



Clearing Permit Decision Report

1 Application details and outcome

1.1. Permit application details

Permit number:	CPS 9603/1
Permit type:	Area permit
Applicant name:	Shire of Collie
Application received:	11 February 2022
Application area:	1.23 hectares of native vegetation
Purpose of clearing:	Construction of road drainage, car park, toilet blocks and footpaths
Method of clearing:	Mechanical clearing
Property:	Lot 5220 on Deposited Plan 240066, Collie Minninup Road reserve (PIN 11522508), Collie
Location (LGA area/s):	Shire of Collie
Localities (suburb/s):	Collie

1.2. Description of clearing activities

The vegetation proposed to be cleared is distributed across separate areas as illustrated in Figure 1 of section 1.5. The proposed clearing is for the purpose of construction of road drainage, car park, toilet blocks and footpaths with the final land use after the clearing being day use areas for picnics and recreation. The Shire of Collie advised the Department of Water and Environmental Regulations (the department) that in a recently issued Economic Development Task Force Report, it was identified that tourism was a key factor within Collie and an initiative was the development of a nature-based hub at Minninup Pool, linking with the Munda Biddi Trail and the Bibbulmun Track and featuring accommodation and activity options (Shire of Collie, 2022a). This clearing permit application aims to deliver the hub development at Minninup Pool.

The total area of clearing required to construct the above-mentioned facilities as part of the planned development equates to 1.23 hectares of native vegetation (Shire of Collie, 2022a).

1.3. Decision on application

Decision:	Granted
Decision date:	12 August 2022
Decision area:	1.23 hectares of native vegetation, as depicted in Section 1.5, below.

1.4. Reasons for decision

This clearing permit application was submitted, accepted, assessed and determined in accordance with sections 51E and 51O of the *Environmental Protection Act 1986* (EP Act). The Department of Water and Environmental Regulation (the department) advertised the application for 21 days and one submission was received. Consideration of matters raised in the public submission is summarised in Appendix B.

In making this decision, the Delegated Officer had regard for the site characteristics (see Appendix C), relevant datasets (see Appendix G.1), the findings of a flora and vegetation survey, fauna survey (see Appendix F), the clearing principles set out in Schedule 5 of the EP Act (see Appendix D), relevant planning instruments and any other matters considered relevant to the assessment (see Section 3). The Delegated Officer also took into consideration the purpose of the clearing is to benefit the tourism industry in Shire of Collie.

The assessment identified that the proposed clearing will result in:

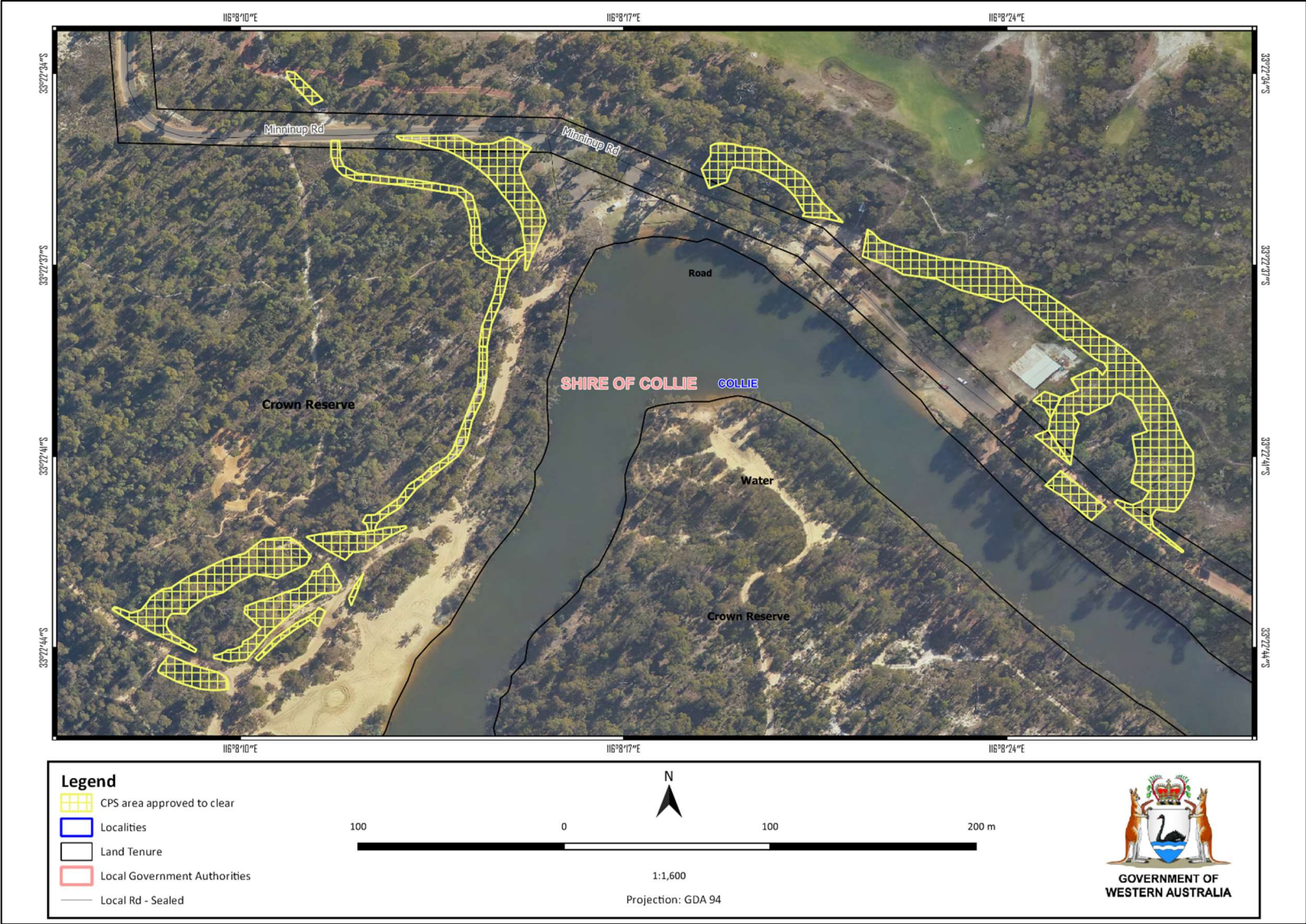
- the potential introduction and spread of weeds into adjacent vegetation, which could impact on the quality of the adjacent vegetation and its habitat values;
- the loss of native vegetation that is suitable foraging habitat for the three black cockatoo species;
- potential surface water runoff to the adjacent Collie River during heavy rainfall events;
- the loss of Priority 4 flora identified from one location within the application area (*Grevillea ripicola*).

After consideration of the available information, as well as the applicant's minimisation and mitigation measures (see Section 3.1), the Delegated Officer determined that the proposed clearing is unlikely to lead to appreciable land degradation, have long-term adverse impacts on environmental values and can be minimised and managed to unlikely lead to an unacceptable risk to environmental values.

The Delegated Officer decided to grant a clearing permit subject to conditions to:

- avoid, minimise to reduce the impacts and extent of clearing;
- take hygiene steps to minimise the risk of the introduction and spread of weeds;
- the clearing is to be conducted outside of the high rainfall months;
- commence the proposed construction no later than one month after the clearing;
- demarcate the boundary of the proposed clearing area to avoid accidental clearing of potential black cockatoo habitat trees and *Grevillea ripicola* species located within close proximity;
- undertake slow, progressive one directional clearing to allow terrestrial fauna to move into adjacent habitat ahead of the clearing activity;
- engage a fauna specialist to inspect the clearing area immediately prior to, and for the duration of the clearing activities for terrestrial fauna (Chuditch, Quenda, Western brush wallaby, South-western brush-tailed phascogale and Quokka);
- the proposed planting list must include the Priority 4 flora *Grevillea ripicola* and foraging species for black cockatoos.

1.5. Site map



2 Legislative context

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

In addition to the matters considered in accordance with section 51O of the EP Act (see Section 1.4), the Delegated Officer has also had regard to the objects and principles under section 4A of the EP Act, particularly:

- the precautionary principle
- the principle of intergenerational equity
- the principle of the conservation of biological diversity and ecological integrity.

Other legislation of relevance for this assessment include:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Conservation and Land Management Act 1984* (WA) (CALM Act)
- *Country Areas Water Supply Act 1947* (WA) (CAWS Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)
- *Soil and Land Conservation Act 1945* (WA)

The key guidance documents which inform this assessment are:

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

3 Detailed assessment of application

3.1. Avoidance and mitigation measures

Supporting documentation was submitted by the applicant, demonstrating that avoidance and mitigation measures have been considered for this clearing proposal (Shire of Collie, 2022b, Shire of Collie, 2022d, Shire of Collie, 2022e). The Delegated Officer was satisfied that the applicant has made a reasonable effort to avoid and minimise potential impacts of the proposed clearing on environmental values.

Shire of Collie advised the department that the project was designed and planned around maintaining as much vegetation as possible with a focus on clearing in areas where minimum mature trees had to be removed and in areas that were previously disturbed. The project included deliberate avoidance of certain trees such as large jarrah trees, and paper barks and Christmas trees which are important to the Aboriginal people. A site analysis was undertaken to ensure a site sensitive design which took into consideration impact to flora and fauna. A tree audit was carried out prior to finalising the application area footprint (Shire of Collie, 2022d).

Further avoidance and mitigation measures considered and proposed to be implemented by Shire of Collie are described below.

Avoidance/mitigation measures of *Grevillea Ripicola* (P4)

Shire of Collie has selected areas that had already been predominately cleared and disturbed for the construction of roads and parking. This approach will result in removing five to ten individuals of *Grevillea Ripicola* plants. However, this approach will avoid removing large trees and other mature vegetation (Shire of Collie, 2022d).

In order to mitigate the removal of the *Grevillea Ripicola* individuals, Shire of Collie has included this species in the planting list for the areas proposed to be revegetated as part of the overall project. The planting list was prepared by a botanist from Southern Flora and it is included in Appendix F. Addition to the planting list, a planting map and treatments for the different proposed revegetation areas has also been prepared (Shire of Collie, 2022e).

Avoidance of black cockatoo habitat trees

Prior to finalising the clearing footprint, Shire of Collie commissioned a fauna specialist in 2019 to undertake a fauna assessment which included an assessment of the black cockatoo habitat trees. According to the survey data, thirteen potential black cockatoo habitat trees occur within the survey area. Therefore, the proposed application area was finalised to exclude these habitat trees. Shire of Collie has advised the department that the identified black cockatoo habitat trees will be marked with flagging tape/and or marker paint for easy identification prior to any clearing being undertaken (Shire of Collie, 2022c).

Shire of Collie has further compiled a technical works specification document which includes specific guidelines in regard to flora and fauna for the contractors to implement and these guidelines are listed below (Shire of Collie, 2022c).

- “During site works, areas requiring clearing should be clearly marked and access to other areas restricted to prevent accidental clearing of areas to be retained.
- During clearing operations, a suitably experienced ‘fauna spotter’ shall be employed to inspect logs, trees and hollows (where possible) before clearing to reduce the likelihood of injury to fauna. The ‘fauna spotter’ shall be approved by a Shire of Collie representative prior to the commencement of clearing works. Trees observed to contain small hollows should be felled in a manner that reduces the likelihood that fauna present will be injured. Hollows in fallen trees should be inspected for fauna prior to removal from the site. If feasible any fauna encountered should be relocated to suitable retained habitat nearby.
- No dead, standing or fallen timber should be removed unnecessarily and trees noted as habitat trees will be retained. Logs that are not being re-used for the yarning circle, whether they are hollow or not, and other debris resulting from land clearing are to be used to enhance fauna habitat in rehabilitated areas and untouched areas if possible. Where possible, logs are to be retained either by pushing the logs into the surrounding forest, when significant disturbance to the forest can be avoided, or the logs cut so that the length of log outside the clearing area remains insitu. The contractor is to confirm with the Shire of Collie representative how all individual logs are to be managed prior to commencement of clearing.
- Any holes, pits or trenches required for services should be kept open for only as long as necessary and suitable escape ramps (45° batter) and bridging provided if the site is to be left unattended for extended periods. Significant sized holes, pits or trenches should be inspected for fauna immediately prior to filling.”

Shire of Collie proposes erosional management measures to minimise potential surface water runoff into Collie River and these measures are described below (Shire of Collie, 2022d).

- “The overall project includes a foreshore rehabilitation plan and prevention of erosion through coir logs and planting.
- Construction will be scheduled during the summer months or months with low to no documented rainfall events.
- The Contractor shall, at his own expense, provide all plant, materials and labor necessary to protect the works from damage by inclement weather. Low points or excavations where water may collect shall be kept thoroughly drained by mechanical or gravitational means. Drains or water courses utilised for this purpose shall be maintained with appropriate erosion and sediment control to the satisfaction of the Shire of Collie representative.
- The Contractor shall prevent, in so far as is reasonably possible, any materials entering any gully, manhole or pipe, or the river and shall remove from the drainage system any materials from any source which may be deposited in the drainage system or river by any agency up to the date of Practical Completion.
- The Contractor shall take all proper precautions to prevent soil erosion from any land used or occupied by the Contractor in the execution of the work under the contract.
- Disruption to surface and sub-surface hydrology should be minimised where possible and levees and drains designed to mimic natural drainage flows where disruptions will occur.”

Shire of Collie has also prepared a foreshore rehabilitation and vegetation management and planting document as part of the overall project. Shire of Collie has advised the department that as the naturalness of the area is very important to the whole community and retention of trees and local vegetation is particularly important to the Noongar community there has been a focus on retaining, rehabilitating and replanting vegetation throughout the site. The key elements of the vegetation management proposal are (Shire of Collie, 2022e):

- Weed, topsoil and dieback management – Shire of Collie already has a weed management program in place around Minningup Pool. This program is recommended to continue with a focus on areas that will be disturbed by proposed works to minimise the spread of weeds during construction. Shire of Collie will engage a dieback specialist to assess the dieback status of the proposed road alignment and the extent of clearing. This assessment will include an assessment on what soil can be moved where and where topsoil can be reused with the aim of reusing topsoil in areas to be revegetated wherever feasible.
- New trees are proposed throughout the site for various reasons such as to replace removed trees, to provide shade and shelter and to maintain the naturalness of the site. Jarrah trees (*Eucalyptus marginata*) are planned to be used on the upper elevated areas and paperbarks (*Melaleuca preissiana*) will be used where space is more limited and closer to the river. Other trees that maybe considered are swamp paperbark (*Melaleuca raphiophylla*) and the WA peppermint (*Agonis flexuosa*).

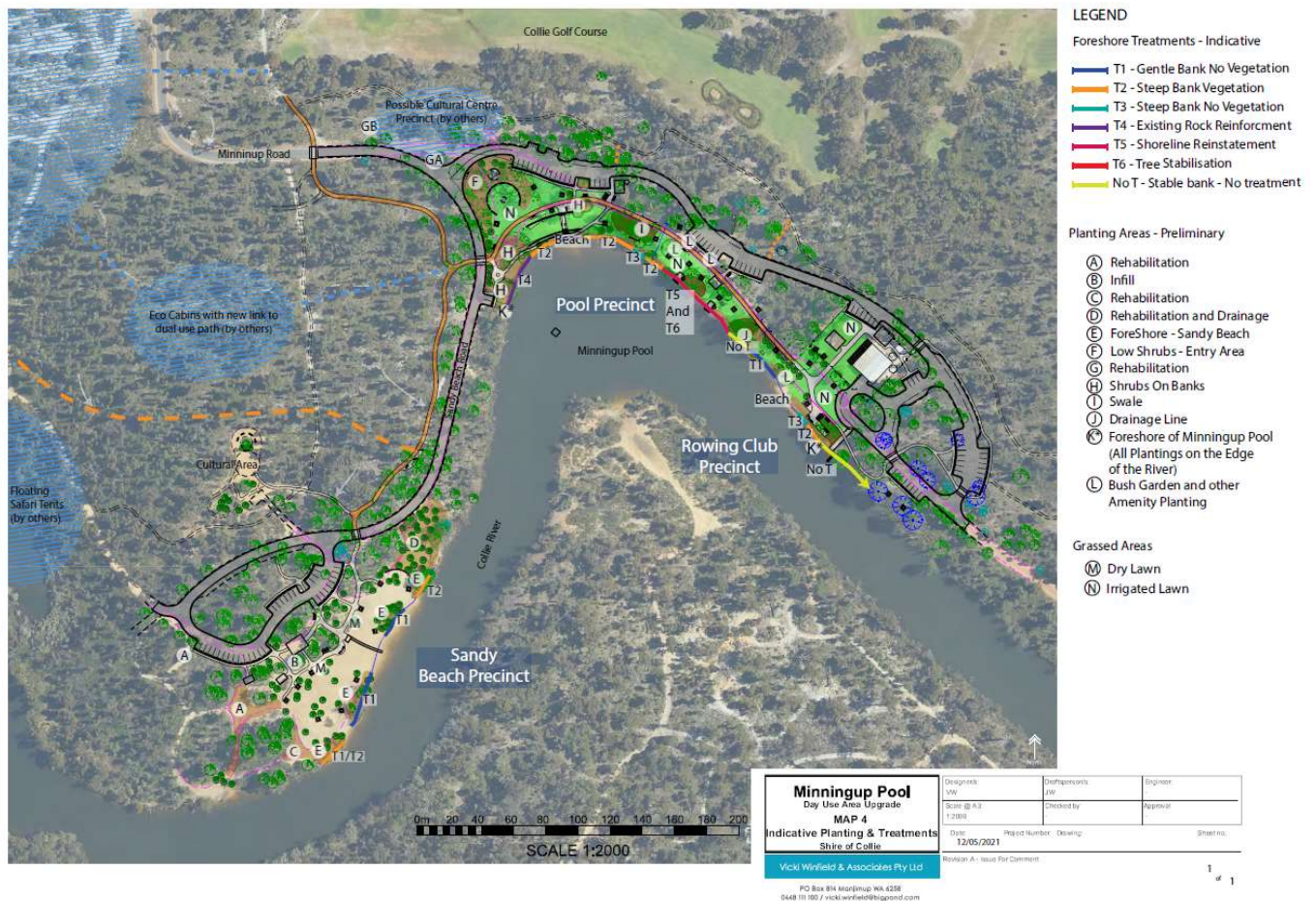


Figure 2: Indicative planting and treatment plan

3.2. Assessment of impacts on environmental values

The assessment against the clearing principles (see Appendix D) identified that the impacts of the proposed clearing present a risk to biological values (fauna, flora and adjacent vegetation), and land and water resources. The consideration of these impacts, and the extent to which they can be managed through conditions applied in line with sections 51H and 51I of the EP Act, is set out below.

3.2.1. Biological values (flora and vegetation) - Clearing Principle (a)

Assessment

The proposed application area is located within the Jarrah Forest Interim Biogeographic Regionalisation for Australia (IBRA) region of Western Australia. Seven vegetation units were recognised within the survey area in which five vegetation units are mapped within the application area (Ecoedge, 2018). A detailed description of each of the vegetation units are listed in Appendix C.1.

The vegetation unit A occurs on freer draining soil than unit B which borders it to the north, and lacks wetland species such as *Banksia littoralis* and *Cyathochaeta avenacea*. Vegetation units B and C are the most dominant with the vegetation unit B being confined to the western part and unit C to the eastern part. Both units are similar in structure, being open forest to woodlands dominated by jarrah (*Eucalyptus marginata*). However, unit B has more taxa characterises of wetland vegetation, such as *Banksia littoralis* and *Melaleuca preissiana*. This is attributable to its clayier soils, with impeded drainage. The structure of vegetation unit E varies from sedgeland, to shrubland to low open woodland (with emergent *Melaleuca preissiana*, *Eucalyptus patens* and *Banksia littoralis* low trees) and is situated on clayey soils with impeded drainage. It intergrades with vegetation unit B in the western part of the survey area (Ecoedge, 2018).

According to the survey by Ecoedge (2018) majority of the application area is rated as being very good (Keighery, 1994) or excellent (Keighery, 1994) condition. Photographs and mapping of the application area is represented in Appendix F.

None of the vegetation units mapped within the application area, with consideration of soil types, resembles a Threatened Ecological Community (TEC) or a Priority Ecological Community (PEC) (Ecoedge, 2018). No PEC or TEC were mapped within the local area.

Flora

The desktop assessment identified 17 priority flora species and one threatened flora species within the local area. Three records of conservation significant flora occur within a one-kilometre radius of the application area. The Shire of Collie commissioned Ecoedge (2018) to undertake a reconnaissance and targeted flora survey across approximately 70 hectares of remnant bushland. The survey was undertaken over two days (29 September 2018 and 9 October 2018). The survey identified a total of 198 vascular flora taxa in which 14 were introduced or non-native species. The most widespread weeds identified was the bulbous herb **Watsonia meriana* var. *bulbifera* (Ecoedge, 2018).

Threatened flora

One species of threatened flora, *Drakaea confluens* was identified from the local area. *Drakaea confluens* is a tuberous, perennial herb of approximately 0.15 to 0.3 metres high with red, brown and yellow flowers occurring on white-grey sand. According to the Interim Recovery Plan for this species, it is found in two widely separated areas, northeast of Boyup Brook and in the Stirling range national park within mixed Jarrah and Banksia woodland (WAH, 1998-). Based on the similarities between the soil and vegetation types within the application area, the application is unlikely to provide suitable habitat for the threatened flora (*Drakaea confluens*) identified from the local area. The closest record of this species was identified approximately 5.63 kilometres from the application area. The flora survey conducted within the application area did not identify *Drakaea confluens* (Ecoedge, 2018).

Priority flora

During the flora and vegetation survey, two species of priority flora, *Synaphea hians* (P3) and *Grevillea ripicola* (P4) and one significant range extension species (*stylidium scandens*) were identified within the survey area. The locations of these species are illustrated in Appendix E. Although two species of priority flora are recorded within the application area, only the *Grevillea ripicola* occur within the application area and is included as part of the proposed clearing.

Grevillea ripicola is a Priority 4 flora species. According to the Florabase website (WAH, 1998-), this species is a spreading, much-branched, non-lignotuberous shrub, typically 0.6 to two metres high, to four metres wide. It has red-orange flowers which can be seen during January, or March to April, or November to December. The species is distributed within the Local Government Areas of Bridgetown-Greenbushes, Collie, and Donnybrook-Balingup.

It occurs on sandy clay, clay or gravelly loam. It also occurs on swampy flats, granite outcrops, along watercourses. Florabase (WAH 1998-) has historically identified this species from 23 different locations mostly representing populations within ten kilometres of Collie. At each of these locations, abundant numbers of this species were recorded, such as along the watercourse Mullalyup State Forest block (four kilometres south-west of Kirup and one kilometre west off Ravenscliffe Road), where over 2,000 individuals were identified. Apart from the one location within the application area the closest record of this species is approximately 0.45 kilometres from the application area, recorded in 1994.

Ecoedge (2022) identified this species from 19 locations comprising of five to ten individuals along much of the riverbank within the survey area, usually on the narrow band of alluvial soils along the Collie River. Ecoedge (2022) determined that the species appears to be a disturbance opportunist and was found growing in other areas where machinery may have carried seed and it is estimated that several hundred plants occur within the survey area. Within the application area, individuals are proposed to be cleared from just one location which comprises of approximately five to ten individuals. Noting the proposed planting of the *G. ripicola* within the proposed revegetation areas (Figure 3) and the species being described as moderately common, with stable populations (Makinson. R & Moks.L, 2020), the Delegated Officer has determined that the proposed clearing of five to ten individuals of *G. ripicola* will not have a significant impact to the *G. ripicola* population.

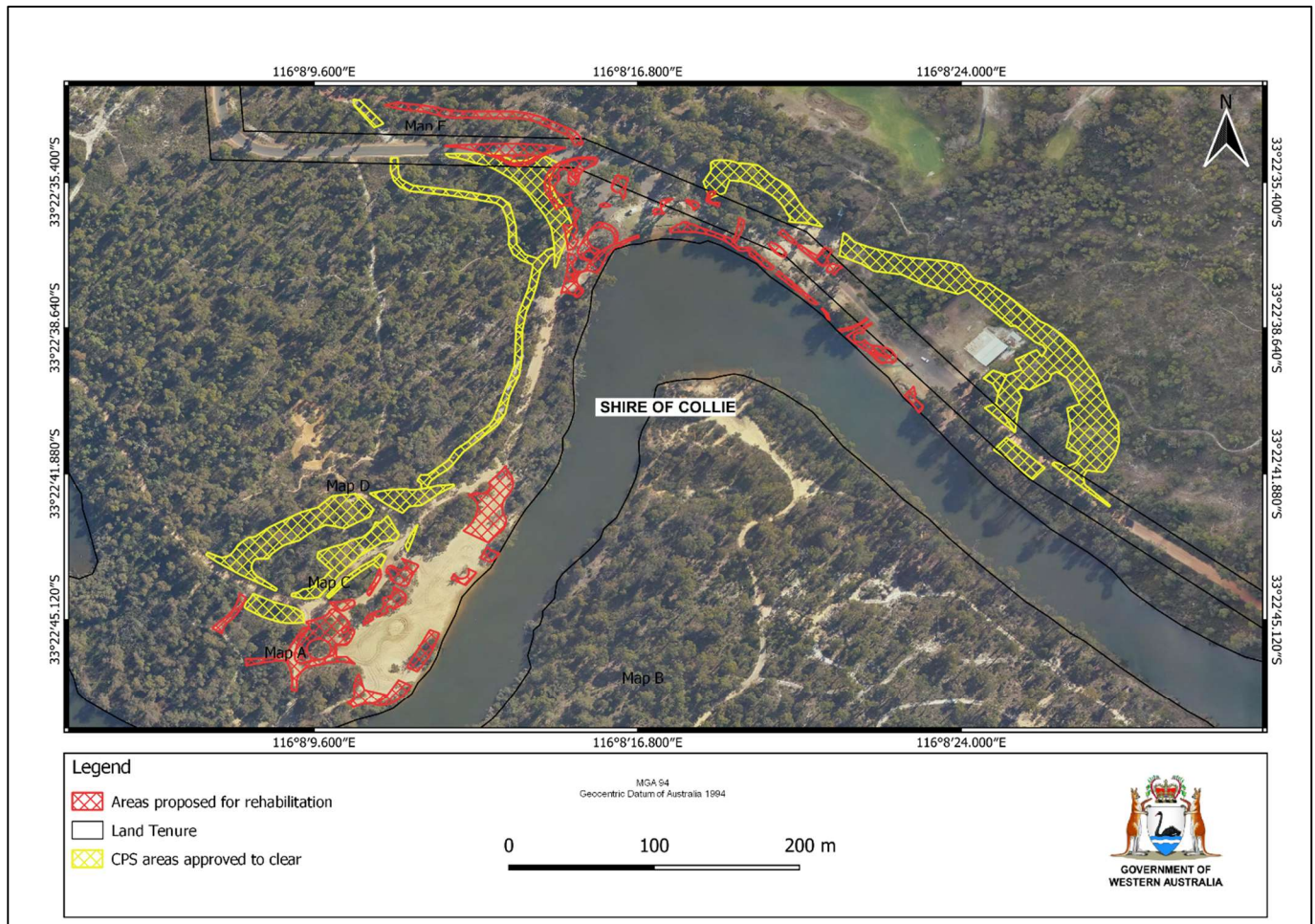


Figure 3: Map of the areas proposed for revegetation

Although the assessment has identified that no significant impact to *G. ripicola* will occur as a result of clearing, Shire of Collie has proposed to plant populations of *G. ripicola* as part of the Shire's overall project (see Section 3.1). The species is known to regenerate from seed (Makinson, R & Moks.L, 2020) and to be a disturbance opportunist. On this basis the Delegated Officer considers the chance of establishment to be probable.

The flora and vegetation survey has also identified the Priority 3 species *Synaphea hians* from two locations within the survey area. The survey has outlined that this species is distributed on the Swan Coastal Plain between Bunbury and Dunsborough, and on the Darling Plateau between Collie and Kojonup. There are also outlying populations on the Blackwood Plateau near Nannup and at Unicup east of Manjimup. Although species of *Synaphea hians* are recorded within the survey area, no individuals occur within the proposed clearing area. The distance to the closest record of *Synaphea hians* identified from the survey is approximately 374 metres from the application area (Ecoedge, 2018).

The likelihood analysis identified ten conservation significant flora species as having a low to moderate likelihood of occurrence within the application area. However, excluding the species *G. ripicola* and *S. hians*, the flora and vegetation survey did not identify any other conservation significant flora species within the survey area (Ecoedge, 2018). According to Ecoedge (2018), the species considered likely to occur within the application area would have been flowering at the time of the survey or could be identified in the field outside of the flowering season for the species.

Conclusion

Based on the findings of the flora survey (Ecoedge, 2018), The department has determined that the proposed clearing is unlikely to significantly impact on priority flora or threatened flora species. As Shire of Collie has proposed (section 3.1), the department encourage the Shire to include the species *G. ripicola* in the revegetation planting list.

It is noted that weeds have the potential to out-compete native flora and reduce the biodiversity of an area. Potential impacts to biodiversity as a result of the introduction and spread of weeds may be minimised by the implementation of a weed management condition.

Conditions

To address the above impacts, the following management measures will be required as conditions on the clearing permit:

- Weed and dieback management measures to be implemented.
- Include the flora species *Grevillea ripicola* as part of the revegetation.

3.2.2. Biological values (fauna) - Clearing Principle (b)

The desktop assessment identified 18 conservation significant fauna species within the local area, which included five birds, one fish, one invertebrate, ten mammals and one reptile species. The nearest record was the threatened *Phascogale tapoatafa wambenger* (South-western brush-tailed phascogale, wambenger) identified approximately 0.03 kilometres from the application area. Shire of Collie commissioned a fauna specialist to undertake a targeted fauna assessment of the proposed project area. A nocturnal survey of the site was carried out on the 7 January 2019 (Harewood, 2019).

Fauna habitats described within the application area (Harewood, 2019):

- A: Open forest of Jarrah, Marri (and occasionally Sheoak or Blackbutt), over Snottygobble and Woody Pear over shrubland on sandy loam.
- B: Open forest to woodland of Jarrah, over Banksia, Paperbark and Christmas tree over shrubland and sedges on greyish sandy clay loams.
- C: Open forest to woodland of Jarrah (occasional Sheoak) over Banksia over shrubland with scattered sedges on sandy loam.
- F: Tall closed shrubland/sedgeland on clay loam.

Noting the habitat requirements of the recorded species, the mapped vegetation type and the vegetation in very good to excellent (Keighery, 1997) condition within the application area, the application area is likely to comprise suitable habitat for:

- Forest red-tailed black cockatoo (*Calyptorhynchus banksia* subsp. *naso*),
- Carnaby's cockatoo (*Zanda latirostris* (previously *Calyptorhynchus latirostris*))
- Baudin's cockatoo (*Zanda Calyptorhynchus* (previously *Calyptorhynchus baudinii*))
- Chuditch (*Dasyurus geoffroii*),
- Quenda, southwestern brown bandicoot (*Isodon fusciventer*),
- Quokka (*Setonix brachyurus*),
- South-western brush-tailed phascogale (*Phascogale tapoatafa* subsp. *wambenger*)
- Western ringtail possum, ngwayir (*Pseudocheirus occidentalis*).

Black cockatoos

The application area is mapped within the known distribution zones of the endangered Baudin's cockatoo, Carnaby's cockatoo and the vulnerable forest red-tailed black cockatoo, together referred to as black cockatoos (Commonwealth of Australia, 2012).

Records of black cockatoos are known from the local area. Black cockatoo habitat can be considered in terms of breeding, roosting and foraging habitat. Suitable breeding habitat for black cockatoos includes trees which either have a suitable nest hollow or are of a suitable DBH to develop a nest hollow. For most tree species a suitable DBH is 500 millimetres (Commonwealth of Australia, 2012). The vast majority of the trees with the subject site are relatively small Jarrah trees which do not have hollows or if present with only small/medium size hollows. During the survey, 13 trees with large hollows or apparent large hollows possibly suitable for black cockatoo use were observed. One of the hollows showed some evidence of use (minor chew marks). However, none of these trees were located within the area proposed for clearing (Harewood, 2019). Shire of Collie has advised the department that any trees with possible black cockatoo hollow have been avoided from the application area (Shire of Collie, 2022d). Therefore, the proposed clearing will not impact on black cockatoo breeding habitats.

Foraging habitat for Carnaby's, Baudin's and forest red-tailed black cockatoo varies (Commonwealth of Australia, 2012). Forest red-tailed black cockatoo forages within jarrah and marri woodlands and forest, and edges of karri forests including wandoo and blackbutt, within the range of the subspecies. The species largely feeds on seeds of marri and jarrah, as well as other *Eucalyptus* species and *Allocasuarina* cones (Commonwealth of Australia, 2012). Baudin's cockatoos prefer foraging within eucalypt woodlands and forest, and proteaceous woodland and heath. Its diet consists mainly of seeds from marri, but Baudin's also feed on various Banksia spp., Hakea spp. and jarrah, and

occasionally insects and insect larvae (DBCA, 2017). During the breeding season (October to late January/early February) this species has a preference for marri seeds. Outside the breeding season the species may feed in fruit orchards and tips of *Pinus* spp. (Commonwealth of Australia, 2012). Carnaby's cockatoo feeds on the seeds, nuts and flowers of a large variety of plants including proteaceous species (*Banksia*, *Hakea* and *Grevillea*), as well as *Allocasuarina* and *Eucalyptus* species, marri and a range of introduced species (Valentine and Stock, 2008).

The survey has identified that the majority of the site contains foraging habitat for black cockatoos. Foraging evidence attributed to the forest red-tailed black cockatoo were the only signs of feeding recorded, being chewed jarrah fruits at a small number of locations (Harewood, 2019).

The local area comprises approximately 22,957 hectares of native vegetation which is mapped as black cockatoo foraging habitat and the application area represents approximately 0.000054 per cent of this extent (Figure 3). Majority of the foraging habitat within the local area occurs within Department of Biodiversity, Conservation and Attraction (DBCA) managed estates including the Collie State Forest, Mumballup State Forest and Harris River State Forest. Foraging habitat for black cockatoos within seven kilometres of a breeding site is important to adequately support breeding pairs (EPA, 2019). The application area is not located within a confirmed breeding area for Carnaby's cockatoo. According to available databases, there are no confirmed black cockatoo breeding points within the local area. The closest confirmed breeding site is located approximately 23.4 kilometres south-east of the application area. Noting this, the proposed clearing is unlikely to significantly reduce the amount of food available for breeding birds.

Based on the above, it is unlikely that the proposed clearing will significantly impact on black cockatoo foraging habitat. Although no significant residue impact occurs to foraging habitat, Shire of Collie has proposed to revegetate areas around the application areas with black cockatoo foraging species as part of the bigger development project (Shire of Collie, 2022b).

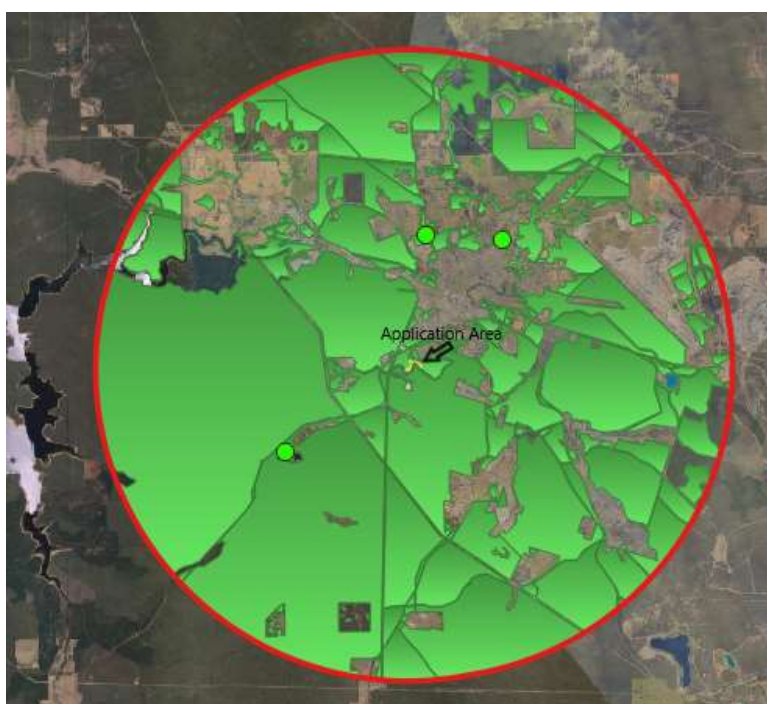


Figure 4: The extent of mapped black cockatoo foraging (green) within the ten-kilometre radius buffer (Red) from the application area. Green dots represent the confirmed black cockatoo roost sites.

Three black cockatoo confirmed roosting sites were identified within the local area. No evidence of black cockatoo roosting within trees located within the application area was observed (Harewood, 2019). As discussed above, the abundant vegetation located in the local area is likely to provide roosting habitat for black cockatoos and the scattered clearing of 1.23 hectares that is proposed is unlikely to significantly impact on black cockatoo roosting habitat (Harewood, 2019).

In addition to the black cockatoo assessment, the survey included a Western Ringtail Possum (WRP) assessment. No evidence of WRP utilising the survey area was observed during the survey. Habitat within the survey area was identified suitable for WRP within the relatively dense midstorey vegetation in unburnt areas, most of which bordered the Collie River such as the vegetation unit G (Harewood, 2019). However, the vegetation unit G does not fall within

the proposed clearing area therefore, it is unlikely the proposed clearing will impact on WRP habitat. A directional clearing condition imposed on the permit will mitigate indirect impact to WRP that may transient the application area.

Mammals

The camera traps used as part of the fauna survey, recorded a total of 24 fauna species (native and introduced) within the survey area, which also included the Priority 4 species, Western brush wallaby (*Notamacropus irma*) at two locations and the the Priority 4 species Western false pipistrelle (*Falsistrellus mackenziei*). The Carter's freshwater mussel (*Westralunio carteri*) was also identified during the survey. However, this area does not form part of the proposed clearing. None of these species were identified within the application area (Harewood, 2019). Although the Carter's freshwater mussel was identified from the survey area, this species is unlikely to occur within the application area given the lack of a watercourse within the application area.

Based on the habitat preferences of Chuditch, Quenda - southwestern brown bandicoot, Quokka, South-western brush-tailed phascogale, it is likely that these species maybe transient visitors to the application area (DCCEEW, n.d). Noting this, it is important to undertake clearing in one direction towards adjacent native vegetation with the presence of a fauna spotter on site to avoid mortality to fauna individuals.

Shire of Collie has proposed the following fauna management measures to be implemented during the clearing works (Shire of Collie, 2022c).

- During clearing operation, a fauna spotter should be employed to inspect logs, trees and hollows (where possible) before clearing to reduce likelihood of injury to fauna. Trees observed to contain hollows will be felled in a manner that reduces the likelihood that fauna present will be injured. Hollows in fallen trees is to be inspected for fauna prior to removal from the site. Any fauna encountered is to be relocated to suitable retained habitat nearby (Shire of Collie, 2022c).
- Logs and other remains from the clearing are to be used to enhance fauna habitat in rehabilitated areas and areas surrounding the clearing area (Shire of Collie, 2022c).
- Any holes, pits or trenches required during works is to be kept open only as long as necessary and at suitable escape ramps of 45-degree batter and bridging is to be provided if the site is to be left unattended for extended periods. Any significant size holes, pits or trenches are to be inspected for fauna immediately prior to filling (Shire of Collie, 2022c).

Ecological Linkage

According to available databases, the vegetation over the application area is assigned a proximity rating of "2a" as the proposed vegetation clearing is located less than 500 metres from a north-south Southwest Regional Ecological Linkage (SWREL) axis and a SWREL axis line associated with the Collie River (Molly et al, 2009). Given the separation distance, shape and size of the proposed clearing and the abundant vegetation in the local area, the proposed clearing is unlikely to sever the connectivity of, or permanently disrupt the function of, these or any other ecological linkage.

Conclusion

Based on the above assessment, the proposed clearing will result in the loss of foraging habitat for three black cockatoo species. However, given the abundant similar foraging habitat available locally, much of which is reserved, it is unlikely the proposed clearing will result in a significant residual impact to foraging habitat for black cockatoos. In addition, Shire of Collie's proposed revegetation around the application area with black cockatoo foraging species would further reduce any potential impact. The proposed planting list is included in Appendix F of the report. Chuditch, Quenda, southwestern brown bandicoot, Quokka and South-western brush-tailed phascogale may periodically utilise the application area.

For the reasons set out above, it is considered that the impacts of the proposed clearing on the species utilising the application area can be managed by slow directional clearing, allowing fauna to move into adjacent vegetation with the presence of a fauna specialist on site during clearing activities.

Conditions

To address the above impacts, the following management measures will be required as conditions on the clearing permit:

- Slow directional clearing to allow fauna to move into adjacent vegetation ahead of the clearing activity to avoid mortality of individuals.

- Engage a fauna specialist to inspect the clearing area including an inspection of the logs, trees and hollows immediately prior to, and for the duration of clearing activities.

3.2.3. Land and Water Resources - Clearing Principles (g and i)

The soils within the application area have been mapped by the Department of Primary Industries and Regional Development (DPIRD) as the Cardiff soil landscape subsystem which is described as low lying poorly drained flats over coal measures. The sand within the application area is described as deep sands and duplex sandy gravels, and wet soils (DPIRD, 2019).

The DPIRD mapping indicates that the “Cardiff soil landscape subsystem” soil unit covers the majority of the application area. The soil within the application area has a low susceptibility to water erosion and risk of flooding, moderate susceptibility to wind erosion and a high susceptibility to subsurface acidification, water logging and phosphorus export risk (DPIRD, 2019). Given the purpose of the clearing and the extent of the clearing area, it is unlikely the proposed clearing will lead to an increased risk from subsurface acidification, water logging and phosphorus export risk.

Although, the risk of mapped water erosion is low within the application area, some short-term surface water runoff during the times of high rainfall may be likely. If such an event was to occur, sedimentation may erode into the Collie River located immediately adjacent to the application area. Considering the above matter, the Shire of Collie has proposed erosion management measures to minimise run off into the Collie River (Shire of Collie, 2022d). The overall project includes a foreshore rehabilitation and prevention of erosion through coir logs (logs are 300 millimetres diameter and three meters long and expected to last for 6-12 years) and plantings (shrubs and trees planted). In steep or unstable areas coir or jute mesh or matting will also be considered for interim stabilisation until vegetation establishes (Shire of Collie, 2022e). Construction is proposed during the summer months or months with low to no documented rainfall events (Shire of Collie, 2022d).

Based on the above water erosion management measures and the nature of the proposed clearing, the occurrence of significant surface water runoff into the Collie River is considered low.

Groundwater salinity within the application area has been mapped as fresh at between 500-1000 milligrams per liter Total Dissolved Solids. It is not likely that the proposed clearing will cause land degradation through salinity.

Conclusion

Based on the above, the proposed clearing will not lead to an appreciable land degradation or cause deterioration in the quality of surface or underground water. Shire of Collie is encouraged to implement the proposed erosion management measures outlined in the document “*Minningup Pool Foreshore Master Plan*” during the clearing and construction activities.

Conditions

To address the above, the following management measures will be required as conditions on the clearing permit:

- Undertake the proposed clearing outside of the high rainfall months.
- The proposed construction to commence no later than one month after undertaking the clearing activities.

3.3. Relevant planning instruments and other matters

The application area is located within the Wellington Dam Catchment Area subject to the *Country Areas Water Supply Act 1947* (CAWS Act) and advice from the Water Source Protection was requested. The advice received from the Water Source Protection team at the department is that the proposed clearing is located in Zone D, a low salinity risk part of the catchment where the department’s Policy and Guidelines for the “Granting of licences to clear indigenous vegetation” provide for clearing licences to be granted for any purpose subject to their being greater than one-tenth of the land in question remaining under native vegetation. The Shire of Collie has ample bushland under its tenure to ensure this criterion is met and there is at least 71 per cent native vegetation remaining within Lot 5220. Consequently, the Water Source Protection had no objection to the proposal (DWER, 2022).

During the assessment, it was noted that a section of the proposed clearing area have formed a part of a previously approved clearing permit application CPS 5499/1 granted for Shire of Collie. Location of CPS 5499/1 area which intersect with the proposed application area is illustrated in the figure below.



Figure 5: Location of CPS 5499/1 area which intersect with the proposed clearing footprint.

Two registered Aboriginal sites of significance have been mapped within the application area. Shire of Collie has advised the department that as the works are in a registered aboriginal site, the local Noongar elders will be present to oversee and monitor the works. It is the permit holder's responsibility to comply with the *Aboriginal Heritage Act 1972* (WA) and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

End

Appendix A. Additional information provided by applicant

Information	Description
Reconnaissance and Targeted Flora survey (Ecoedge, 2018)	Shire of Collie had commissioned Ecoedge to undertake a reconnaissance and targeted flora survey. The survey area included 70 hectares of remnant bushland. The field survey was carried out on 29 September and 9 October 2018 along transects of approximately 40 metres apart. The purpose of the survey was to delineate key flora and vegetation values and their potential sensitivity to impacts that may result from the proposed clearing. Taxa not able to be identified in the field were photographed for later determinations (Ecoedge, 2018).
Targeted Fauna Assessment at the Minninup Pool Project (Harewood, 2019)	Shire of Collie had commissioned a fauna specialist to undertake a level one fauna survey as defined by the EPA. Daytime field survey work including camera trap deployment/retrieval and bat call recording were carried out on various days/nights between September 2018 to January 2019. A nocturnal survey of the subject site was carried out on the 7 January 2019. Identified hollows were examined using binoculars for evidence of actual use by black cockatoos (Harewood, 2019).
Vegetation Management and foreshore planting – extract (Shire of Collie, 2022e).	Shire of Collie submitted an extract from the Minninup Pool Foreshore Master Plan (a DRAFT), which outlines weed, topsoil and dieback management on site as well as vegetation management and proposed planting (Shire of Collie, 2022e).
Indicative Planting Map and a planting list (Shire of Collie, 2022e).	Shire of Collie submitted a map of the proposed indicative planting on the site. The map represents locations of proposed rehabilitation and infilling areas. The proposed planting list was also submitted to the department (Shire of Collie, 2022e).
Technical Specification: Minninup pool proposed day use area upgrades (Shire of Collie, 2022b).	Shire of Collie submitted a technical specification guideline for the project. This guideline contained information in regard to foreshore stabilisation, weed controlling spraying, supply of plants, site preparation and planting notes for planting areas, soil erosion and fauna management guidelines (Shire of Collie, 2022b).
Fauna Management Recommendations (Shire of Collie, 2022c)	Shire of Collie compiled a separate document outlining the fauna management recommendations provided by the fauna specialist and proposed to be implemented by Shire of Collie (Shire of Collie, 2022c).
Minningup Pool – Mitigation measures (Shire of Collie, 2022d)	Shire of Collie compiled a separate document outlining avoidance and mitigation measures that were considered by Shire of Collie (Shire of Collie, 2022d).

Appendix B. Details of public submissions

The department received one public submission during the advertisement period of this clearing permit application (Submission, 2022).

Summary of comments	Consideration of comment
No proper discussion with residents on this matter	In accordance with section 51E(4)(b) and (c) of the EP Act, the clearing permit application CPS 9603-1 was publicly advertised in a prescribed manner, inviting any person to comment within a 21-day period.
No consulting done at all with resident on impacts of noise, of endless trucks, machinery, infrastructure.	This matter does not form part of the clearing permit assessment. The department does not consider this to be a valid comment for a clearing permit application.
Concern for the Collie River	The impact to Collie River through sedimentation run off has been considered under Principals (g) and (i) and are further discussed under section 3.2.3.

Appendix C. Site characteristics

C.1. Site characteristics

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

Characteristic	Details
Local context	The application area is situated within Southern Jarrah Forest sub-region of the Jarrah Forest biographic region and is located approximately one kilometre south of the Collie townsite. The application area is surrounded by state forests and located on the north bank of the Collie River east. Aerial imagery and spatial data indicates the local area (ten-kilometre radius from the centre of the area proposed to be cleared) retains approximately 70.3 per cent of the original native vegetation cover.
Ecological linkage	A north-south Southwest Regional Ecological Linkage (SWREL) occurs approximately 650 metres east of the application area and a second, association with the Collie River runs along Minninup Pool located to the south of the application area. No formal ecological linkages are mapped intersecting the application area.
Conservation areas	The application area is surrounded by the state forests including Collie state forest, Mumballup state forest and Harris River state forest. The closest point to the State Forest is located approximately 0.68 kilometres from the application area. The Westralia conservation park is located approximately 0.70 kilometres northwest from the application area. No conservation areas are mapped within the application area.
Vegetation description	Photographs supplied by the applicant and the vegetation survey (Ecoedge, 2018) indicate the vegetation within the proposed clearing area consists of five Vegetation Units. - A: Open forest of <i>Eucalyptus marginata</i>, <i>Corymbia calophylla</i> (and occasionally <i>Allocasuarina fraseriana</i>, or <i>E. patens</i>), with the small trees <i>Persoonia longifolia</i> and <i>Xylomelum occidentale</i> over shrubland dominated by <i>Acacia extensa</i>, <i>A. pulchella</i>, (<i>Grevillea ripicola</i>), <i>Hypocalymma angustifolium</i>, <i>Kennedia coccinea</i>, <i>Macrozamia riedlei</i>, and <i>Xanthorrhoea brunonis</i> or <i>X. preissii</i> on sandy loam. - B: Open forest to woodland of <i>Eucalyptus marginata</i>, with in places the small trees <i>Banksia littoralis</i>, <i>Melaleuca preissiana</i> and <i>Nuytsia floribunda</i> over shrubland dominated by <i>Acacia extensa</i>, <i>A. pulchella</i>, <i>Dasypogon bromeliifolius</i> and <i>Xanthorrhoea brunonis</i> over <i>Cyathochaeta avenacea</i> and <i>Lepidosperma squamatum</i> sedges on greyish sandy clay loams.

Characteristic	Details
	- C: Open forest to woodland of <i>Eucalyptus marginata</i>, <i>Allocasuarina fraseriana</i> over <i>Banksia grandis</i> small trees over shrubland of <i>Acacia extensa</i>, <i>Adenanthos obovatus</i>, <i>Bossiaea eriocarpa</i>, <i>Gompholobium tomentosum</i>, <i>Macrozamia riedlei</i> and <i>Xanthorrhoea preissii</i> with scattered <i>Lepidosperma squamatum</i> sedges on sandy loam. - E: Open to very open woodland to closed or open shrubland of <i>Banksia littoralis</i> or <i>Melaleuca preissiana</i> (occasionally small <i>Eucalyptus patens</i>) over <i>Aotus gracillima</i>, <i>Astartea scoparia</i>, <i>Gastrolobium capitatum</i>, <i>Hakea ceratophylla</i>, <i>Hibbertia stellaris</i>, <i>Melaleuca lateritia</i> over sedgeland which may include <i>Cyathochaeta avenacea</i>, <i>Leptocarpus roycei</i>, and <i>Mesomelaena tetragona</i> on grey clay or sandy clay - F: Tall closed shrubland/sedgeland of <i>Acacia divergens</i>, <i>Aotus gracillima</i>, <i>Astartea scoparia</i>, <i>Callistemon glaucus</i>, <i>Taxandria linearifolia</i> and <i>Cyathochaeta avenacea</i>, <i>Gahnia decomposita</i> on clay loam. Representative photos and the full survey descriptions and maps are available in Appendix F. The broad scale mapped vegetation types within the application area are: - Beard vegetation association three, which is described as mainly <i>Eucalyptus marginata</i> (jarrah) and <i>Corymbia calophylla</i> (marri) (Shepherd et al, 2001). - Muja southwest vegetation complex, which is described as Open woodland of <i>Melaleuca preissiana</i>, <i>Banksia littoralis</i>, <i>Banksia ilicifolia</i> with some <i>Eucalyptus patens</i> on moister sites, <i>Banksia</i> spp. on drier sites of valley floors in the subhumid zone. The mapped vegetation types retain more than 50 per cent of the original extent (Government of Western Australia, 2019).
Vegetation condition	Photographs supplied by the applicant and the vegetation survey (Ecoedge, 2018) indicate that the majority of the vegetation within the proposed clearing area is in very good (Keighery, 1994) to excellent (Keighery, 1994) condition. The full Keighery (1994) condition rating scale is provided in Appendix E. Representative photos and the full survey descriptions and mapping are available in Appendix F.
Climate and landform	Rainfall: 700-1050 millimetres Evapotranspiration: 700 millimetres The application area is mapped within the Cardiff soil landscape subsystem which is described as low lying poorly drained flats over coal measures. There are also scattered low rises with gravels. A landform with a slope of zero to three per cent, occasionally to five per cent on rises or edges (DPIRD, 2019).
Soil description	The soil is mapped as deep sands and duplex sandy gravels, and wet soils (DPIRD, 2019).
Land degradation risk	The mapped soils have a high susceptibility to subsurface acidification, water logging and phosphorus export risk and a low risk of water erosion (DPIRD, 2019). The full land degradation risk summary for the mapped soil subsystem is provided in Appendix C.5.
Waterbodies	The application area is mapped over the Western Darling Range hydrological zone of Western Australia (DPIRD-069). The desktop assessment and aerial imagery indicated that the Collie River which is classified as a major river is located immediately south of the application area. No

Characteristic	Details
	mapped conservation significant wetlands occur within a close proximity to or within the application area.
Hydrogeography	The application area falls within the Collie River Irrigation District Surface Water Area (DWER-037) and the Collie groundwater area (DWER-034) as proclaimed under the <i>Rights in Water and Irrigation Act 1914</i> (RiWI Act). The application area also mapped over the Wellington dam catchment area subject to the <i>Country Water Supply Act 1917</i> (CAWS Act). The application area is not mapped within a Public drinking water source area (DWER-033). The groundwater salinity level (Total Dissolved Solids) is mapped as 500-1000 milligrams per litre (fresh).
Flora	The desktop assessment identified 18 flora records in the local area which comprise of 17 priority and one threatened flora species. According to the available databases, the nearest conservation significant flora recorded is the Priority 4 flora, <i>Grevillea ripicola</i> located 0.45 kilometres from the application area. The reconnaissance and targeted flora and vegetation survey has identified individuals of <i>Grevillea ripicola</i> (P4) within the application area (Ecoedge, 2018).
Ecological communities	No conservation significant ecological communities are mapped within the local area. The vegetation within the application area is not representative of any conservation significant ecological communities (Ecoedge, 2018).
Fauna	The desktop assessment has identified 18 conservation significant fauna records in the local area, which comprise of five birds, one fish, one invertebrate, ten mammals and one reptile species. The nearest record was the threatened <i>Phascogale tapoatafa wambenger</i> (South-western brush-tailed phascogale, wambenger) identified approximately 0.03 kilometres from the application area. The survey recorded the Western brush wallaby (<i>Notamacropus irma</i>) at two locations, Western false pipistrelle (<i>Falsistrellus mackenziei</i>) and the Carter's freshwater mussel (<i>Westralunio carteri</i>). Forest red-tailed black cockatoo was also identified within the survey area (Harewood, 2019). Records of the three known black cockatoos are identified from the local area. The application area is mapped within the known distribution zone of all three black cockatoos. Three black cockatoo roost sites are identified from the local area.

C.2. Vegetation extent

	Pre-European extent (ha)	Current extent (ha)	Extent remaining (%)	Current extent in all DBCA managed land (ha)	Current proportion (%) of pre-European extent in all DBCA managed land
IBRA bioregion**					
Jarrah Forest	4,506,660.25	2,399,838.15	53.25	1,673,614.25	37.14
Vegetation complex					
Beard bridedown_3 *	2,390,591.54	1,604,101.56	67.10	1,299,263.74	54.35
Muja_187*	10,200.51	6,070.51	59.51	4,470.56	43.83
Local area					

	Pre-European extent (ha)	Current extent (ha)	Extent remaining (%)	Current extent in all DBCA managed land (ha)	Current proportion (%) of pre-European extent in all DBCA managed land
10km radius	31,494.29	22,148.92	70.3	-	-

*Government of Western Australia (2019a)

**Government of Western Australia (2019b)

C.3. Flora analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix G.1), and biological survey information, impacts to the following conservation significant flora required further consideration.

Species name	Conservation status	Suitable habitat features ? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Did survey identify? [Y, N, N/A]
<i>Acacia semitrullata</i>	P4	Y	9.73	1	N
<i>Adenanthos cygnorum</i> subsp. <i>chamaephyton</i>	P3	Y	1.48	1	N
<i>Caladenia validinervia</i>	P1	Y	1.48	1	N
<i>Calothamnus graniticus</i> subsp. <i>leptophyllus</i>	P4	N	1.48	1	N
<i>Calytrix pulchella</i>	P3	Y	8.06	1	N
<i>Drakaea confluens</i>	T	N	5.65	1	N
<i>Eucalyptus rudis</i> subsp. <i>cratyantha</i>	P4	N	7.44	1	N
<i>Grevillea prominens</i>	P3	N	8.05	1	N
<i>Grevillea ripicola</i>	P4	Y	0.45	42	Y – within application area
<i>Hypolaena robusta</i>	P4	Y	1.53	1	N
<i>Juncus meianthus</i>	P3	N	4.38	1	N
<i>Leucopogon extremus</i>	P2	N	9.82	1	N
<i>Lomandra whicherensis</i>	P3	N	7.29	1	N
<i>Pultenaea skinneri</i>	P4	Y	0.80	6	N
<i>Sphaerolobium benetectum</i>	P2	Y	9.26	2	N
<i>Synaphea hians</i>	P3	Y	1.00	6	Y – within survey area
<i>Tetradlea parvifolia</i>	P3	N	1.81	3	N
<i>Thysanotus unicus</i>	P3	Y	6.08	1	N

C.4. Fauna analysis table

Aquatic species identified from the local area are not recorded in the following table.

Species name	Common name	Conservation status	Suitable habitat features ? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Year of the most recent record	Did survey identify? [Y, N, N/A]
BIRD							
<i>Calyptrorhynchus banksii</i> naso	Forest red-tailed black cockatoo	VU	Y	1.47	18	2018	Y-foraging

Species name	Common name	Conservation status	Suitable habitat features ? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Year of the most recent record	Did survey identify? [Y, N, N/A]
<i>Calyptorhynchus baudinii</i>	Baudin's cockatoo	EN	Y	1.47	36	2018	N
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	EN	Y	1.80	12	2018	N
<i>Calyptorhynchus</i> sp. 'white-tailed black cockatoo'	white-tailed black cockatoo	EN	Y	3.01	12	2018	N
<i>Ixobrychus flavicollis australis</i> (southwest subpop.)	Black bittern (southwest subpop.)	P2	N	1.46	2	1937	N
MAMMAL							
<i>Dasyurus geoffroii</i>	Chuditch, western quoll	VU	Y	1.47	19	2019	N
<i>Falsistrellus mackenziei</i>	Western false pipistrelle, western falsistrelle	P4	Y	3.95	1	2010	Y – bat call recording
<i>Hydromys chrysogaster</i>	Water-rat, rakali	P4	N	1.47	5	2015	N
<i>Isodon fusciventer</i>	Quenda, southwestern brown bandicoot	P4	Y	1.47	20	2019	N
<i>Macrotis lagotis</i>	bilby, dalgyte, ninu	VU	N	5.62	1	1971	N
<i>Myrmecobius fasciatus</i>	numbat, walpurti	EN	N	3.20	2	1981	N
<i>Notamacropus irma</i>	Western brush wallaby	P4	Y	1.47	3	2000	Y – Camera traps
<i>Phascogale tapoatafa wambenger</i>	South-western brush-tailed phascogale, wambenger	CD	Y	0.03	25	2019	N
<i>Pseudocheirus occidentalis</i>	western ringtail possum, ngwayir	CR	N	1.38	12	2018	N
<i>Setonix brachyurus</i>	Quokka	VU	Y	1.47	7	2006	N
REPTILE							
<i>Ctenotus delli</i>	Dell's skink, Darling Range Southwest Ctenotus	P4	N	8.10	3	2000	N

C.5. Land degradation risk table

Risk categories	Land Unit 255SCFCF
Wind erosion	M2: 47% of map unit has a high to extreme hazard
Water erosion	L1: 1% of map unit has a very high to extreme hazard
Salinity	L1: 0% of map unit has a moderate hazard
Subsurface Acidification	H2: 100% of map unit has a high susceptibility
Flood risk	L1: 1% of the map unit has a moderate to high hazard
Water logging	H1: 60% of map unit has a moderate to very high risk
Phosphorus export risk	H1: 60% of map unit has a high to extreme hazard

Appendix D. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
Environmental value: biological values		
<u>Principle (a):</u> <i>"Native vegetation should not be cleared if it comprises a high level of biodiversity."</i> <u>Assessment:</u> The area proposed to be cleared contains Priority 4 conservation significant flora species within the application area and the vegetation proposed for clearing also provide foraging habitat for the black cockatoo species.	May be at variance	Yes <i>Refer to Section 3.2.1, above.</i>
<u>Principle (b):</u> <i>"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."</i> <u>Assessment:</u> The application area comprises suitable foraging habitat for the three black cockatoo species, and it is likely that five terrestrial, ground dwelling or arboreal fauna may periodically utilise the application area.	May be at variance	Yes <i>Refer to Section 3.2.2, above.</i>
<u>Principle (c):</u> <i>"Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora."</i> <u>Assessment:</u> The area proposed to be cleared is unlikely to contain habitat for flora species listed as threatened under the BC Act. The survey did not identify any threatened flora within the application area.	Not likely to be at variance	No
<u>Principle (d):</u> <i>"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."</i> <u>Assessment:</u> The area proposed to be cleared does not contain species that can indicate a threatened ecological community.	Not at variance	No
Environmental value: significant remnant vegetation and conservation areas		

Assessment against the clearing principles	Variance level	Is further consideration required?
<u>Principle (e):</u> <i>"Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared."</i> <u>Assessment:</u> The extent of the mapped vegetation type and the native vegetation in the local area is consistent with the national objectives and targets for biodiversity conservation in Australia. The vegetation proposed to be cleared is not considered to be part of a significant ecological linkage in the local area.	Not at variance	No
<u>Principle (h):</u> <i>"Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area."</i> <u>Assessment:</u> Several conservation areas are mapped within the local area. The distance to the closest conservation area is approximately 680 metres from the application area. Given the distance to the nearest conservation area, along with the weed and dieback management condition imposed on the permit, the proposed clearing is unlikely to spread weeds and dieback and impact on the environmental values of adjacent conservation areas.	Not likely to be at variance	No
Environmental value: land and water resources		
<u>Principle (f):</u> <i>"Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland."</i> <u>Assessment:</u> There are no mapped wetlands or watercourses within the application area. The application area borders the Collie River. However, vegetation associated with the watercourse does not form part of the proposed clearing.	Not likely to be at variance	No
<u>Principle (g):</u> <i>"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation."</i> <u>Assessment:</u> The mapped soils are not susceptible to wind and water erosion or salinity. The mapped soil type is susceptible to nutrient export (DPIRD, 2019). However, noting the extent and the purpose of the application, the proposed clearing is not likely to have an appreciable impact on land degradation. Surface water runoff maybe likely during a high rainfall event.	May be at variance	Yes <i>Refer to Section 3.2.3, above.</i>
<u>Principle (i):</u> <i>"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water."</i> <u>Assessment:</u> The Collie River is located immediately south of the application area. The soil within the application area has a low risk of water erosion. However, during a heavy rainfall event, sediment runoff into Collie River maybe likely. Shire of Collie has proposed erosion management measures to minimise surface water erosion. Along with management measures and conditions imposed on the clearing permit, it is unlikely the proposed clearing will cause significant deterioration in the quality of surface water in the Collie River.	May be at variance	Yes <i>Refer to Section 3.2.3, above.</i>
<u>Principle (j):</u> <i>"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding."</i> <u>Assessment:</u>	Not likely to be at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
The mapped soils and topographic contours in the surrounding area do not indicate the proposed clearing is likely to contribute to increased incidence or intensity of flooding. The application area is mapped as having a low risk of flooding (DPIRD, 2019).		

Appendix E. Vegetation condition rating scale

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

Considering its location, the scale below was used to measure the condition of the vegetation proposed to be cleared. This scale has been extracted from Keighery, B.J. (1994) *Bushland Plant Survey: A Guide to Plant Community Survey for the Community*. Wildflower Society of WA (Inc). Nedlands, Western Australia.

Measuring vegetation condition for the South West and Interzone Botanical Province (Keighery, 1994)

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

Appendix F. Biological survey information excerpts/ photographs of the vegetation and planting list extracts (Ecoedge, 2018) (Harewood, 2019) (Shire of Collie, 2022e).

Vegetation Unit A



Open forest of *Eucalyptus marginata*, *Corymbia calophylla* (and occasionally *Allocasuarina fraseriana*, or *E. patens*), with the small trees *Persoonia longifolia* and *Xylomelum occidentale* over shrubland dominated by *Acacia extensa*, *A. pulchella*, (*Grevillea ripicola*), *Hypocalymma angustifolium*, *Kennedia coccinea*, *Macrozamia riedlei*, and *Xanthorrhoea brunonis* or *X. preissii* on sandy loam.



Open forest to woodland of *Eucalyptus marginata*, with in places the small trees *Banksia littoralis*, *Melaleuca preissiana* and *Nuytsia floribunda*) over shrubland dominated by *Acacia extensa*, *A. pulchella*, *Dasypogon bromeliifolius* and *Xanthorrhoea brunonis* over *Cyathochaeta avenacea* and *Lepidosperma squamatum* sedges on greyish sandy clay loams.



Open forest to woodland of *Eucalyptus marginata*, (*Allocasuarina fraseriana*) over *Banksia grandis* small trees over shrubland of *Acacia extensa*, *Adenanthos obovatus*, *Bossiaea eriocarpa*, *Gompholobium tomentosum*, *Macrozamia riedlei* and *Xanthorrhoea preissii* with scattered *Lepidosperma squamatum* sedges on sandy loam.

Vegetation Unit D



Open forest of *Eucalyptus marginata* (and occasionally *E. patens*) over *Xylomelum occidentale* low trees over shrubland of *Acacia extensa*, *Banksia dallanneyi*, *Bossiaea ornata*, (*Grevillea ripicola*), *Hakea lissocarpha*, *Hibbertia hypericoides*, *Hypocalymma angustifolium*, *Leucopogon propinquus*, *Macrozamia riedlei* and *Xanthorrhoea preissii* on lateritic gravel.

Vegetation Unit E



Open to very open woodland to closed or open shrubland of *Banksia littoralis* or *Melaleuca preissiana* (occasionally small *Eucalyptus patens*) over *Aotus gracillima*, *Astartea scoparia*, *Gastrolobium capitatum*, *Hakea ceratophylla*, *Hibbertia stellaris*, *Melaleuca lateritia* over sedgeland which may include *Cyathochaeta avenacea*, *Leptocarpus roycei*, and *Mesomelaena tetragona*.

Vegetation Unit F



Tall closed shrubland/sedgeland of *Acacia divergens*, *Aotus gracillima*, *Astartea scoparia*, *Callistemon glaucus*, *Taxandria linearifolia* and *Cyathochaeta avenacea*, *Gahnia decomposita* on clay loam.

Vegetation Unit G



Open forest of *Corymbia calophylla*, *Eucalyptus patens* and *E. rudis* with scattered *Banksia littoralis* and *Melaleuca preissiana* over a variable tall shrubland/shrubland that may include *Acacia extensa*, *A. pulchella*, *Astartea scoparia*, *Grevillea ripicola*, *Hakea lissocarpha*, *Hypocalymma angustifolium*, *Melaleuca viminea*, *Taxandria linearifolia* and *Xanthorrhoea brunonis* on loam.

Vegetation Unit H



Open forest of *Eucalyptus rudis* over tall shrubland of **Acacia longifolia*, *A. extensa*, *A. pulchella*, *Taxandria linearifolia* over *Lepidosperma effusum* and **Watsonia meriana* on loam.

Figure 6: Vegetation units within the survey area

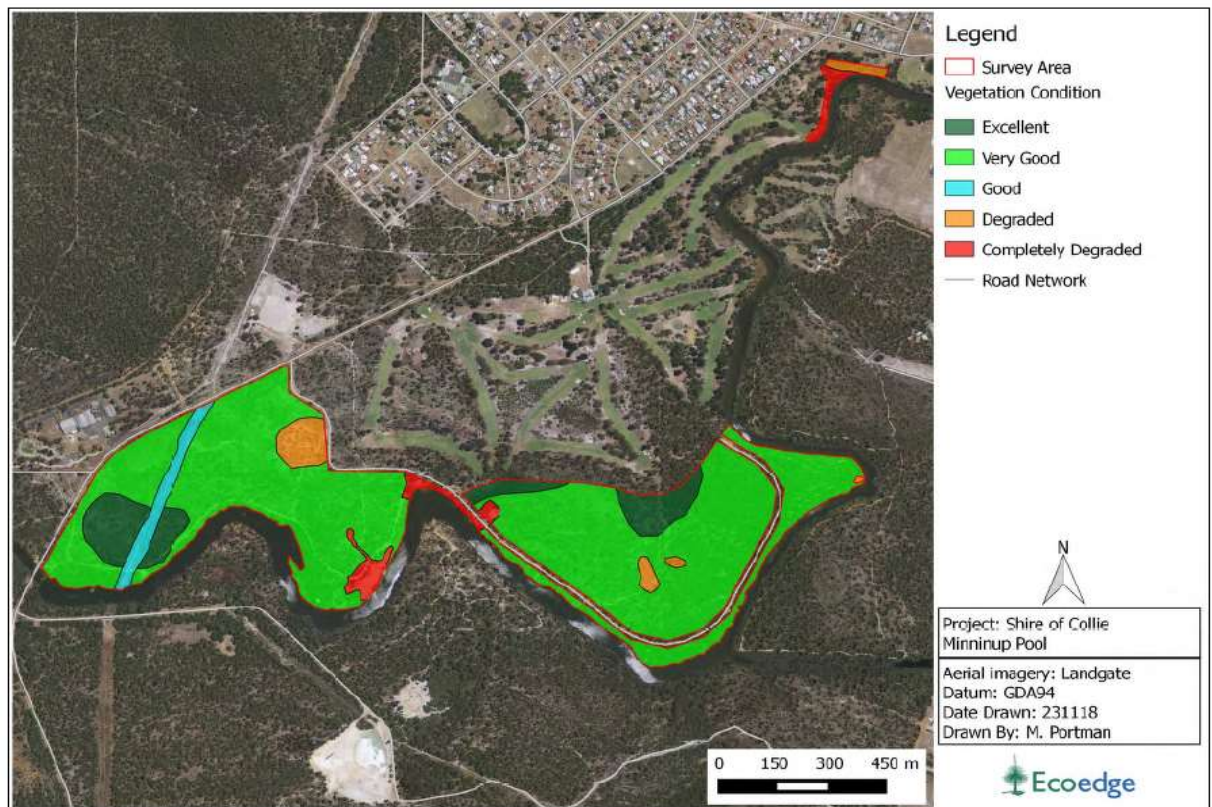


Figure 14. Condition of vegetation within the Survey Area.

Figure 7: Map of the condition of the vegetation within the survey area

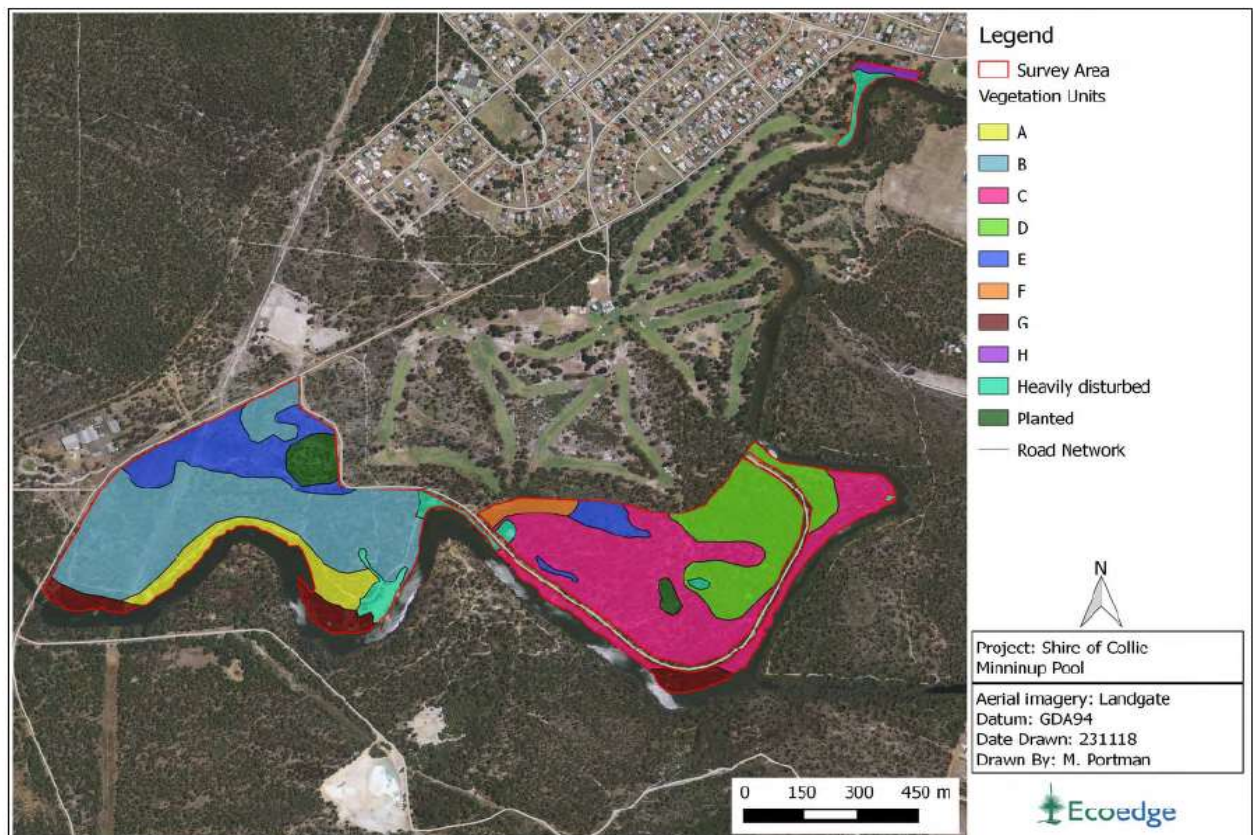


Figure 13. Vegetation units mapped within the Survey Area.

Figure 8: Map of the vegetation units within the survey area



Figure 10. *Synaphea hians*.



Figure 11. *Grevillea ripicola*.



Figure 12. *Stylidium scandens*.

Figure 9: Photographs of the conservation significant flora species identified from the survey area.

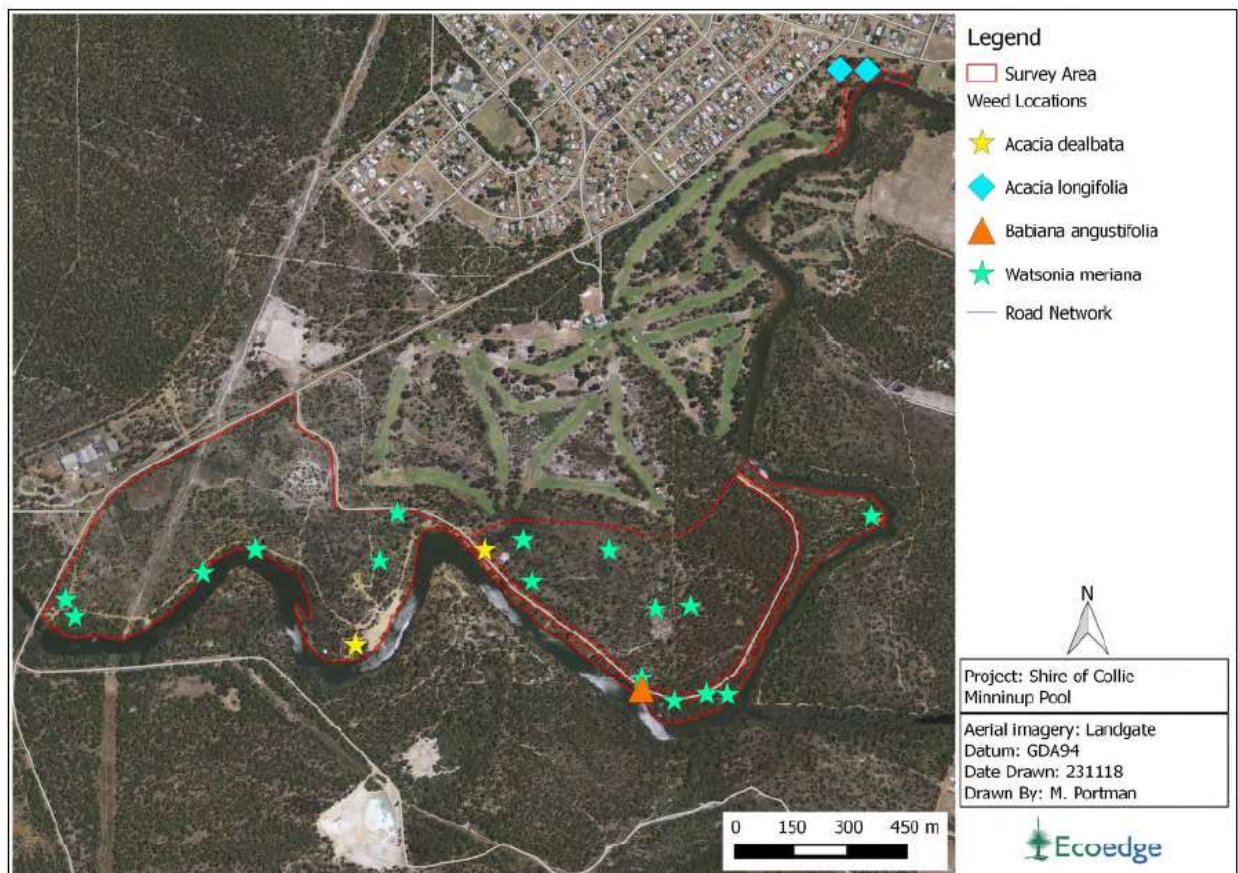


Figure 8. Location of conservation significant taxa within the Survey Area.

Figure 10: Map of the locations of the weed species.

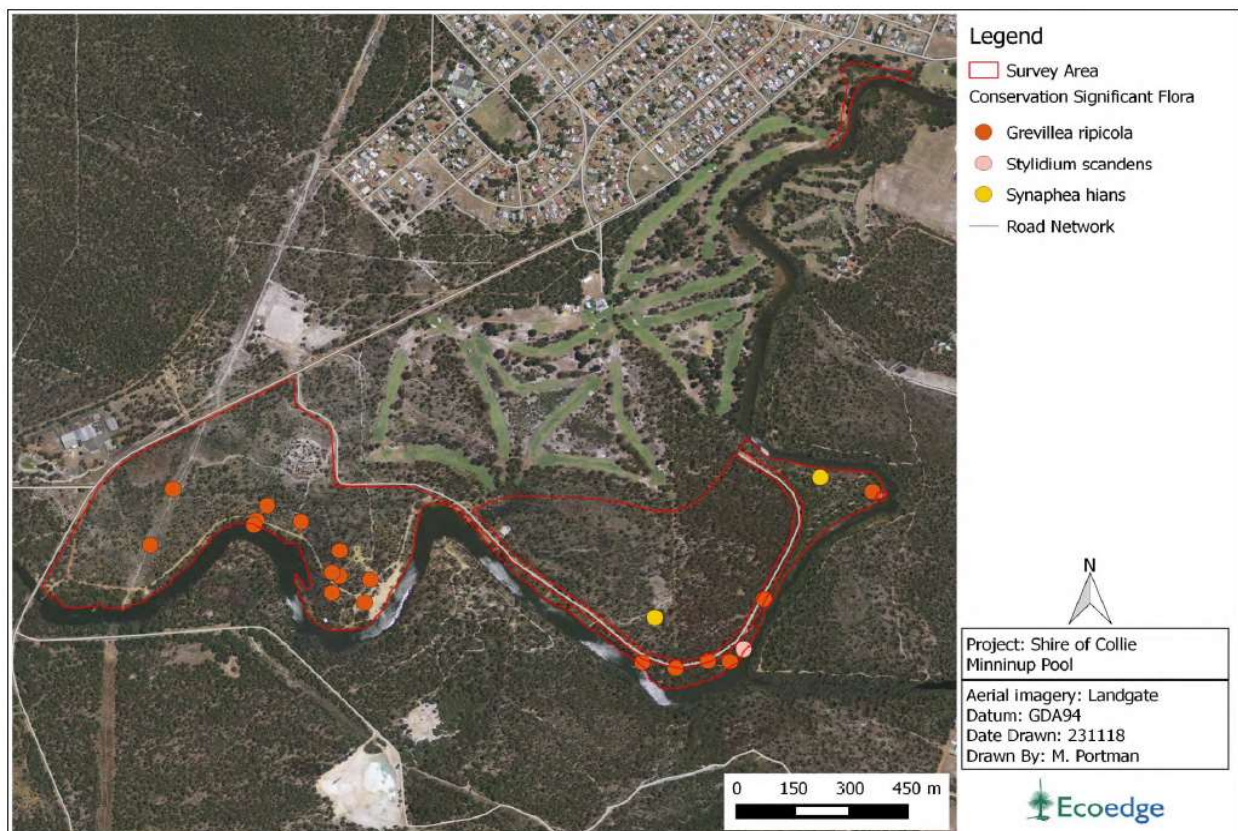


Figure 9. Location of conservation significant taxa within the Survey Area.

Figure 11: Map of the location of the conservation significant flora species.

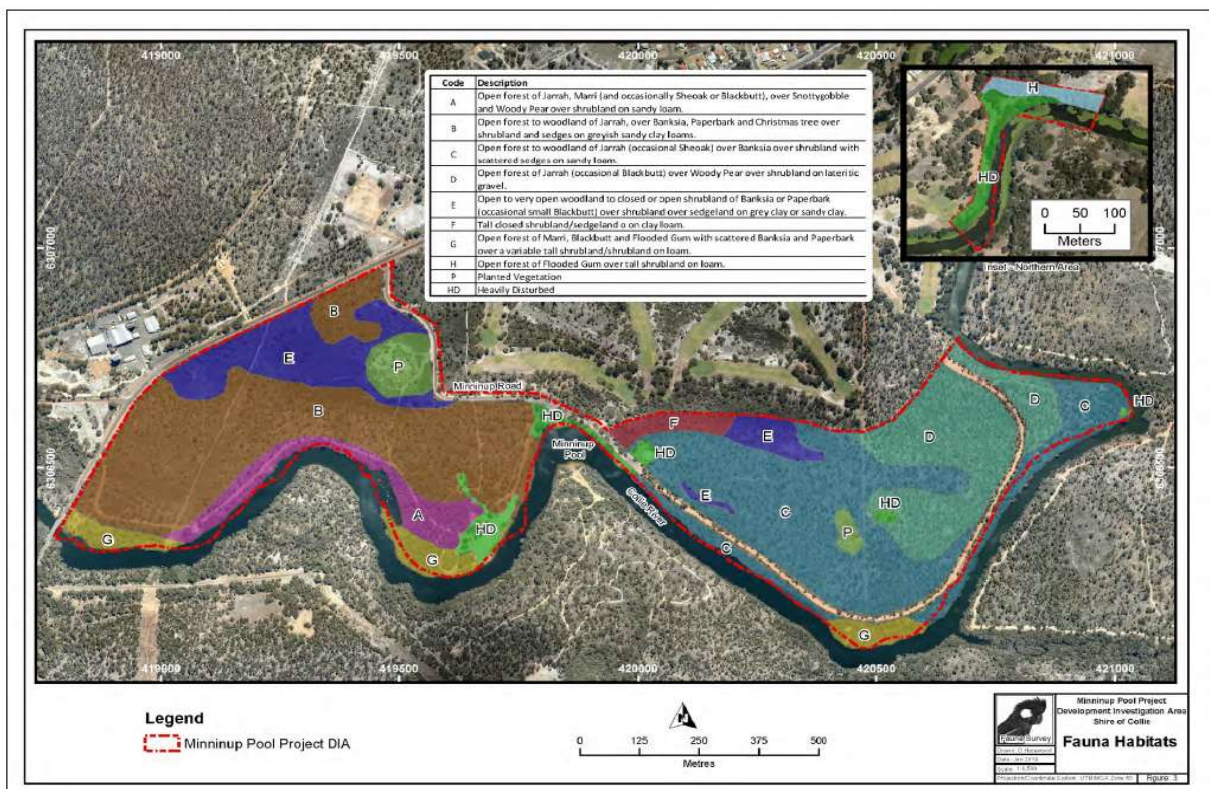


Figure 3. Fauna habitat types mapped during the field survey.

Figure 12: Map of the fauna habitats within the survey area.

Code	Fauna Habitat Description	Example Image
A	Open forest of Jarrah, Marri (and occasionally Sheoak or Blackbutt), over Snottygobble and Woody Pear over shrubland on sandy loam.	
	Total Area = ~3.6 ha (~5.2%)	
B	Open forest to woodland of Jarrah, over Banksia, Paperbark and Christmas tree over shrubland and sedges on greyish sandy clay loams.	
	Total Area = ~20.8 ha (~29.7%)	
C	Open forest to woodland of Jarrah (occasional Sheoak) over Banksia over shrubland with scattered sedges on sandy loam.	
	Total Area = ~19.0 ha (~27.2%)	

Code	Fauna Habitat Description	Example Image
D	Open forest of Jarrah (occasional Blackbutt) over Woody Pear over shrubland on lateritic gravel.	
	Total Area = ~9.8 ha (~14.0%)	
E	Open to very open woodland to closed or open shrubland of Banksia or Paperbark (occasional small Blackbutt) over shrubland over sedgeland on grey clay or sandy clay.	
	Total Area = ~7.4 ha (~10.5%)	
F	Tall closed shrubland/sedgeland on clay loam.	
	Total Area = ~1.1 ha (~1.6%)	

Code	Fauna Habitat Description	Example Image
HD	Heavily disturbed.	
	Total Area = ~2.5 ha (~3.6%)	

Figure 13: Description of the identified fauna habitats within the application area.

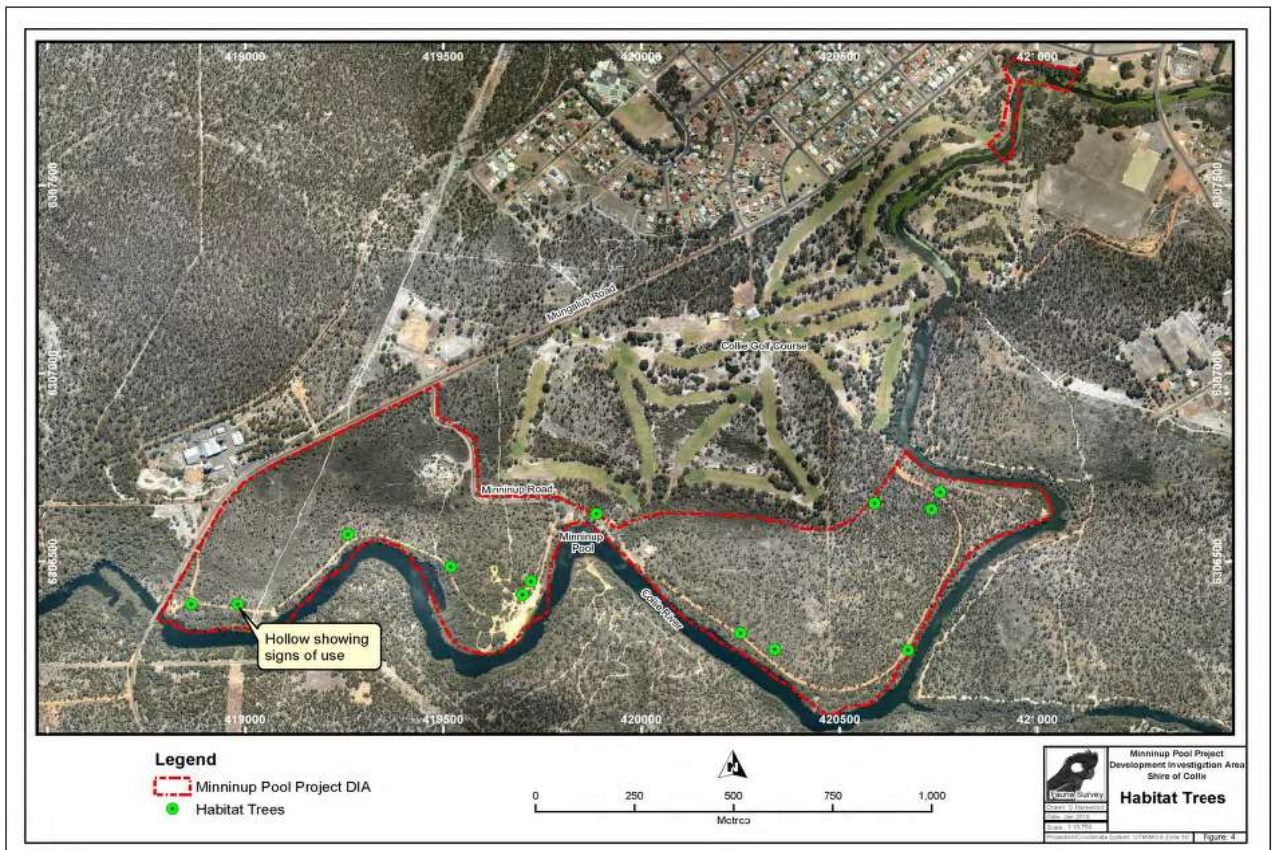


Figure 4. Locations of black cockatoo habitat trees mapped during the field survey.

Figure 14: Map of the potential black cockatoo habitat tree locations

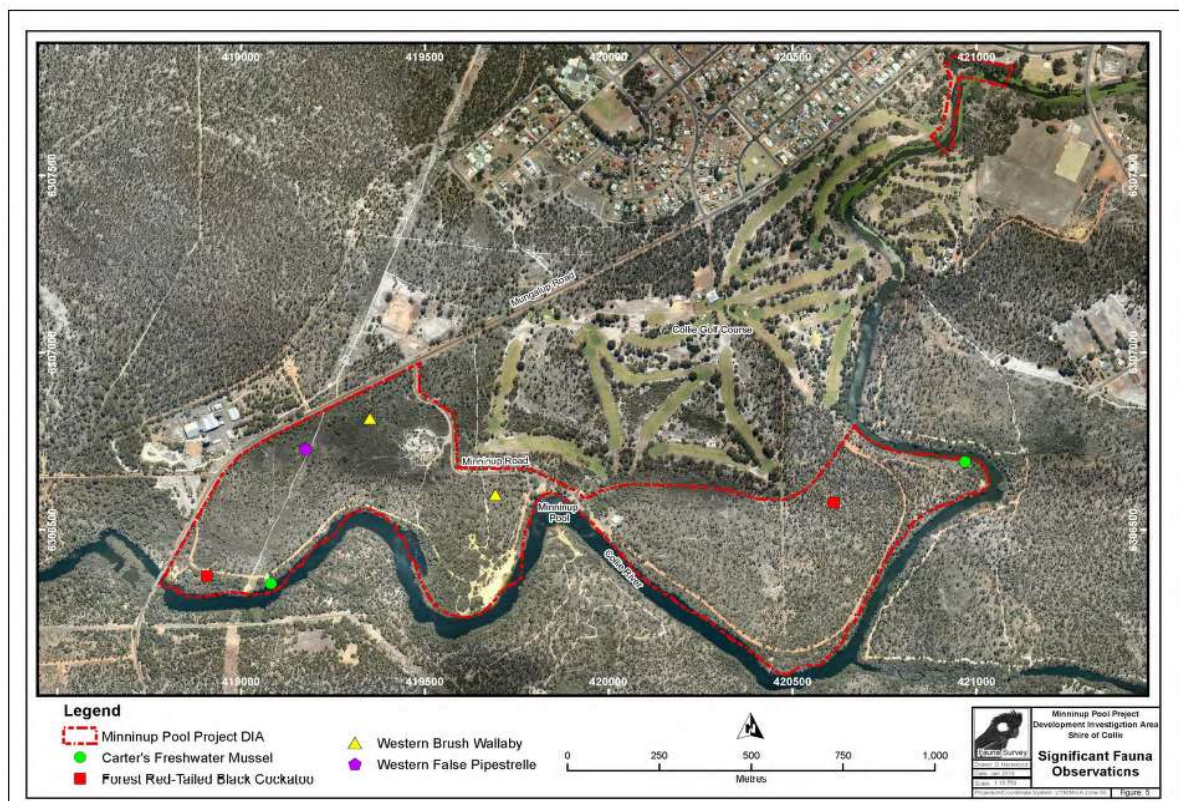


Figure 5. Locations of sighting/records of fauna species of conservation significance.

Figure 15: Map of the locations of identified fauna species within the survey area.

SANDY BEACH

Area A - 'Moist' Rehabilitation area south of the western parking area which includes old access tracks into the Bedroom (Moist Habitat)– Primarily colonising species with occasional large trees as people should not be accessing these areas, so planting trees that might drop branches is not a significant risk issue.

List 1 - Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<i>Acacia extensa</i>								x	x	x		
<i>Anigozanthus flavidus</i>	x										x	x
<i>Astartea scoparia</i>	x	x										
<i>Eucalyptus rudis</i>							x	x	x			
<i>Grevillea ripicola</i>			x	x							x	x
<i>Kunzea ericifolia</i>										x	x	
<i>Lepidosperma squamatum</i>			x	x	x	x	x	x	x	x	x	
<i>Leptospermum erubescens</i>							x	x	x	x	x	
<i>Melaleuca preissiana</i>	x	x									x	x

Area B- Scattered infill planting between the parking area and the river –These plants are to provide interest and to encourage visitors to stay on the paths.

List 2 - Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<i>Acacia extensa</i>								x	x	x		
<i>Astartea scoparia</i>	x	x										
<i>Billardiera fusiformis</i>	x	x									x	x
<i>Conostylis aculeata</i>								x	x	x	x	
<i>Grevillea ripicola</i>			x	x							x	x
<i>Hakea lissocarpa</i>					x	x	x	x	x			
<i>Kunzea ericifolia</i>										x	x	
<i>K. recurva</i>								x	x	x	x	x
<i>Leptospermum erubescens</i>							x	x	x	x	x	
<i>Melaleuca preissiana</i>	x	x									x	x
<i>Patersonia occidentalis</i>								x	x	x	x	x
<i>Phyllanthus calycinus</i>	x					x	x	x	x	x	x	x

Area C - Rehabilitation area south of the beach (north of the rope swing) – Species list 1 is to be used for this area with no *Melaleuca preissiana* as it is a more elevated area or *Eucalyptus rudis* as visitors will be close by.

Area D – Sandy rehabilitation area north of the beach – Primarily colonising species suited to moist areas with the *Anigozanthus flavidus*, *Acacia pulchella*, *Eucalyptus rudis* and *E. patens* planted away from the boundary on the beach and road boundary so people are not close to them.

Some rushes and sedges will be used in the culvert outfall area see species with *.

List 3 - Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<i>Acacia extensa</i>								x	x	x		
<i>A. pulchella</i>					x	x	x	x	x	x	x	x
<i>Anigozanthus flavidus</i>	x										x	x
<i>Astartea scoparia</i>	x	x										
<i>Billardiera fusiformis</i>	x	x									x	x
<i>Conostylis acculeata</i>								x	x	x	x	
<i>Eucalyptus rudis</i>							x	x	x			
<i>E. patens</i>	x	x					x	x			x	x
<i>Grevillea ripicola</i>			x	x							x	x
<i>Kunzea ericifolia</i>										x	x	
<i>K. recurva</i>								x	x	x	x	x
<i>Leptospermum erubescens</i>							x	x	x	x	x	
<i>Melaleuca preissiana</i>	x	x									x	x
* <i>Hypolaena exsulca</i> (Damp Zone)									x	x	x	x
* <i>Lepidosperma squamatum</i> (Damp Zone)			x	x	x	x	x	x	x	x	x	
* <i>Juncus kraussii subsp. australiensis</i> (for deep basin = Emergent Zone)	x									x	x	x

Area E River Edge Planting – These plantings are to stabilise the foreshore long term and coir logs will be used on the river's edge to assist the reed establishment. Plants that are known to pose some risk to visitors are to be excluded from these areas such as itchy or prickly plants or plants such as wattles that are known to cause allergies. As *Grevillea ripicola* is a priority flora for the area it will be included even though *Grevillea*'s can cause irritation, but it should not be planted on edges, only in the centre of the planting areas. Large trees will not be planted due to potential for limb drop in the future though they are expected to self seed into the areas in due course. Advanced *Melaleuca preissiana* trees will be located in the beach areas and some tube stock of the species will be included in the river edge planting areas.

The weeds in these areas are to be controlled / removed before planting including removing the Mt. Morgan Wattle *Acacia podalyrifolia*. The *Cyperus polystachyos* bunchy sedge and couch grass *Cynodon dactylon* along the foreshore can be retained to stabilise the foreshore and because removal is impractical.

List 4 Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<i>Astartea scoparia</i>	x	x										
<i>Cyperus polystachyos</i> (existing will spread itself)	x	x		x	x	x	x					x
<i>Grevillea ripicola</i>			x	x							x	x
<i>Hypocalymma angustifolium</i>						x	x	x	x	x		
<i>Melaleuca incana</i>					x	x	x	x	x	x	x	
<i>M. preissiana</i>	x	x									x	x
<i>M. viminea</i>							x	x	x	x	x	
<i>Taxandria linearifolia</i>			x	x	x							
Rush sp. along water's edge									x	x	x	x
<i>Hypolaena exsulca</i>												
<i>Juncus kraussii subsp. australiensis</i>	x									x	x	x

Area M – Non irrigated lawn area, 10m wide on the riverside of the paths and picnic tables. Fox tail mulga grass *Neurachne alopecuroides*, which is native to the shire, may be suitable, alternatively a kikiyu sterile grass cultivar, such as Village Green may be suited. This grass will likely be used at the main pool. *Sporobolus virginicus* – Marine couch which is native to the south west was considered but as it is not drought tolerant there was concern about its ability to persist.

There is also the option to leave this as an area of sand if there are concerns with using the above grass species.

MINNINUP POOL

Area F - Low amenity planting in dry areas. This planting, in the entry area and under the mature jarrah trees, is to give visual interest and spatial separation while still allowing views over the plants to the river so the plants should generally grow no more than 600mm – 1m high. They will be watered the first year only (unless it's a drought year the second year and they'll get a bit more). A few advanced jarrah trees *Eucalyptus marginata* will also be planted in these areas, as in the long term these will frame rather than block views. Those noted * will need planting at 2m centres; others will be 1m centres.

List 5 Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<i>Acacia stenoptera</i>			x	x	x	x	x	x	x	x	x	x
* <i>Allocasuarina humilis</i>					x	x	x	x	x	x	x	
<i>Anigozanthus mangleissii</i>								x	x	x	x	
<i>Conostylis aculeata</i>								x	x	x	x	
<i>Daviesia decurrens</i>						x	x	x	x			
* <i>Darwinia citriodora</i>					x	x	x	x	x	x	x	x
* <i>Grevillea ripicola</i>			x	x							x	x
<i>Hemiandra pungens</i>	x	x	x	x	x	x	x	x	x	x	x	x
<i>Hibbertia hypericoides</i>				x	x	x	x	x	x	x	x	x
* <i>Hypocalymma angustifolium</i>						x	x	x	x	x		
<i>Kennedia prostrata</i>				x	x	x	x	x	x	x	x	
<i>Leucopogon sp?</i>												
<i>Leschenaultia biloba</i>							x	x	x	x	x	x

<i>Pimelia ciliata</i>								x	x	x	x	x
<i>Xanthorrhoea gracilis</i>										x	x	x
* <i>X. preissii</i>						x	x	x	x	x	x	x

Area G - Low amenity planting in dry areas. This planting is to rehabilitate redundant road and paths in the entry area so will use the same species as for Area F. However watering may be more difficult and so tube stock are generally to be used.

Area H - Dry bank plantings (vicinity of old diving board and welcome area) – These plantings are for visual interest and to stabilise the bank areas with most of these areas also being in the root zone of established trees, mostly jarrah trees. Plantings are to be low, up to 1.2 m high.

Should the concrete steps be removed some additional lateritic rocks should be installed and coir logs may be required to assist with stabilising the banks.

List 6 Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<i>Acacia stenoptera</i>			x	x	x	x	x	x	x	x	x	x
<i>Allocasuarina humilis</i>				x	x	x	x	x	x	x		
<i>Anigozanthus mangleissii</i>								x	x	x	x	
<i>Billardiera fusiformis</i>	x	x									x	x
<i>Conostylis aculeata</i>								x	x	x	x	
<i>Daviesia decurrens</i>					x	x	x	x				
<i>Darwinia citriodora</i>				x	x	x	x	x	x	x	x	x
<i>Hakea lissocarpa</i>				x	x	x	x	x				
<i>Hemiandra pungens</i>	x	x	x	x	x	x	x	x	x	x	x	x
<i>Hypocalymma angustifolium</i>						x	x	x	x	x		
<i>Kennedia prostrata</i>				x	x	x	x	x	x	x	x	
<i>Leptospermum erubescens</i>							x	x	x	x	x	

Area I – Occasional Drainage Line

This is currently mown grass but sedges and rushes are proposed for the outfall area in the vicinity of the stepping stones, which are to be installed near the river's edge.

List 7 Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rushes etc. (@8 per m2)												
<i>Ficinia nodosa</i>	x									x	x	x
<i>Juncus kraussii subsp australiensis</i>	x									x	x	x
<i>Juncus pallidus</i>										x	x	x
<i>Lepidosperma longitudinale</i>					x	x		x	x	x		

Area J – Existing Drainage Line

The edges of the drainage line will have the grass sprayed out (Total width 6m including existing rushes along water course so 1 – 1.5m wide strips of grass to be sprayed) and a strip of medium

shrubs and an occasional advanced tree planted adjacent to the rushes to reinforce the drainage line and create spaces and interest in the park.

List 8 Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<i>Astartea scoparia</i>	x	x										
<i>Callistemon glaucus</i>									x	x	x	x
<i>Melaleuca incana</i>					x	x	x	x	x	x	x	
<i>M. preissiana</i>	x	x									x	x
<i>M. viminea</i>							x	x	x	x	x	
<i>Taxandria linearifolia</i>			x	x	x							

Area K Foreshore – Tall shrubs and rushes / sedges, combined with coir logs, (see details in section 3.4.2 for the range of river edge treatments, with construction details in Part D) will be used to stabilise the river's edge between the hardened access points. Fencing will protect these areas until they are established and tube stock used. The sword grass *Lepidosperma* sp. is already established along the foreshore at the mouth of stream from the wetland. Although sword grasses have the potential to cut hands if grabbed, these sedges have broader, flat leaves but they are not sharp edged and as there are no reports of problems to date, the sedge will be used along the emergent zone as it seems very successful. The taller *Juncus pallidus* will not be used as it will totally block views and specific views, such as those from nearby picnic tables, will be maintained by the use of lower plants to 1m combined with taller trunked trees such as *Melaleuca preissiana* that will frame views. Weeds (such as *Paspalum urvillei*) and open patches of existing introduced grasses such as *Cynodon dactylon* are to be sprayed out without impacting existing native vegetation. It is acknowledged that some creeping grasses will remain but if weed free areas/patches can be created short term this should allow new plantings to establish and ultimately smother out the weeds.

List 9 Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Shrubs												
<i>Astartea scoparia</i>	x	x										
<i>Hypocalymma angustifolium</i>						x	x	x	x	x		
<i>Kunzea recurva</i>								x	x	x	x	x
<i>Melaleuca incana</i>					x	x	x	x	x	x	x	
<i>M. preissiana</i>	x	x									x	x
<i>M. viminea</i>							x	x	x	x	x	
<i>Taxandria linearifolia</i>			x	x	x							
Rushes etc. (@8 per m2)												
<i>Ficinia nodosa</i> (set above the high water line)	x									x	x	x
<i>Juncus kraussii subsp australiensis</i> (set in 1m wide strip on and below the high water level)	x									x	x	x
<i>Juncus pallidus</i> (damp areas)										x	x	x
<i>Lepidosperma longitudinale</i> (set on and just below the high water line)					x	x		x	x			

Figure 16: The proposed planting list prepared for the larger project.

Appendix G. Sources of information

G.1. GIS databases

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

- 10 Metre Contours (DPIRD-073)
- Aboriginal Heritage Places (DPLH-001)
- Aboriginal Heritage Places (DPLH-001)
- Cadastre (LGATE-218)
- Cadastre Address (LGATE-002)
- Contours (DPIRD-073)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Flood Risk (DPIRD-007)
- Groundwater Salinity Statewide (DWER-026)
- Hydrography – Inland Waters – Waterlines
- Hydrological Zones of Western Australia (DPIRD-069)
- IBRA Vegetation Statistics
- Imagery
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Native Title (ILUA) (LGATE-067)
- Offsets Register – Offsets (DWER-078)
- Pre-European Vegetation Statistics
- Public Drinking Water Source Areas (DWER-033)
- Ramsar Sites (DBCA-010)
- Regional Parks (DBCA-026)
- Remnant Vegetation, All Areas
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Land Quality – Flood Risk (DPIRD-007)
- Soil Landscape Land Quality – Phosphorus Export Risk (DPIRD-010)
- Soil Landscape Land Quality – Subsurface Acidification Risk (DPIRD-011)
- Soil Landscape Land Quality – Water Erosion Risk (DPIRD-013)
- Soil Landscape Land Quality – Water Repellence Risk (DPIRD-014)
- Soil Landscape Land Quality – Waterlogging Risk (DPIRD-015)
- Soil Landscape Land Quality – Wind Erosion Risk (DPIRD-016)
- Soil Landscape Mapping – Best Available
- Soil Landscape Mapping – Systems
- Wheatbelt Wetlands Stage 1 (DBCA-021)

Restricted GIS Databases used:

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

G.2. References

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