Government of Western Australia
Department of Water and Environmental Regulation

Clearing Permit Decision Report

1 Application details and outcome

1.1. Permit application details

Permit number:	CPS 9886/1
Permit type:	Area permit
Applicant name:	Shire of Waroona
Application received:	20 September 2022
Application area:	Five (5) native trees
Purpose of clearing:	Constructing a community precinct
Method of clearing:	Mechanical Clearing
Property:	Lot 73 on Deposited Plan 223197 (Reserve 14841)
Location (LGA area/s):	Shire of Waroona
Localities (suburb/s):	Waroona

1.2. Description of clearing activities

Clearing of five trees are required to enable the construction of a community precinct. The Shire of Waroona informed the department that the proposed community precinct will include (Shire of Waroona, 2022b):

- Playgrounds with seating and shade for young families.
- Open grassed areas for community gatherings, events, movie nights and markets.
- An all-ages skate park and pump track.
- A big shed which will be used for a range of community activities.
- Accessible toilets, pathways, shelters, BBQs and seating.
- Retention of all the big trees where possible and replanting.

To accommodate the construction of the precinct, the vegetation proposed to be cleared comprises five *Corymbia calophylla* (marri) trees (see Figure 1, Section 1.5).

1.3. Decision on application

Decision:	Granted
Decision date:	23 December 2022
Decision area:	Five (5) native trees, 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 (DWER) advertised the application for 21 days and no submissions were received.

In making this decision, the Delegated Officer had regard for the site characteristics (see Appendix B), relevant datasets (see Appendix F.1), the photographs and a description of each tree, an arboriculture report (see Appendix E), the clearing principles set out in Schedule 5 of the EP Act (see Appendix C), relevant planning instruments and any other matters considered relevant to the assessment (see Section 3). The Delegated Officer also took into

consideration that the purpose of the clearing is to benefit the community and is consistent with Shire's planning instruments and the trees proposed for clearing expose a risk to the people around the park given the signs of severe canker in canopy and trunk of these trees.

The assessment identified that the proposed clearing will result in:

- the loss of native vegetation that is suitable foraging habitat for threatened black cockatoo species and is significant as a remnant of native vegetation in an area that has been extensively cleared.
- the potential introduction and spread of weeds and dieback into adjacent vegetation, which could impact on the quality of the adjacent vegetation and its habitat values.

After consideration of the available information, as well as the applicant's minimisation and mitigation measures (see Section 3.1), the Delegated Officer determined the proposed clearing can be 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 and minimise to reduce the impacts and extent of clearing.
- take hygiene steps to minimise the risk of the introduction and spread of weeds and dieback.
- undertake deliberate planting and ensure the long-term survival of at least ten locally-provenanced native species that provide black cockatoo foraging value within the Shire of Waroona's proposed landscaping plan.

1.5. Site map

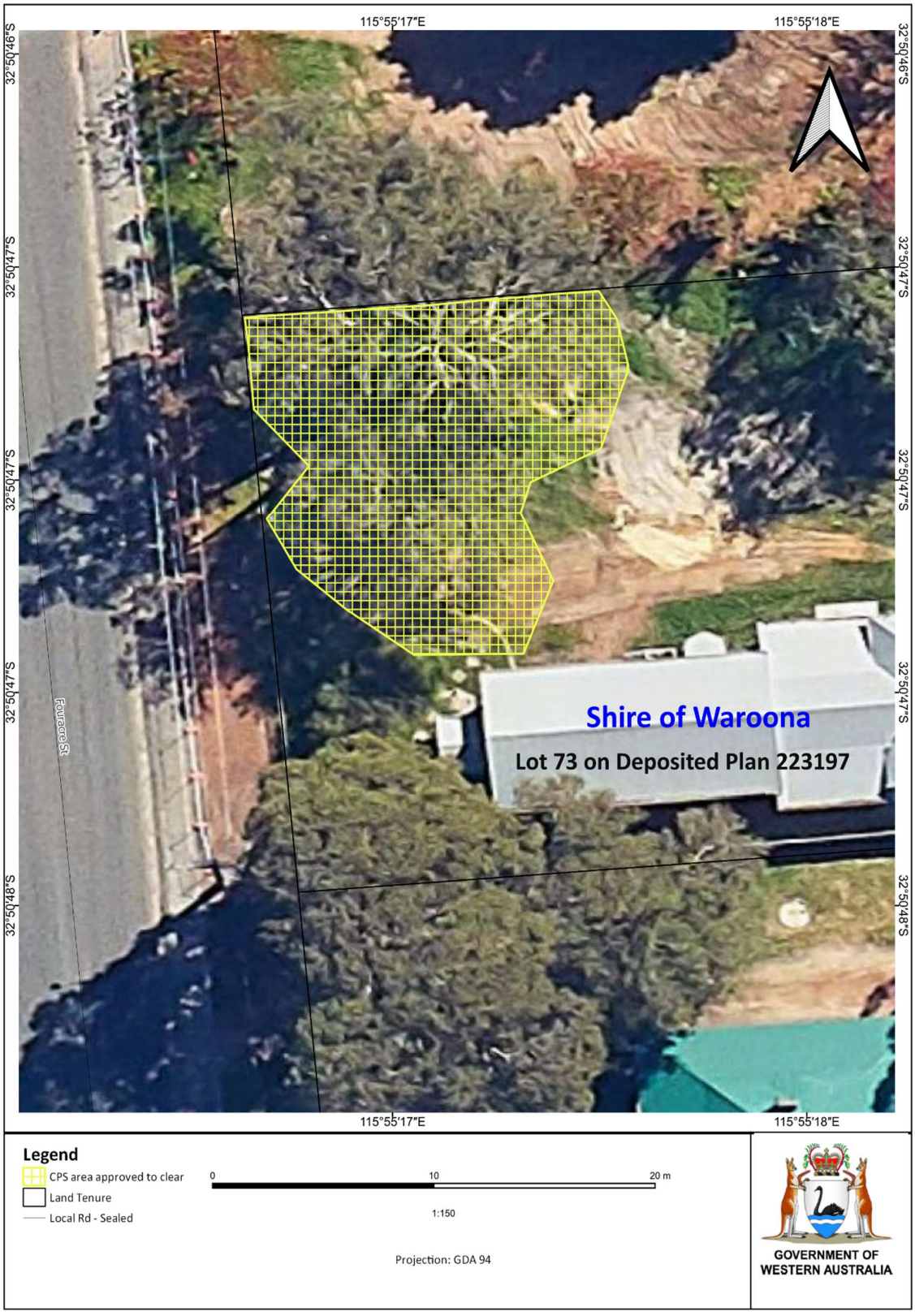

Figure 1 Map of the application area

The area cross-hatched yellow indicates the area authorised to be cleared under the granted clearing permit.

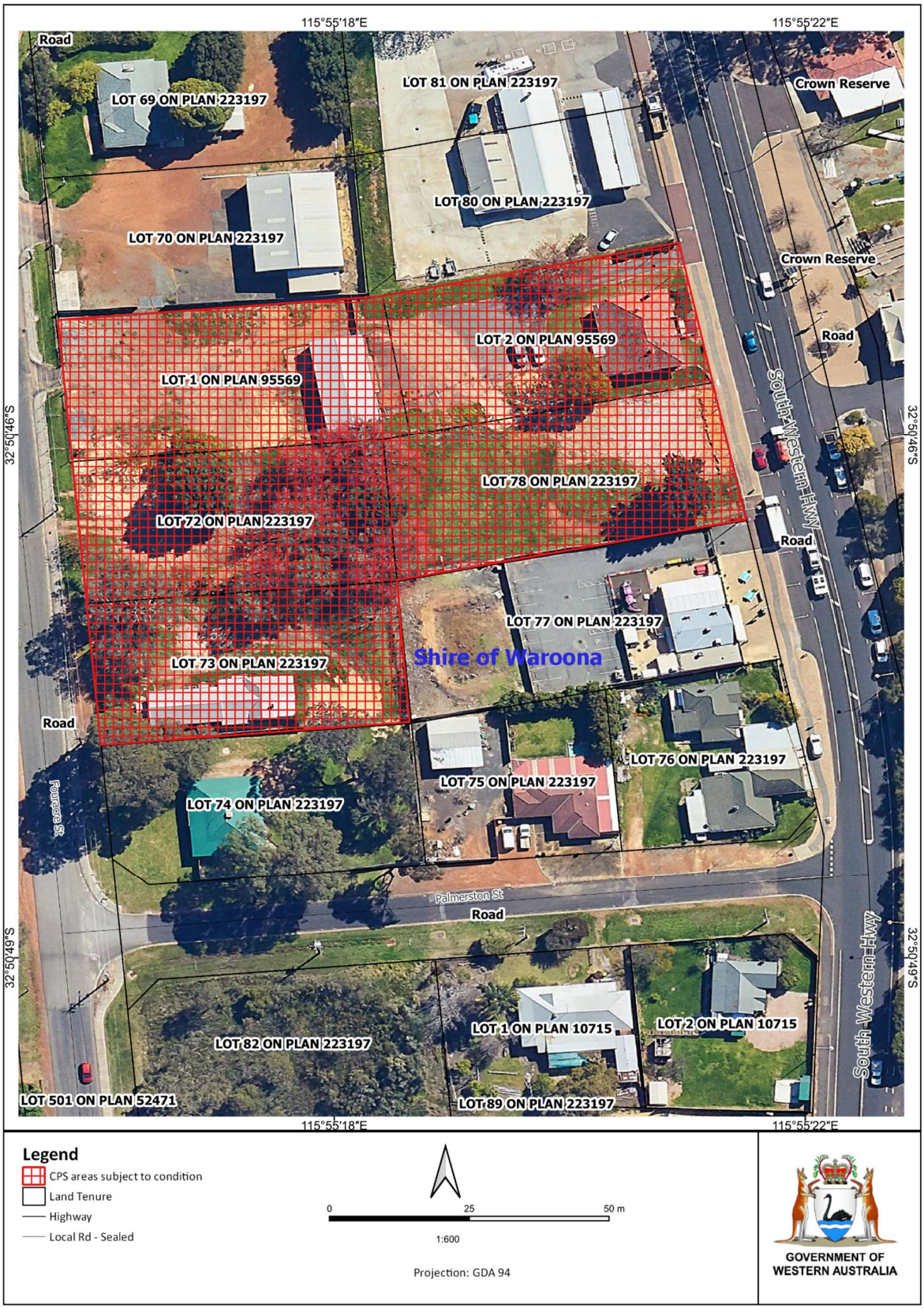

Figure 2 Map of the area subject to conditions

The area cross-hatched red indicates area within which specific conditions apply.

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)
- *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)

3 Detailed assessment of application

3.1. Avoidance and mitigation measures

The Shire of Waroona (the Shire) has advised the department that only the absolute minimum amount of vegetation required will be cleared as tree removal is an expensive exercise. A surveyor has been engaged to create survey files to pinpoint the location of the selected vegetation and the tree species have been identified (Shire of Waroona, 2022b). The Shire has submitted an arborist report to assist with the assessment of vegetation clearing permit (Shire of Waroona, 2022c).

Due regard was given to the findings of the arborist report. The five trees selected for clearing are in average health and pose a risk to the future development. The report states that signs of sever canker within the canopy and trunk were identified. Canker is an easily spread disease and according to the report, the only way to eliminate the spread is to remove the canker. It was further determined that to monitor and manage the risk of the trees, if they were to be kept, will incur an expensive cost on an annual basis. Tree 1 (see Appendix E) has also been pollarded and is determined to expose huge risks to anyone around the park (Shire of Waroona, 2022c).

Figure 3: Photographs of the trees proposed for clearing extracted from the arborist report.

The application area is located in the Swan Coastal Plain which is an area used by black cockatoos primarily for foraging resources and the marri trees are considered a primary food source for all three threatened black cockatoo species. A key focus for this region is the ongoing viability of foraging resources for black cockatoos, particularly the Carnaby's cockatoos (DAWE, 2022). Clearing of black cockatoo foraging species, within an extensively cleared landscape may represent a significant impact. Based on the above, a mitigation calculation was conducted using the WA environmental offset metric calculator. As a result, it was determined that to mitigate the above environmental impact, the Shire is required to revegetate at least ten native trees that the black cockatoos are known to feed on. The department recommended to the Shire that consideration be given to the revegetation of ten *Corymbia calophylla* trees to mitigate the impact of clearing.

The Shire has advised the department that the revegetation of *Corymbia calophylla* trees would not be achievable within the property due to the risk to the members of the public and the infrastructure within the community precinct with the development of the skate park and the BMX pump (Shire of Waroona, 2022d).

However, the Shire has provided an alternative proposal to the department. This proposal is based on a landscaping plan which the shire is currently in the process of finalising which is based on the Indigenous six seasons which will see native vegetation known within the surrounding area being planted. It is expected that the landscaping will follow the development and therefore, is unlikely to be completed for at least 24 months (Shire of Waroona, 2022d). Plants used by black cockatoos for foraging are included in the planting list. The planting list is included in Appendix E along with the proposed planting zone map.

The Delegated Officer was satisfied that the applicant has undertaken reasonable measures to avoid, minimise and mitigate potential impacts of the proposed clearing on environmental values.

3.2. Assessment of impacts on environmental values

In assessing the application, the Delegated Officer has had regard for the site characteristics (see Appendix B) and the extent to which the impacts of the proposed clearing present a risk to biological, conservation, or land and water resource values.

The assessment against the clearing principles (see Appendix B) identified that the impacts of the proposed clearing present a risk to biological values (fauna) and loss of remnant vegetation within an extensively cleared landscape. 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 (fauna) - Clearing Principles (b)

Assessment

The five trees proposed for clearing are *Corymbia calophylla* (marri) trees. According to the arboriculture report, the marri trees under assessment are in average health (Shire of Waroona, 2022c). According to the photographs provided by the Shire, the condition of the vegetation is completely degraded (Keighery, 1994).

The desktop assessment identified 16 conservation significant fauna species within the local area, which include seven birds, one invertebrate and eight mammals. The majority of the records identified from the local area are *Calyptorhynchus banksii naso* (Forest red-tailed black cockatoo). A likelihood of occurrence analysis was undertaken for the species previously recorded within the local area and it was determined that habitat for the following species is likely to occur;

- *Calyptorhynchus banksii naso* (Forest red-tailed black cockatoo) – VU
- *Zanda baudinii* (previously *Calyptorhynchus baudinii*) (Baudin's cockatoo) – EN
- *Zanda latirostris* (previously *Calyptorhynchus latirostris*) (Carnaby's cockatoo) – EN

The completely degraded (Keighery, 1994) condition of the native vegetation, and in particular the lack of an understorey, the isolation of the application area from areas of native vegetation in good or better condition (Keighery, 1997) and the location of the application area being an urban town centre excludes the likelihood of migratory and terrestrial ground dwelling fauna of conservation significance occurring within the application area.

Black cockatoos

The application area is mapped within the known distribution zones of the endangered Baudin's cockatoos, Carnaby's cockatoos and the vulnerable Forest red-tailed black cockatoos, together referred to as 'black cockatoos'. However, Baudin's cockatoo is more commonly associated with the forests of the Jarrah Forest Bioregion approximately 11 kilometres to the south, with Carnaby's cockatoo more commonly associated with the Swan Coastal Plain (DAWE,

2022). The Forest red-tailed black cockatoo has become more commonly sighted on the Swan Coastal Plain in recent decades.

Black cockatoo habitat can be considered in terms of breeding, roosting and foraging habitat. Suitable breeding habitat for black cockatoos include trees which either have a suitable nest hollow or are of a suitable Diameter Breast Height (DBH) to develop a nest hollow. For most tree species a suitable DBH is 500 millimetres (Commonwealth of Australia, 2012). The supporting document provided by the applicant did not represent trees with hollows or trees likely to develop large hollows required for black cockatoo breeding within the application area (Shire of Waroona, 2022b).

Night-roosts are usually located in the tallest trees of an area, and in close proximity to both a food supply and a water source (DAWE, 2022). Based on the photographs (see Appendix E), it is unlikely that the five marri trees proposed for clearing are of a suitable height to provide for a roosting habitat. The closest confirmed roost site is located 1.07 kilometres from the application area.

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, 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 (Johnstone et al, 2013). 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 species, Hakea species jarrah, and occasionally insects and insect larvae (DBCA, 2017). During the breeding season (October to late January/early February), Baudin's has a preference for marri seeds (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).

Food resources within the range of breeding sites and roost sites are important to sustain black cockatoo populations. Foraging resources are therefore, viewed in the context of known breeding and night roosting sites. It is considered that foraging habitat within 6 to 12 kilometres of an application area are a significant food source (DAWE, 2022). According to the available databases, two known black cockatoo roosting sites and two potential breeding sites are mapped within six kilometres of the application area. The closest potential breeding sites are located 0.76 kilometres and 2.11 kilometres from the application area respectively.

Based on the above, the department's assessment has identified that the five marri trees proposed for clearing are a potential food source for black cockatoo species given the distance to the confirmed roost sites and the potential breeding sites.

A key focus for the Swan Coastal Plain is the ongoing viability of foraging resources for black cockatoos, particularly Carnaby's cockatoo (DAWE, 2022). However, given the size of the proposed clearing in relation to its position in the landscape, it is unlikely that the five individual marri trees proposed for clearing represent a significant foraging resource to support black cockatoo populations. The department also notes the properties to the immediate west along the Fouracre Road are heavily vegetated. According to the Shire, approximately 30 per cent of this vegetation includes healthy marri trees which will provide a better foraging value to the black cockatoos (Appendix E). According to the mapped 'black cockatoo foraging in the Swan Coastal Plain' layer, the department recognises that the application area is not mapped as an area requiring investigation as black cockatoo feeding habitat, nor does it qualify as mapped remnant vegetation as illustrated in Figure 4 below.

However, given the close proximity to the known roosting sites and the potential breeding sites, it is appropriate that the applicant is conditioned to revegetate an area with black cockatoo foraging species to mitigate the potential impact to black cockatoo foraging habitat as a result of the clearing. The Shire is finalising a landscaping plan based on the indigenous six seasons. The Shire has committed to replace the native trees cleared by re-planting black cockatoo foraging species within the proposed landscaping area (Shire of Waroona, 2022d). It is the department's view that the proposed revegetation will counterbalance the loss of the marri trees.

Figure 4: An image illustrating the extent of DBCA mapped black cockatoo foraging (green polygons) within a 500 metre radius buffer (blue) of the application area (red).

Conclusion
Based on the above assessment and the proposed mitigation measures, the Delegated officer has considered that the potential impacts of the proposed clearing on threatened species of black cockatoos can be managed by the re-planting of black cockatoo foraging species at a ratio of 2:1 within the Shire's landscaping plan.

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

- Planting and ensure long-term survival of ten trees of black cockatoo foraging species within the Shire's proposed landscaping plan, using locally-provenanced material.

3.2.2. Significant remnant vegetation - Clearing Principles (e)

Assessment
The proposed application area is located within the Swan Coastal Plain Interim Biogeographic Regionalisation for Australia (IBRA) region of Western Australia. The Swan Coastal Plain bioregion has approximately 38.6 per cent of its original extent of native vegetation remaining (Government of Western Australia, 2019a).

The application area falls within the Pinjarra vegetation association 968, which is described as *Eucalyptus marginata* (Jarrah), *Corymbia calophylla* (Marri) and *Eucalyptus wandoo* (wandoo) (Shepherd et al, 2001) and within the vegetation complex 29; described as vegetation ranging from open forest of *Corymbia calophylla* (Marri) - *Eucalyptus wandoo* (Wandoo) - *Eucalyptus marginata* (Jarrah) to open forest of *Eucalyptus marginata* (Jarrah) - *Corymbia calophylla* (Marri) - *Allocasuarina fraseriana* (Sheoak) - Banksia species. Fringing woodland of *Eucalyptus rudis* (Flooded Gum) in the gullies that dissect this landform. The mapped 'Forrestfield complex' retains approximately 12.29 per cent of it its pre-European vegetation extent within the bioregion (Government of Western Australia, 2019b). The native vegetation remaining within the Pinjarra vegetation association is also below 30 per cent with 6.62 per cent remaining.

The national objectives and targets for biodiversity conservation in Australia has a target to prevent the clearance of ecological communities with an extent below 30 per cent of that present prior to the year 1750, below which species loss appears to accelerate exponentially at an ecosystem level (Commonwealth of Australia, 2001).

The department's assessment notes that the vegetation in the application area consists of marri trees in a completely degraded condition (Keighery, 1994). Based on the condition of the vegetation, it is unlikely to be representative of the vegetation complex and the mapped vegetation association and is not considered significant as a remnant of native vegetation.

Within the local area (10-kilometre radius around the application area), approximately 29.98 per cent of its original native vegetation extent remains, this is marginally below the 30 per cent retention threshold of the Commonwealth of Australia (2001). Based on this, the application area is considered to be within an extensively cleared landscape.

Clearing of five native trees within an extensively cleared landscape with consideration of cumulative impact from other approved clearing within the local area is considered a significant impact on the extent of remnant vegetation remaining.

Based on the WA environmental offset metric calculator, the Shire is required to revegetate nine trees to mitigate the impact of clearing within an extensively cleared landscape. As discussed under section 3.1, the Shire's landscaping plan includes a variety of native vegetation known to the local area which would counterbalance the resulting impact from the proposed clearing. The planting list and the proposed landscaping map are included in Appendix E.

Conclusion

For the reasons set out above, and the mitigation measures provided by the Shire, it is considered that potential impacts of the proposed clearing on remnant vegetation can be managed by re-planting native vegetation within the Shire's proposed landscaping area.

Condition

To address potential impacts to remnant vegetation from proposed road upgrades, the following management measures will be required as a condition on the clearing permit.

- Replant and ensure the long-term survival of 10 native plants within the Shire's proposed landscaping plan, using locally-provenanced material.

3.3. Relevant planning instruments and other matters

The proposed clearing area is zoned as 'Urban 1 – town centre zone' under the Shire's Local Planning Scheme No.7 (DPLH-071). The Council's objective for this zone is to ensure that the zone develops as the commercial and community activity centre for the Town and the District, and that the functional and visual qualities of the zone are commensurate with that status. Based on the description, the purpose of clearing is consistent with the Local Planning Scheme No.7. The application area is also located within the Crown Reserve 14841 which is currently vested in Shire of Waroona. The current purpose of this reserve is for a "hall site" which is consistent with the purpose of the clearing.

The application area is located within the Murray groundwater area and the Waroona Irrigation District surface water area proclaimed under the *Rights in Water and Irrigation Act 1914* (RiWI Act). The department requested internal expert advice from the Kwinana Peel region in regard to impacts to groundwater and surface water. The advice received was "*The construction of a well and take of groundwater for non-domestic purposes, such as dust suppression for earthworks and construction would require a licence from the Department of Water and Environmental Regulation*" (DWER, 2022)

The Shire advised the department that the Shire will not be constructing a well to need a water licence and have no intention to use groundwater for construction purposes. The Shire has several standpipes which will be used if required during the construction period. The Shire will be investigating connecting the site to Harvey Water pipeline which runs from the Shire's pumping station on McClure Road to the recreation oval and therefore, no groundwater bore or well will be required onsite (Shire of Waroona, 2022d).

No Aboriginal sites of significance have been mapped within the application area. 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
Supporting information – Correlating tree ID's and canopy width (Shire of Waroona, 2022b).	• Identification of trees to be cleared (and retained) within the property. • Project background, project brief, timing, design elements, tree data (ID, species, DBH, Canopy), aerial photography, photographs of individual trees with comments.
Arboriculture Report (Shire of Waroona, 2022c)	An arboriculture report was conducted to determine the health of the trees with the impact of the development. The report outlines health issues and recommended measure for the site (Shire of Waroona, 2022c).
Mitigation strategies proposed by the Shire (Shire of Waroona, 2022d)	Shire of Waroona submitted a letter response to the requested further information letter sent by the department. The response included the Shire's proposed mitigation measures (Shire of Waroona, 2022d).

Appendix B. Site characteristics

B.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 C.

Characteristic	Details
Local context	The application area is located within the Swan Coastal Plain IBRA Bioregion of Thackway and Cresswell (1995) and the Perth sub-region. The area proposed to be cleared include five native trees in the Shire of Waroona, located more than 100 kilometres south of Perth in the extensive land use zone of Western Australia. It is surrounded by urban development and is adjacent to the Fouracre Street. Aerial imagery and spatial data indicates the local area (10-kilometre radius from the centre of the area proposed to be cleared) retains approximately 29.98 per cent of the original native vegetation cover.
Ecological linkage	No formal ecological linkage is mapped within the application area and the proposed clearing area is unlikely to form part of a fauna corridor.
Conservation areas	No conservation areas are mapped within the application area. The closest conservation area is 'an agreed for conservation' area located approximately 1.5 kilometres to the east of the application area. The Dwellingup State Forest is located approximately four kilometres east of the application area.
Vegetation description	Photographs supplied by the applicant indicate the vegetation within the proposed clearing area comprises *Corymbia calophylla* trees (Shire of Waroona, 2022b). Representative photos and a description of each tree is available in Appendix E. The broad scale vegetation mapping include: • Beard vegetation association (968), which is described as *Eucalyptus marginata* (Jarrah), *Corymbia calophylla* (Marri) and *Eucalyptus wandoo* (wandoo) (Shepherd et al, 2001).

Characteristic	Details
	• Forrestfield complex (29), which is described as vegetation ranging from open forest of *Corymbia calophylla* (Marri) - *Eucalyptus wandoo* (Wandoo) - *Eucalyptus marginata* (Jarrah) to open forest of *Eucalyptus marginata* (Jarrah) - *Corymbia calophylla* (Marri) - *Allocasuarina fraseriana* (Sheoak) - Banksia species. Fringing woodland of *Eucalyptus rudis* (Flooded Gum) in the gullies that dissect this landform (Webb et al, 2016). The mapped vegetation types retain less than 30 per cent of the original extent (Government of Western Australia, 2019b).
Vegetation condition	Photographs supplied by the applicant (Shire of Waroona, 2022b) indicate the vegetation within the proposed clearing area is in a completely degraded (Keighery, 1994) condition. The full Keighery (1994) condition rating scale is provided in Appendix D. Representative photos and a description of each tree are available in Appendix E.
Climate and landform	The southwest of Western Australia experiences a mediterranean climate of hot dry summers and cool wet winters, and the proposed clearing area is situated within the 'Temperate – distinctly dry and warm summer' Köppen climate class. An average of 680.6 millimetres of rainfall is recorded annually from the Pinjarra South weather station. The application area is within the Forrestfield System described as undulating foot slopes of the Darling and Whicher Scarps. Duplex sandy gravels, pale deep sands and grey deep sandy duplexes (DPIRD, 2019).
Soil description	The soil is mapped as Forrestfield F2b Phase described as low slopes and foot slopes up to 5-10% with well drained moderately deep to deep, gravelly acidic yellow duplex soils and rare laterite (DPIRD, 2019).
Land degradation risk	The land degradation table B.4 outline the land degradation risk levels for the Forrestfield F2b Phase (DPIRD, 2019).
Waterbodies	The application area is located within the Coastal Plain hydrological zone of Western Australia (DPIRD-059). The desktop assessment and aerial imagery indicated that no watercourses or wetlands transect the area proposed to be cleared.
Hydrogeography	The application area is located within the Coastal Plain hydrological zone of Western Australia (DPIRD-059). The application area falls within the Murray groundwater area and the Waroona Irrigation District surface water area proclaimed under the RiWI Act (DWER-034). The application area is not within an area subject to the *Country Areas Water Supply Act 1947* clearing control catchments or within any public drinking water source areas (DWER-033). The groundwater salinity level (Total Dissolved Solids) is mapped as 500-1,000 milligrams per litre (fresh) (DWER-026).
Flora	The desktop assessment identified 29 conservation significant flora species within the local area, which comprise of 23 priority flora and six threatened flora species. None of the mapped flora records are within 100 metres of the application area.
Ecological communities	The application area is not mapped within a Threatened Ecological Community (TEC) or Priority Ecological Community (PEC). The species identified over the application area do not represent a conservation significant ecological community.

Characteristic	Details
Fauna	The desktop assessment has identified 16 conservation significant fauna species within the local area which include seven birds, one invertebrate and eight mammals. The closest record of the conservation significant fauna species was the *Zanda latirostris* (previously *Calyptorhynchus latirostris*) (Carnaby's cockatoo) recorded 0.06 kilometres from the application area. The local area includes two black cockatoo roost sites, approximately 1.07 kilometres and 2.16 kilometres respectively from the application area. There are two artificial hollows mapped as potential breeding sites within the local area. These are located approximately 0.76 kilometres and 2.11 kilometres from the application area respectively.

B.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*					
Swan Coastal Plain	1,501,221.93	579,813.47	38.62	222,916.97	14.85
Vegetation complex					
Pinjarra_968*	136,188.20	9,017.632	6.62	1,948.40	1.43
Forrestfield complex 29 **	22,812.92	2,803.36	12.29	381.57	1.67
Local area					
10km radius	31,473.58	9,436.31	29.98	-	-

*Government of Western Australia (2019a)

**Government of Western Australia (2019b)

B.3. Fauna analysis table

Conservation significant fauna species identified from the local area that required further consideration.

Species scientific name	Species common name	Conservation status	Year of the most recent record	Distance of closest record to application area (km)	Number of known records (total)	Suitable habitat features? [Y/N]
Calyptorhynchus banksii naso	Forest red-tailed black cockatoo	VU	2018	0.57	57	Y
Zanda baudinii	Baudin's cockatoo	EN	2018	1.98	20	Y
Zanda latirostris	Carnaby's cockatoo	EN	2013	0.06	16	Y
Calyptorhynchus sp. 'white-tailed black cockatoo'	White-tailed black cockatoo	EN	2018	1.06	8	Y

EN: endangered, VU: vulnerable,

B.4. Land degradation risk table

Risk categories	*213Fo_F2b*
Wind erosion	H2: 90% of map unit has a high to extreme hazard
Water erosion	L1: 0% 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: 0% of the map unit has a moderate to high
Water logging	L1: 0% of map unit has a moderate to very high risk
Phosphorus export risk	L1: 2% of map unit has a high to extreme hazard

L = Low , H = High

Appendix C. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
Environmental value: biological values		
Principle (a): *"Native vegetation should not be cleared if it comprises a high level of biodiversity."* Assessment: The area proposed to be cleared contains marri trees which are suitable foraging habitat for the three threatened black cockatoo species. Based on the completely degraded condition (Keighery, 1994) of the vegetation with no native species present in the understorey, the native vegetation proposed to be cleared does not represent any conservation significant ecological communities, does not support threatened and priority taxa, and does not comprise a high level of biodiversity.	Not likely to be at variance	No
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."* Assessment: The application area is mapped within the modelled distribution of the three threatened black cockatoo species. The marri trees are likely to provide foraging habitat for the black cockatoo species, however, unlikely to provide breeding and roosting habitat due to the size of the trees and the absence of visible signs of nesting and hollows. To mitigate the impact to foraging habitat, the Shire is proposing to plant black cockatoo foraging trees as part of a landscaping project.	At variance	Yes *Refer to Section 3.2.1, above.*
Principle (c): *"Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora."* Assessment: Native vegetation is in a completely degraded condition with exotic pasture grasses in the understorey (Keighery, 1994). No native flora species are represented in the understorey and the native vegetation within the application area is unlikely to include, or be necessary for, the continues existence of flora species listed as threatened under the BC Act.	Not likely to be at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
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."* Assessment: The area proposed to be cleared does not contains species that can indicate a threatened ecological community.	Not at variance	No
Environmental value: significant remnant vegetation and conservation areas		
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."* Assessment: The extent of the mapped vegetation types and the native vegetation in the local area is inconsistent 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.	At variance	Yes
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."* Assessment: Given the distance to the nearest conservation area, the proposed clearing is not likely to have an impact on the environmental values of conservation areas.	Not at variance	No .
Environmental value: land and water resources		
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."* Assessment: Given no watercourses or wetlands are recorded within the application area, the proposed clearing is unlikely to impact on- or off-site hydrology and water quality. The proposed clearing does not include clearing of riparian vegetation.	Not at variance	No
Principle (g): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation."* Assessment: The mapped soils are highly susceptible to wind erosion and subsurface acidification. Noting the extent and the location of the application area and the completely degraded condition (Keighery, 1994) of the vegetation, the proposed clearing is not likely to have an appreciable impact on land degradation.	Not likely to be at variance	No
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."* Assessment: No watercourses, wetlands or public drinking water sources areas are recorded within the application area. Soils will not be excavated at depth and no wells or groundwater bores are proposed. The proposed clearing is unlikely to impact surface or groundwater quality.	Not likely to be at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
Principle (j): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding."* Assessment: 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. Given no watercourses or wetlands are recorded within the application area, the proposed clearing is unlikely to contribute to waterlogging.	Not at variance	No

Appendix D. 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 E. photographs of the vegetation and the proposed landscaping project extracts.

Figure 5: Photograph of Tree 1

Tree 2.

Figure 6: Photograph of Tree 2

Tree 3.

Figure 7: Photograph of Tree 3

Tree 4.

Figure 8: Photograph of tree 4

Tree 5.

Figure 9: Photograph of Tree 5

Figure 10: Photographs of the trees impacted by diseases.

Tree ID	Description	Trunk (m)	Canopy (m)	Pruning/ Removal	Observations
1	*Corymbia Calophylla*	1.6m	8m	Removal	Tree in average health has been pollarded which exposes huge risk to anyone around the park. Signs of severe canker in canopy and trunk. *Extract Arboriculture Report* No visible signs of nesting or hollows.
2	*Corymbia Calophylla*	2.5	8m	Removal	Tree in average health has been pollarded which exposes huge risk to anyone around the park. Signs of severe canker in canopy and trunk. *Extract Arboriculture Report.* No visible signs of nesting
3	*Corymbia Calophylla*	.70	3	Removal	Tree in average health has been pollarded which exposes huge risk to anyone around the park. Signs of severe canker in canopy and trunk. *Extract Arboriculture Report* *No visible signs of nesting or hollows*
4	*Corymbia Calophylla*	13	3	Removal	Tree in extreme poor health, has been pollarded which exposes huge risk to anyone around the park. Signs of severe canker in canopy and trunk. *Extract Arboriculture Report* No visible signs of nesting.
5	*Corymbia Calophylla*	9	1.65	Removal	Tree in average health has been pollarded which exposes huge risk to anyone around the park. Signs of severe canker in canopy and trunk. *Extract Arboriculture Report* No visible signs of nesting.

Figure 11: A detailed description of each marri tree proposed for clearing.

Trees 1, 2, 3, 4, 5
Scientific name: Corymbia callophylla
Common name: Marri
Age class: semi mature
Health & Condition: Average
Risk rating post development: High

These marri's are in average health and poses a risk the future development with signs of severe canker within the canopy and trunk(this is outlined in the photos). Canker is an easily spread disease and the only way to stop the spread is to remove the canker. Tree 1 has also been pollarded which exposes huge risk to anyone around the park.

With close excavations to the tree about to be undertaken the root plate will be highly compromised and unbalancing the health and life expectancy.

Risk management – to monitor and manage the risk of this tree if it where to be kept will incur an expensive cost on an annual basis and with so many unknown variables once excavations are compete the trees will most likely have more value if it where to be removed and replaces with a healthy juvenile in its place away from the park

Figure 12: Extract from the Arborist report.

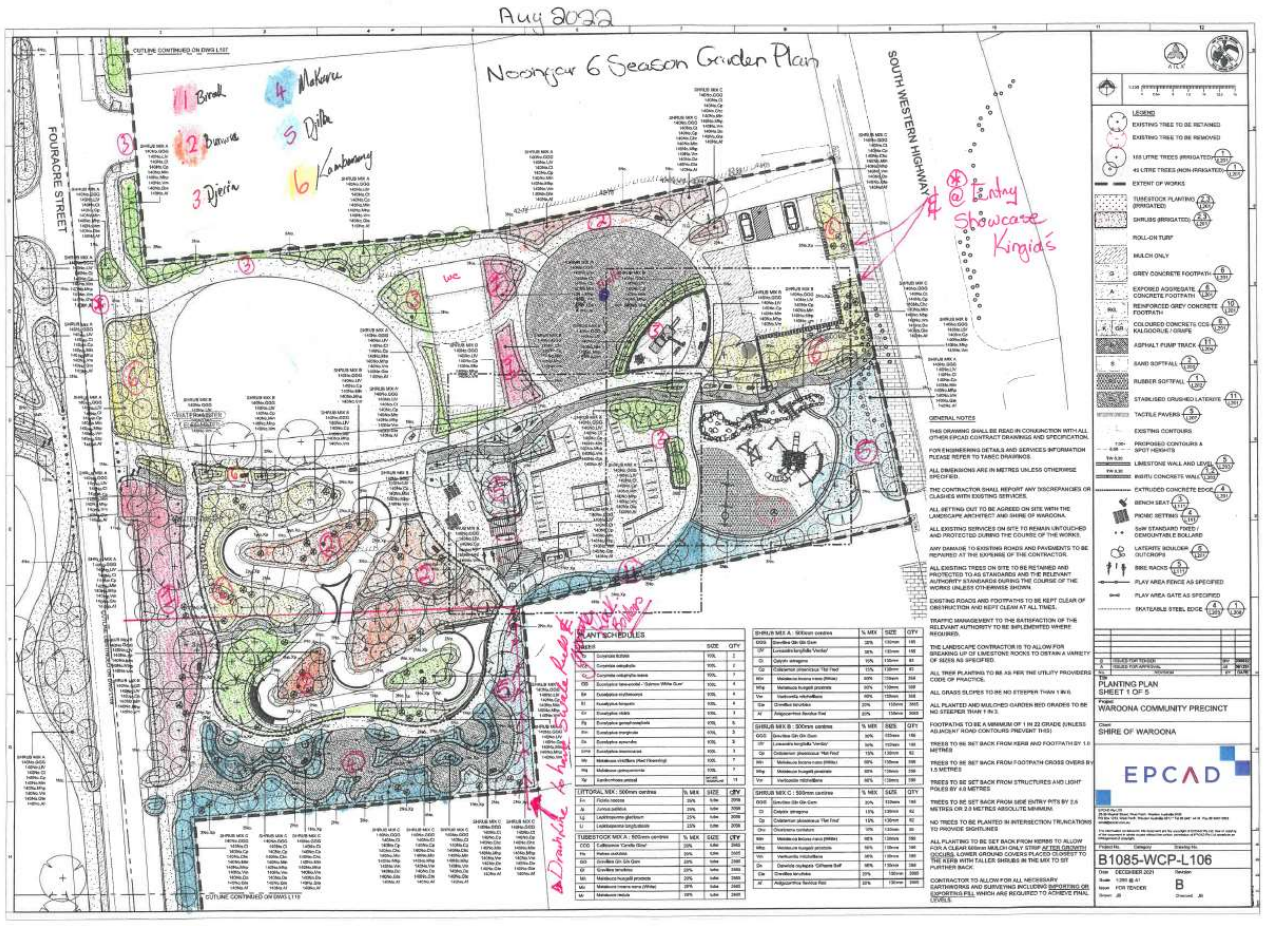

Figure 13: The proposed landscaping plan.

Appendix A – Waroona Community Precinct 6 Seasons Plant Guide

WAROONA COMMUNTIY PRECINCT PARK PROJECT

1. Pre-order the plants – at least 8 months ahead;
2. Ensure there is a competent maintenance schedule that includes pruning, replanting schedules and 'special needs' plants
3. Consider opening up a volunteer work force ("Friends of the Waroona Town Garden")– maybe a fast-track is via the Waroona Garden Club, or a retainer to someone like Dion Pisconeri or his uncle who are noteworthy gardeners

• **Kingia entry statement**(s) or central pivot garden (transplanted grove of Kingia) that acknowledges the Shire having a significant remnant of this critically endangered community. – the vegetation has long ago been cleared. Underplant with some noteworthy plants from the TEC including (Mesomelaena tetragona, Hypocalymma ellipticum Loxocarya fasciculata Neurachne alopecuroidea Patersonia occidentalis Pericalymma ellipticum Synaphea petiolaris Thysanotus manglesianus)

Noongar Seasons Gardens To have species that flower for each of the six seasons like a living calendar of seasons. NOTE: where spp is indicated this will be resolved with advice from Ben Croxford of Nuts About Natives as to availability of particular species within those genera.

*indicates species not endemic to the greater Shire of Waroona region but which provide colour and texture highlights or black cockie forge

Feature Salvage Plants
In addition to the Season's plantings there are large plant transplants to be considered which will feature in the garden areas. These plants will need to be dug and transferred to large containers for at least 12 months to ensure survival.

Kingia (Entry Statements – front and back): will require sourcing where plants are to be cleared or lost due to development eg falling into drains. Early contract extraction, holding and transplant to site will need to be negotiated with relevant professional transplanters eg Grasstrees Australia
Grasstrees (for insertion into garden areas where larger spaces exist). Ditto as above
Macrozamia (for insertion into garden areas where larger spaces exist). Ditto as above

Birak (December to January)
Verticordia spp
Beaufortia spp
Banksia attenuata dwarf
Caltrix spp
Santalum acuminatum (Quandong)
Nuytsia floribunda
Anigozanthos flavidus 'pink'
Anigozanthos flavidus 'yellow'
Banksia grandis 'dwarf'
Beaufortia elegans
Beaufortia aestiva
Verticordia densiflora

Bunuru (February to March)
Beaufortia aestiva
Banksia prionotes dwarf
Banksia burdettii*
Banksia sceptrum dwarf*
Hemiandra pungens (mixed colours)
Xylomelum occidentalis
Xylomelum angustifolium*
Eucalyptus synandra*

Djerin (April to May)
Banksia menziesii dwarf
Banksia prionotes dwarf
Eucalyptus erythrocorys*
Calytrix fraseri
Thryptomene baeckeaea*
Beaufortia aestiva
Beaufortia squarrosa

Makuru (June – July)
Hovea spp
Hardenbergia
Banksia menziesii dwarf
'Dryandra spp'
Boronia crenulata
Philotheca spicata
Hypocalymma angustifolium
Chorizema cordatum/illicifolia
Hakea laurina*
Templetonia retusa
Kunzea baxteri dwarf
Acacia denticulosa*
Hakea bucculenta*
Grevillea flexuosa
Chorizema varium
Guichenotia macrantha
Eucalyptus preissiana*

Djilba (August to September)
Acacia lasiocarpa
Hibbertia hypericoides
Gompholobium scabrum
Anigozanthos manglesii
Clematis aristata (climber)
Banksia nivea (or other low growing spp)
Shrub 'Dryandra' spp
Lechenaultia biloba
Conospermum stoechadis
Banksia polycephala*
Eremophila nivea*

Kambarang (October to November)
Pimelea rosea or ferruginea
Mirbelia dilatata
Hypocalymma robustum
Verticordia densiflora
Verticordia spp
Ricinocarpus spp
Melaleuca huegelii dwarf
Melaleuca scabra*
Eucalyptus macrocarpa*
Eucalyptus rhodantha*
Melalueca incana dwarf*
Verticordia monodelpha*
Verticordia mitchelliana*

Screen shrubs/small trees
Chamelaucium cultivars
Banksia ashbyi
Banksia prionotes
Agonis flexuosa
Corymbia ficifolia
Corymbia summer red !!!! Excellent small tree
Eucalyptus todtiana
Eucalyptus lane-poolei
PLUS
Eucalyptus foecunda
Eucalyptus drummondii
Eucalyptus torquata
Eucalyptus synandra

To Be Considered for this and further garden stages:

•. **Native Bee Garden**: our natives are stingless, solitary and Waroona is one of the richest places for their diversity. Plantings of Mirbelia, Gompholobium, Chorizema, Gompholobium scabrum, and, of course Hovea (such a wonderful genus of winter flowering plants). Such a garden will be a smash hit as native bees are a global rage and provide important supplementary pollination for our crops such as avocado, strawberry, blueberries etc

• **Bush food and Plant Story Telling Garden**: native plants that have stories from the region. Native yams (Dioscorea); Macrozamia (everything from native kapok for pillows to Indig food) – salvage plants from paddocks (I know a few); Emu plum; local native medicinal plants , mix of bush foods that are readily available from Bush Tucker (only chose WA species); 1080 plants

• **Carnabys Café**: along some of the verge tree areas consider putting in the high value nut trees – almonds (winter colour), pecan (wonderful shade in summer, deciduous in winter) and native Macadamia (I can donate from our large plant stock at Kims)

•. **Banksia gardens** (the species here will produce flowers all year long): everyone knows and loves a Banksia: dwarf prionotes (stunning), menziesii, attenuata, plus ashbyi, audax, cuneata (this is super stunning, critically rare so a great story with this species), hookeriana. Plus the cockies will help themselves too.

Figure 14: The proposed landscaping planting list.

Image 1: Lot 501 Fouracre Street, Waroona

Image 2: Vegetation within Lot 501 Fouracre Street, Waroona

Image 3: Vegetation within Lot 501 Fouracre Street, Waroona

Image 4: Vegetation with Lot 501 Fouracre Street, Waroona

Appendix F. Sources of information

F.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)

F.2. References

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