				X	X	X	
Santalaceae	*Santalum*	*acuminatum*										X		
Solanaceae	*Solanum*	*nigrum*	X			X	X							
Stylidiaceae	*Levenhookia*	*pusilla*			X	X								X
Thymelaceae	*Pimelea*	*angustifolia*				X					X		X	
Thymelaceae	*Pimelea*	*erecta*				X					X		X	
Unknown	*Cheiranthera*	*filifolia*								X	X			
Unknown	*Juncus*	*capitatus*	X							X				
Violaceae	*Hybanthus*	*epacroides*					X				X	X	X	
Xanthorraceae	*Chamaescilla*	*corymbosa*			X	X				X	X			
Xanthorraceae	*Xanthorrhoea*	*platyphylla*											X	

8.5 TPFL Forms

Department of Biodiversity, Conservation and Attractions

Threatened and Priority Flora Report Form

Version 1.3 August 2017

Please complete as much of the form as possible, with emphasis on those sections bordered in black. For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DBCA website at http://www.wa.gov.au/ under *Standard Report Forms*

TAXON: Grevillea baxteri **TPFL Pop. No:**

OBSERVATION DATE: 08/10/20 **CONSERVATION STATUS:** P4 New population ☒

OBSERVER/S: Katie White and Sophie Willsher **PHONE:** 90831518

ROLE: Environmental Officer **ORGANISATION:** Shire of Esperance

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place): ~87 km east of Esperance townsite. ~26 km east of Condingup townsite. On Henkes Rd, ~1.7 km west of north-east of Howick Rd intersection. On Western road reserve.

Reserve No:

DBCA DISTRICT: South Coast **LGA:** Esperance Land manager present: ☐

DATUM: GDA94 / MGA94 ☒ AGD84 / AMG84 ☐ WGS84 ☐ Unknown ☐

COORDINATES: (If UTM coords provided, **Zone** is also required) DecDegrees ☐ DegMinSec ☐ UTMs ☒

Lat / Northing: 485844 m N

Long / Easting: 6273544 m N

ZONE: 51 H

METHOD USED: GPS ☐ Differential GPS ☐ Map ☐

No. satellites: Map used:

Boundary polygon captured: ☐ Map scale:

LAND TENURE:

Nature reserve ☐ Timber reserve ☐ Private property ☐ Rail reserve ☐ Shire road reserve ☒

National park ☐ State forest ☐ Pastoral lease ☐ MRWA road reserve ☐ Other Crown reserve ☐

Conservation park ☐ Water reserve ☐ UCL ☐ SLK/Pole ____ to ____ Specify other:

AREA ASSESSMENT: Edge survey ☒ Partial survey ☐ Full survey ☐ Area observed (m²):

EFFORT: Time spent surveying (minutes): No. of minutes spent / 100 m²:

POP'N COUNT ACCURACY: Actual ☒ Extrapolation ☐ Estimate ☐ Count method: (Refer to field manual for list)

WHAT COUNTED: Plants ☒ Clumps ☐ Clonal stems ☐

TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:
Alive	3			
Dead				

Area of pop (m²):

Note: Pls record count as numbers (not percentages) for database.

QUADRATS PRESENT: No. Size Data attached ☐ Total area of quadrats (m²):

Summary Quad. Totals: Alive				

REPRODUCTIVE STATE: Clonal ☐ Vegetative ☐ Flowerbud ☒ Flower ☒

Immature fruit ☐ Fruit ☐ Dehisced fruit ☐ Percentage in flower: 100%

CONDITION OF PLANTS: Healthy ☒ Moderate ☐ Poor ☐ Senescent ☐

COMMENT:

THREATS - type, agent and supporting information: Eg clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. **Specify agent** where relevant. Rate current and potential threat impact: N=Nil, L=Low, M=Medium, H=High, E=Extreme. Estimate time to potential impact: S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)	Current Impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
• Road widening - all plants present directly on the road edge. Widening of 1 m on either side of road will impact all plants. Some plants are likely to not be killed, with large branches only trimmed	?	M-H	S
•			
•			

Please return completed form to **Species And Communities Branch** DBCA,
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983 **OR** email to: flora.data@dbca.wa.gov.au
RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.
Record entered by: _____ **Sheet No.:** _____ **Record Entered in Database** ☐

Department of Biodiversity, Conservation and Attractions

Threatened and Priority Flora Report Form

Version 1.3 August 2017

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK: (on soil surface; eg gravel, quartz fields)	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest ☐	Granite ☐	0-10% ☐	Sand ☐	Red ☐	Well drained ☒
Hill ☐	Dolerite ☐	10-30% ☐	Sandy loam ☐	Brown ☒	Seasonally inundated ☐
Ridge ☐	Laterite ☐	30-50% ☐	Loam ☐	Yellow ☐	Permanently inundated ☐
Outcrop ☐	Ironstone ☐	50-100% ☐	Clay loam ☐	White ☐	Tidal ☐
Slope ☐	Limestone ☐		Light clay ☐	Grey ☐	
Flat ☒	Quartz ☐		Peat ☐	Black ☐	
Open depression ☐	Specify other:		Specify other:	Specify other:	
Drainage line ☐	Gravel				
Closed depression ☐					
Wetland ☐					

Specific **Landform** Element: ____
(Refer to field manual for additional values)

CONDITION OF SOIL: Dry ☒ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION CLASSIFICATION*:
Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia); 2. Open shrubland (Hibbertia sp., Acacia spp.); 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Closed Mallee Woodland with dense Hakea corymbosa understory and dense Sedgeland - meets
2. Kwongkan TEC criteria
3.
4.

ASSOCIATED SPECIES:
Hakea laurina, Hakea corymbosa, Hakea prostrata

Other (non-dominant) spp

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☒ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: **Last Fire:** Season/Month: _____ Year: _____ **Fire Intensity:** High ☐ Medium ☐ Low ☐ No signs of fire ☒

FENCING: Not required ☒ Present ☐ Replace / repair ☐ Required ☐ Length req'd: ____

ROADSIDE MARKERS: Not required ☒ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: ____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Collected KW087, Accession 8652. Confirmed by Michael Hislop 10/12/20. Specimen retained by WA herbarium

DRF PERMIT/ LICENCE No: FT61000029 Note if only observing plants (i.e. no specimens or plant material is taken) then no permit/licence is required. For further information on permit and licensing requirements see the Threatened Flora and Wildlife Licensing pages on DBCA's website. Any actions carried out under licence/permit should be recorded above in the OTHER COMMENTS section.

SPECIMEN: Collectors No: _____ WA Herb. ☑ Regional Herb. ☐ District Herb. ☐ Other: _____

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☒ Field notes ☐ Other:

COPY SENT TO: Regional Office ☒ District Office ☒ Other: ____

Submitter of Record: _Katie White_____ Role: _Environmental Officer_ Signed: _KW_ Date: 17/12/20

Please return completed form to **Species And Communities Branch** DBCA,
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983 **OR** email to: flora.data@dbca.wa.gov.au

RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.
Record entered by:_____ Sheet No.:_____ Record Entered in Database ☐

Department of Biodiversity, Conservation and Attractions

Threatened and Priority Flora Report Form

Version 1.3 August 2017

Please complete as much of the form as possible, with emphasis on those sections bordered in black. For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DBCA website at http://www.wa.gov.au/ under *Standard Report Forms*

TAXON: Isopogon alcicornis, Elkhorn Coneflower **TPFL Pop. No:**

OBSERVATION DATE: 08/10/20 **CONSERVATION STATUS:** P3 New population ☒

OBSERVER/S: Katie White and Sophie Willsher **PHONE:** 90831518

ROLE: Environmental Officer **ORGANISATION:** Shire of Esperance

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place): ~87 km east of Esperance townsite. ~26 km east of Condingup townsite. On Henkes Rd. Scaterred regularly from intersection of Orleans Rd to ~1.01 km south of Orleans Rd. On both sides of road reserve

Reserve No:

DBCA DISTRICT: South Coast **LGA:** Esperance Land manager present: ☐

DATUM: GDA94 / MGA94 ☒ AGD84 / AMG84 ☐ WGS84 ☐ Unknown ☐

COORDINATES: (If UTM coords provided, **Zone** is also required) DecDegrees ☐ DegMinSec ☐ UTMs ☒

Lat / Northing: 484356 m E

Long / Easting: 6272055 m N

ZONE: 51 H

METHOD USED: GPS ☐ Differential GPS ☐ Map ☐

No. satellites: Map used:

Boundary polygon captured: ☐ Map scale:

LAND TENURE:

Nature reserve ☐ Timber reserve ☐ Private property ☐ Rail reserve ☐ Shire road reserve ☒

National park ☐ State forest ☐ Pastoral lease ☐ MRWA road reserve ☐ Other Crown reserve ☐

Conservation park ☐ Water reserve ☐ UCL ☐ SLK/Pole to Specify other:

AREA ASSESSMENT: Edge survey ☒ Partial survey ☐ Full survey ☐ Area observed (m²):

EFFORT: Time spent surveying (minutes): No. of minutes spent / 100 m²:

POP'N COUNT ACCURACY: Actual ☒ Extrapolation ☐ Estimate ☐ Count method: (Refer to field manual for list)

WHAT COUNTED: Plants ☒ Clumps ☐ Clonal stems ☐

TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:
Alive	13			
Dead				

Area of pop (m²):

Note: Pls record count as numbers (not percentages) for database.

QUADRATS PRESENT: No. Size Data attached ☐ Total area of quadrats (m²):

Summary Quad. Totals: Alive				

REPRODUCTIVE STATE: Clonal ☐ Vegetative ☐ Flowerbud ☒ Flower ☐

Immature fruit ☐ Fruit ☐ Dehisced fruit ☐ Percentage in flower: %

CONDITION OF PLANTS: Healthy ☒ Moderate ☐ Poor ☐ Senescent ☐

COMMENT:

THREATS - type, agent and supporting information: Eg clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. **Specify agent** where relevant. Rate current and potential threat impact: N=Nil, L=Low, M=Medium, H=High, E=Extreme. Estimate time to potential impact: S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)	Current Impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
• Road widening - all plants present directly on the road edge. Widening of 1 m on either side of road will impact 10 plants	?	M-H	S
•			
•			

Please return completed form to **Species And Communities Branch** DBCA,
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983 **OR** email to: flora.data@dbca.wa.gov.au

RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by: **Sheet No.:** **Record Entered in Database** ☐

Department of Biodiversity, Conservation and Attractions

Threatened and Priority Flora Report Form

Version 1.3 August 2017

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK: (on soil surface; eg gravel, quartz fields)	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest ☐	Granite ☐	0-10% ☐	Sand ☐	Red ☐	Well drained ☒
Hill ☐	Dolerite ☐	10-30% ☐	Sandy loam ☐	Brown ☒	Seasonally inundated ☐
Ridge ☐	Laterite ☐	30-50% ☐	Loam ☐	Yellow ☐	Permanently inundated ☐
Outcrop ☐	Ironstone ☐	50-100% ☐	Clay loam ☐	White ☐	Tidal ☐
Slope ☐	Limestone ☐		Light clay ☐	Grey ☐	
Flat ☒	Quartz ☐		Peat ☐	Black ☐	
Open depression ☐	Specify other:		Specify other:	Specify other:	
Drainage line ☐	Gravel				
Closed depression ☐					
Wetland ☐					

Specific **Landform** Element: _____ (Refer to field manual for additional values)

CONDITION OF SOIL: Dry ☒ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION CLASSIFICATION*:
Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia); 2. Open shrubland (Hibbertia sp., Acacia spp.); 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Mixed tall and low Eucalyptus woodland with dense and highly mixed mid-story
2.
3.
4.

ASSOCIATED SPECIES: Hakea laurina, Hakea corymbosa, Cyathostemon sp.

Other (non-dominant) spp

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☒ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT:

FIRE HISTORY: **Last Fire:** Season/Month: _____ Year: _____ **Fire Intensity:** High ☐ Medium ☐ Low ☐ No signs of fire ☒

FENCING: Not required ☒ Present ☐ Replace / repair ☐ Required ☐ Length req'd: _____

ROADSIDE MARKERS: Not required ☒ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: _____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Collected KW088, Accession 8652. Confirmed by Michael Hislop 10/12/20. Specimen retained by WA herbarium

DRF PERMIT/ LICENCE No: FT61000029 Note if only observing plants (i.e. no specimens or plant material is taken) then no permit/licence is required. For further information on permit and licensing requirements see the Threatened Flora and Wildlife Licensing pages on DBCA's website. Any actions carried out under licence/permit should be recorded above in the OTHER COMMENTS section.

SPECIMEN: Collectors No: _____ WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other: _____

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☒ Field notes ☐ Other:

COPY SENT TO: Regional Office ☒ District Office ☒ Other:

Submitter of Record: Katie White Role: Environmental Officer Signed: KW Date: 17/12/20

Please return completed form to **Species And Communities Branch** DBCA,
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983 **OR** email to: flora.data@dbca.wa.gov.au
RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.
Record entered by:_____ **Sheet No.:**_____ **Record Entered in Database** ☐

Department of Biodiversity, Conservation and Attractions

Threatened and Priority Flora Report Form

Version 1.3 August 2017

Please complete as much of the form as possible, with emphasis on those sections bordered in black. For information on how to complete the form please refer to the Threatened & Priority Flora Report Form (TPRF) manual on the DBCA website at http://kbnew.ws.gov.au/ under *Standard Report Forms*

TAXON: Persoonia scabra **TPFL Pop. No:**

OBSERVATION DATE: 08/10/20 **CONSERVATION STATUS:** P3 New population ☒

OBSERVER/S: Katie White and Sophie Willsher **PHONE:** 90831518

ROLE: Environmental Officer **ORGANISATION:** Shire of Esperance

DESCRIPTION OF LOCATION (Provide at least nearest town/named locality, and the distance and direction to that place): ~87 km east of Esperance townsite. ~26 km east of Condingup townsite. On Henkes Rd, 39 km south-west of Orleans Rd intersection

Reserve No:

DBCA DISTRICT: South Coast **LGA:** Esperance Land manager present: ☐

DATUM: GDA94 / MGA94 ☒ AGD84 / AMG84 ☐ WGS84 ☐ Unknown ☐

COORDINATES: (If UTM coords provided, **Zone** is also required) DecDegrees ☐ DegMinSec ☐ UTMs ☒

Lat / Northing: 481849 m E

Long / Easting: 6269940 m N

ZONE: 51 H

METHOD USED: GPS ☐ Differential GPS ☐ Map ☐

No. satellites: Map used:

Boundary polygon captured: ☐ Map scale:

LAND TENURE:

Nature reserve ☐ Timber reserve ☐ Private property ☐ Rail reserve ☐ Shire road reserve ☒

National park ☐ State forest ☐ Pastoral lease ☐ MRWA road reserve ☐ Other Crown reserve ☐

Conservation park ☐ Water reserve ☐ UCL ☐ SLK/Pole to Specify other:

AREA ASSESSMENT: Edge survey ☒ Partial survey ☐ Full survey ☐ Area observed (m²):

EFFORT: Time spent surveying (minutes): No. of minutes spent / 100 m²:

POP'N COUNT ACCURACY: Actual ☒ Extrapolation ☐ Estimate ☐ Count method: (Refer to field manual for list)

WHAT COUNTED: Plants ☒ Clumps ☐ Clonal stems ☐

TOTAL POP'N STRUCTURE:	Mature:	Juveniles:	Seedlings:	Totals:
Alive	2			
Dead				

Area of pop (m²):

Note: Pls record count as numbers (not percentages) for database.

QUADRATS PRESENT: No. Size Data attached ☐ Total area of quadrats (m²):

Summary Quad. Totals: Alive				

REPRODUCTIVE STATE: Clonal ☐ Vegetative ☐ Flowerbud ☐ Flower ☒

Immature fruit ☐ Fruit ☒ Dehisced fruit ☐ Percentage in flower: 50%

CONDITION OF PLANTS: Healthy ☒ Moderate ☐ Poor ☐ Senescent ☐

COMMENT:

THREATS - type, agent and supporting information: Eg clearing, too frequent fire, weed, disease. Refer to field manual for list of threats & agents. **Specify agent** where relevant. Rate current and potential threat impact: N=Nil, L=Low, M=Medium, H=High, E=Extreme. Estimate time to potential impact: S=Short (<12mths), M=Medium (<5yrs), L=Long (5yrs+)	Current Impact (N-E)	Potential Impact (L-E)	Potential Threat Onset (S-L)
• Road widening - all plants present directly on the road edge will impact all plants	?	M-H	S
•			
•			

Please return completed form to **Species And Communities Branch** DBCA,
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983 **OR** email to: flora.data@dbca.wa.gov.au

RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.

Record entered by: Sheet No.: Record Entered In Database ☐

Department of Biodiversity, Conservation and Attractions

Threatened and Priority Flora Report Form

Version 1.3 August 2017

HABITAT INFORMATION:

LANDFORM:	ROCK TYPE:	LOOSE ROCK: (on soil surface; eg gravel, quartz fields)	SOIL TYPE:	SOIL COLOUR:	DRAINAGE:
Crest ☐	Granite ☐	0-10% ☐	Sand ☐	Red ☐	Well drained ☒
Hill ☐	Dolerite ☐	10-30% ☐	Sandy loam ☐	Brown ☒	Seasonally inundated ☐
Ridge ☐	Laterite ☐	30-50% ☐	Loam ☐	Yellow ☐	Permanently inundated ☐
Outcrop ☐	Ironstone ☐	50-100% ☐	Clay loam ☐	White ☐	Tidal ☐
Slope ☐	Limestone ☐		Light clay ☐	Grey ☐	
Flat ☒	Quartz ☐		Peat ☐	Black ☐	
Open depression ☐	Specify other:		Specify other:	Specify other:	
Drainage line ☐	Gravel				
Closed depression ☐					
Wetland ☐					

Specific **Landform** Element: ____
(Refer to field manual for additional values)

CONDITION OF SOIL: Dry ☒ Moist ☐ Waterlogged ☐ Inundated ☐

VEGETATION CLASSIFICATION*:
Eg: 1. Banksia woodland (B. attenuata, B. ilicifolia); 2. Open shrubland (Hibbertia sp., Acacia spp.); 3. Isolated clumps of sedges (Mesomelaena tetragona)

1. Dense Eucalyptus angulosa with dominant Banksia armata or Hakea corymbosa with mixed low
2. shrubland
3. ____
4. ____

ASSOCIATED SPECIES:
Eucalyptus angulosa, Petrophile fastigiata, Synaphea sp.

Other (non-dominant) spp: ____

* Please record up to four of the most representative vegetation layers (with up to three dominant species in each layer). Structural Formations should follow 2009 *Australian Soil and Land Survey Field Handbook* guidelines – refer to field manual for further information and structural formation table.

CONDITION OF HABITAT: Pristine ☐ Excellent ☒ Very good ☐ Good ☐ Degraded ☐ Completely degraded ☐

COMMENT: ____

FIRE HISTORY: **Last Fire:** Season/Month: ____ Year: ____ **Fire Intensity:** High ☐ Medium ☐ Low ☐ No signs of fire ☒

FENCING: Not required ☒ Present ☐ Replace / repair ☐ Required ☐ Length req'd: ____

ROADSIDE MARKERS: Not required ☒ Present ☐ Replace / reposition ☐ Required ☐ Quantity req'd: ____

OTHER COMMENTS: (Please include recommended management actions and/or implemented actions - include date. Also include details of additional data available, and how to locate it.)

Collected KW089, Accession 8652. Confirmed by Michael Hislop 10/12/20. Specimen retained by WA herbarium

DRF PERMIT/ LICENCE No: FT61000029 Note if only observing plants (i.e. no specimens or plant material is taken) then no permit/licence is required. For further information on permit and licensing requirements see the Threatened Flora and Wildlife Licensing pages on DBCA's website. Any actions carried out under licence/permit should be recorded above in the OTHER COMMENTS section.

SPECIMEN: Collectors No: ____ WA Herb. ☒ Regional Herb. ☐ District Herb. ☐ Other: ____

ATTACHED: Map ☐ Mudmap ☐ Photo ☐ GIS data ☒ Field notes ☐ Other:

COPY SENT TO: Regional Office ☒ District Office ☒ Other: ____

Submitter of Record: _Katie White____ Role: _Environmental Officer_ Signed: _KW_ Date: 17/12/20

Please return completed form to **Species And Communities Branch** DBCA,
Locked Bag 104, BENTLEY DELIVERY CENTRE WA 6983 **OR** email to: flora.data@dbca.wa.gov.au
RECORDS: Please forward to **Flora Administrative Officer,** Species and Communities Branch.
Record entered by:____ **Sheet No.:**____ **Record Entered In Database** ☐