



Clearing Permit Decision Report

1 Application details and outcome

1.1. Permit application details

Permit number:	CPS 9827/1
Permit type:	Area permit
Applicant name:	City of Denmark
Application received:	28 July 2022
Application area:	26 native trees and the associated 0.04 hectares of native understorey (revised)
Purpose of clearing:	Road widening
Method of clearing:	Mechanical Removal
Property:	Lights Road reserve (PIN 11746689 and PIN 1285689)
Location (LGA area/s):	Shire of Denmark
Localities (suburb/s):	Ocean Beach

1.2. Description of clearing activities

The applicant originally applied to clear 0.42 hectares of native vegetation and one native tree within Lights Road reserve (PIN 11746689 and PIN 1285689), Ocean Beach, for the purpose of road widening and sealing to improve traffic safety.

During the assessment, the application area was reduced to 26 native trees and the associated 0.33hectares of native understorey.

1.3. Decision on application

Decision:	Granted
Decision date:	23 December 2022
Decision area:	26 native trees and the associated 0.04 hectares of native understorey

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 14 days and one submission was received (Appendix B).

In making this decision, the Delegated Officer had regard for the site characteristics (Appendix C), relevant datasets (Appendix G.1.), the images from a fauna habitat survey (Appendix E), the clearing principles set out in Schedule 5 of the EP Act (Appendix D), relevant planning instruments and any other matters considered relevant to the assessment (Section 3).

In addition, the Delegated Officer has considered that Lights Road has been identified as a road of significance with a higher volume of traffic, particularly during peak tourism periods. Currently it is only a one-way windy road with blind corners and limited opportunities to pullover; with significant sized trees located close to the road edge. It is also used by heavy vehicles and is on a school bus route. The purpose of the clearing is to improve community safety and reduce the likelihood and/or severity of crashes by improving road width to accommodate traffic volumes, increase sightlines/driver visibility, remove risks from falling branches and trees being in close proximity to the road.

The assessment has identified that the proposed clearing will result in:

- The loss of suitable habitat for conservation significant fauna including:
 - *Zanda latirostris* (Carnaby's black cockatoo), *Zanda baudinii* (Baudin's black cockatoo) and *Calyptorhynchus banksii naso* (forest red-tailed black cockatoo) (collectively known as black cockatoos)
- Clearing may introduce and / or spread weeds and dieback to the adjacent vegetation.
- Wind erosion if bare ground is left exposed for an extended period of time between clearing and subsequent road works.

The Delegated Officer considered the *Corymbia calophylla* (marri), *Eucalyptus marginata* (jarrah), *Callistachys lanceolata* (wonnich), *Eucalyptus diversicolor* (karri) and *Allocasuarina decussata* (sheoak) trees proposed to be cleared, are part of a continuous track of vegetation within the road reserve. Given the limited extent of clearing and the condition of the large tracks of intact vegetation surrounding the application area, the Delegated Officer considered the proposed clearing is not likely to impact significant habitat for black cockatoos. To minimise impacts to fauna, progressive one directional clearing is required to allow individuals present at the time of clearing to move to adjacent vegetation as well as the planting of black cockatoo foraging and breeding habitat will be undertaken. The likelihood of impact from weeds and dieback can be minimised and mitigated by applying proper weed and dieback management measures. Given the minimal extent of clearing within the extensive cover of native vegetation in the local context, the clearing is not likely to cause significant land degradation.

After consideration of the available information, as well as the applicant's avoidance and mitigation measures (Section 3.1), the Delegated Officer determined the proposed clearing is unlikely to lead to appreciable land degradation or have long-term adverse impacts on conservation significant fauna or flora species 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 and dieback.
- Forty native tree seedlings, with a combination of *Corymbia calophylla* (marri), *Eucalyptus marginata* (jarrah), *Allocasuarina decussata* (sheoak) and *Eucalyptus diversicolor* (karri), will be planted within the road reserve, as mitigation measures for the clearing of the 26 trees that provide foraging value.
- staged clearing and commencement of the road works within three months of clearing to minimise and mitigate the risk of land degradation in the form of wind erosion nutrient export and sub-surface acidification.



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1.5. Site map



Figure 1: Map of the final application area CPS 9827/1, showing most northern areas. The areas crosshatched yellow indicates the areas authorised to be cleared under the granted clearing permit.

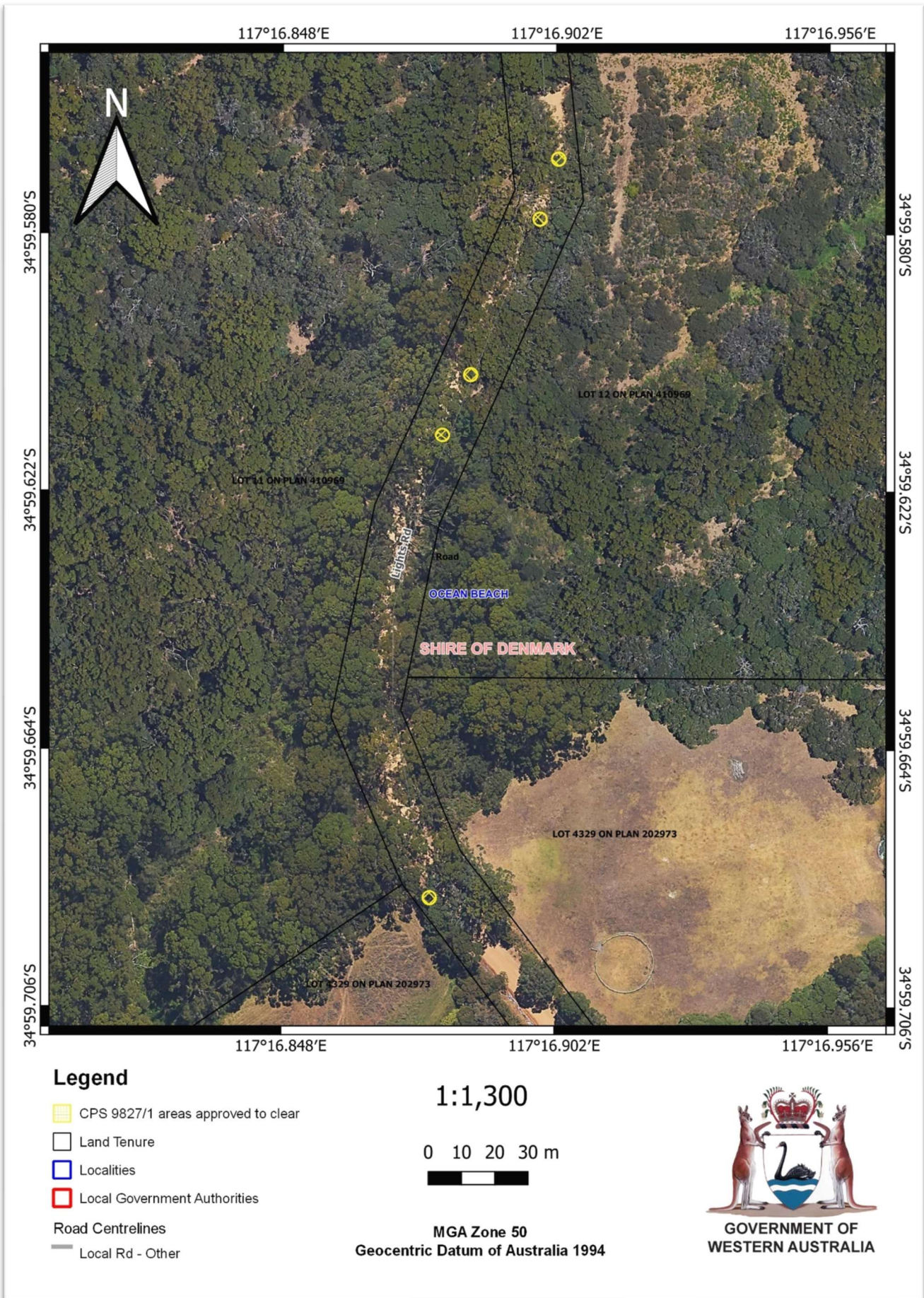


Figure 2: Map of the final application area CPS 9827/1, showing central areas. The areas crosshatched yellow indicates the areas authorised to be cleared under the granted clearing permit.



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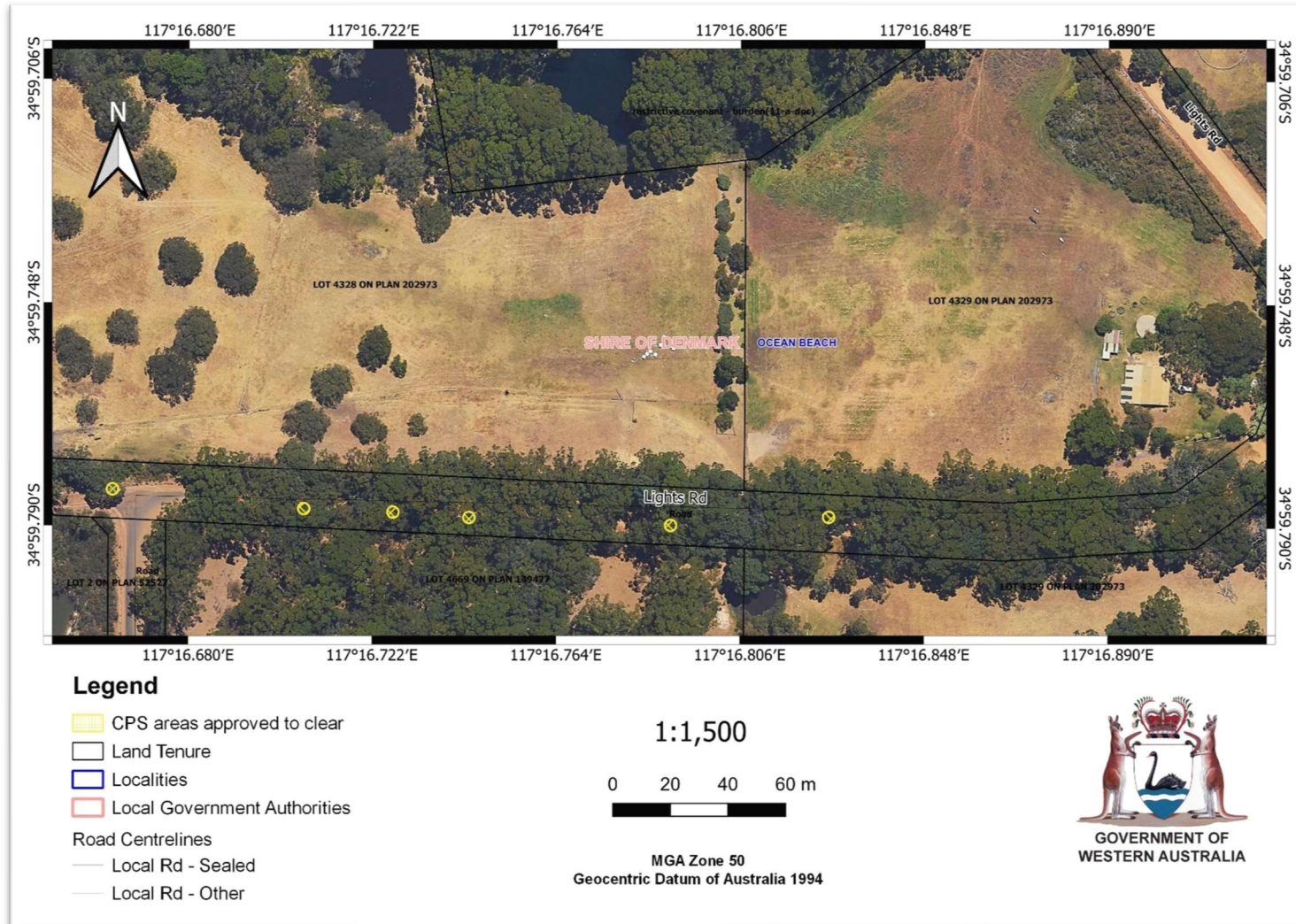


Figure 3: Map of the final application area CPS 9827/1, showing most southern areas. The areas crosshatched yellow indicates the areas authorised to be cleared under the granted clearing permit.



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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)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)
- *Planning and Development Act 2005* (WA) (P&D 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 Denmark (the Shire) has adopted avoidance and mitigation measures to minimise disturbance to native vegetation. These avoidance and mitigation measures include:

Avoidance

- Only trees and understorey required to be cleared for road construction will be removed. A significant number of trees directly adjacent to the roadside are being retained.
- Road widening has been reduced to four to five metres width in the southern section with strategic passing bays, from original six metre width, to enable retention of more trees.
- Road infill increased to up to 500 millimetres depth in areas to bring road surface to original level commensurate with existing roadside vegetation level; to minimise the need for deep drains with adjacent shoulders and batters which would have involved clearing of an additional two to three metres width from existing road edge on both sides of road.
- Amendments in road construction plans has resulted in a reduction in trees being cleared from 31 to 26 trees in total (Figure 4).
- Machinery utilised (skid steer and/or front-end loader) size will be commensurate with the works to be undertaken to ensure all clearing is undertaken in a sensitive manner.
- Appropriate dieback hygiene measures will be undertaken including machinery to be clean on entry and on exit from the site.
- The dominant understorey associated with the trees being cleared is *Pteridium esculentum*, which is not a conservation listed species.

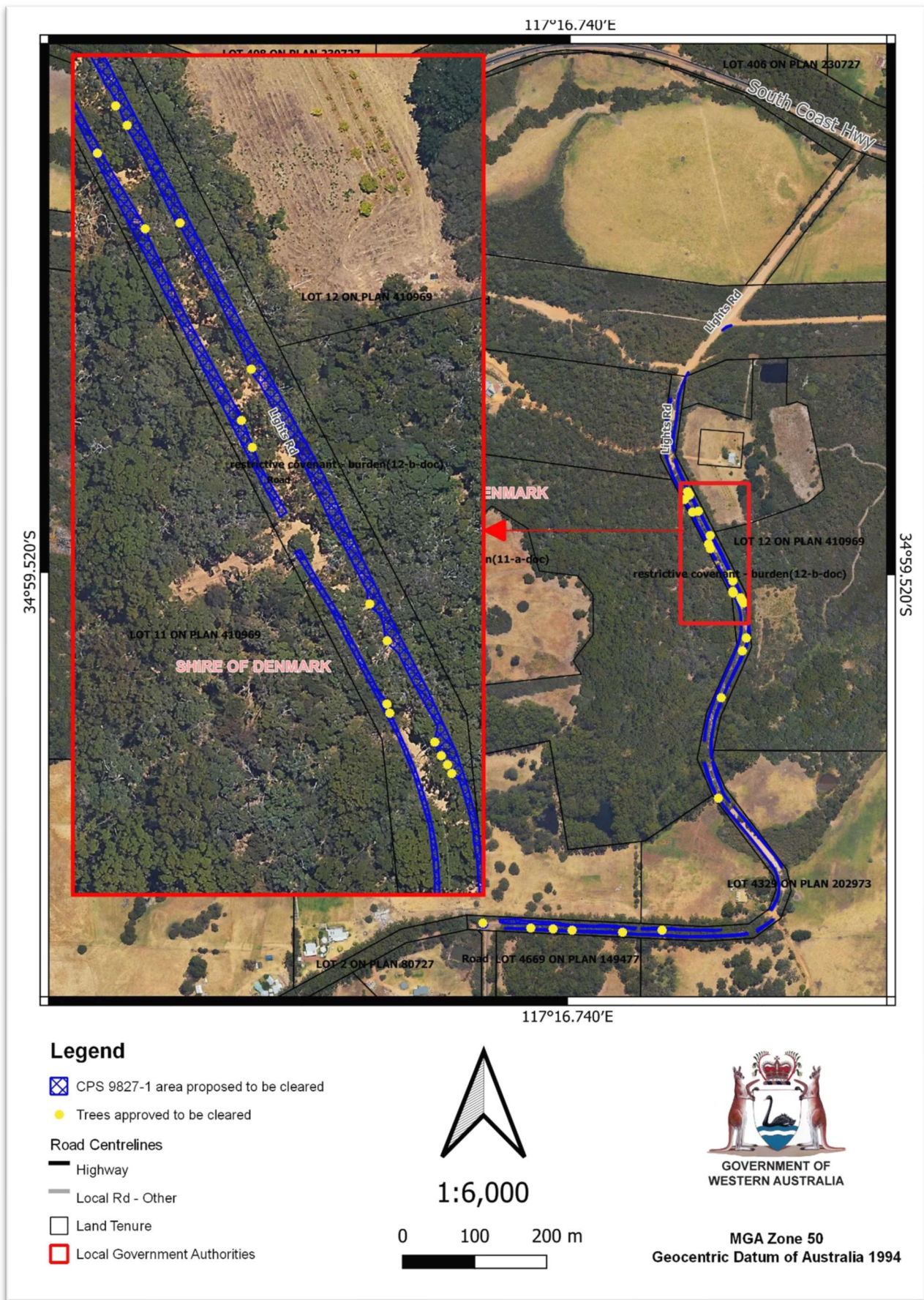


Figure 4: Area proposed to be cleared as a part of CPS 9827/1 original application (shaded blue), compared to the reduction of the application area to the 26 trees and the associated understorey (illustrated by yellow circles), demonstrating applicant avoidance measures.

Mitigation

To avoid any direct or indirect impacts to other vegetation within or adjacent to these trees, the applicant has committed to the following mitigation measures:

- Planting of 40 seedlings of a combination of *Corymbia calophylla* (marri), *Eucalyptus marginata* (jarrah), *Allocasuarina decussata* (she-oak), and *Eucalyptus diversicolor* (karri) within the adjacent road reserve.
- Revegetation will be utilising plants propagated from local provenance seed.
- Revegetation has been planned for early June 2023 (after site works are completed, and to optimise seasonal planting to maximise success rates).
- Seedlings will be planted amongst existing understorey vegetation.
- The planting site for revegetation will to be situated within the road reserve adjacent to the cleared areas along Lights Road.

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.

3.2. Assessment of impacts on environmental values

In assessing the application, the Delegated Officer has had regard for the site characteristics (Appendix C) 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 (Appendix D) identified that the impacts of the proposed clearing present a risk to fauna and land and water resource values. 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 Principle (b)

Assessment

Sixty-seven conservation significant fauna have been recorded within the local area (20 kilometre radius from the application area). None of these fauna species have been recorded within the application area. Of these fauna species recorded, several include marine, aquatic, and coastal species which are unlikely to occur within the application area. Many of these records are also historical. It is not considered for the application area to comprise significant habitat for the majority of the fauna species recorded within the local area based on the habitat values present. A fauna analysis table can be found in Section C.3. of this report, noting the likelihood of the conservation species, recorded within ten kilometres of the application area, to occur within the area proposed to be cleared. Based on the records and habitat preferences of the fauna recorded in the local area, the following species required further consideration.

Peregrine falcon

Falco peregrinus (Peregrine falcon) may utilise the area in its transit. The application area does not contain suitable nesting habitat for the species. Given the small extent of clearing over a fairly large area, the large movement range and range of habitat types utilised by the Peregrine Falcon, and the availability of the large tracks of vegetation nearby, the application area is unlikely to comprise significant habitat for this fauna.

South-western brush-tailed phascogale

The Critically Endangered *Phascogale tapoatafa wambenger* (south-western brush-tailed phascogale) is known to inhabit dry sclerophyll forest and open woodlands with hollow bearing trees. The type and condition of the vegetation, particularly the trees proposed to be cleared, do not exhibit these characteristics and is unlikely to comprise habitat for the brush-tailed phascogale.

Quenda

Priority four listed *Isoodon fusciventer* (quenda, southwestern brown bandicoot) is known to inhabit forest, woodland and heathland, usually with dense understorey vegetation, sometime wetland fringes; forages for plant material, fungi and insects by digging in leaf litter and soil. Although the leaf litter, insects and plant material would be readily available in this area, the type and condition of the vegetation within the application area do not exhibit the characteristics that are a likely preference for the quenda.

Western Australian pill millipede

The area may provide habitat for the Endangered *Cynotelopus notabilis* (Western Australian pill millipede). The invertebrate species is known to occur under deep leaf litter and logs in the wet karri country, such as that of the application area. Most records of pill millipede in the local area were made from 2006 and from within densely vegetated karri woodlands, including the William Bay National Park, approximately 2.5 kilometres from the application area. In the absence of an invertebrate survey, the pill millipede's occurrence in the application area cannot be ruled out. The pill millipede, however, has a very low vagility and lacks dispersive stage (Main et al, 2002). The distribution of this fauna is highly localised and likely to concentrate to the recorded sites. Given the distance of records from the application area and the fauna's restrictive range, it is considered unlikely that the Pill millipede would disperse from the woodlands to the application area. In the event individual millipedes exist in the application area at the time of

clearing, given the limited extent of clearing, it is considered that the impact of clearing on this invertebrate is unlikely to be significant.

Black Cockatoo species

Of the conservation listed fauna recorded, *Zanda latirostris* (Carnaby's black cockatoo), *Zanda baudinii* (Baudin's black cockatoo) and *Calyptorhynchus banksii naso* (forest red-tailed black cockatoo), which are listed as endangered and/or vulnerable under the BC Act and the Commonwealth EPBC Act, are the most likely to be present within the application area and surround. It must be noted that *Calyptorhynchus sp.* (white-tailed black cockatoo) have been recorded in the local area. These records were obtained when the data collector could not definitively distinguish if they spotted a Baudin's cockatoo or a Carnaby's cockatoo, therefore the *Calyptorhynchus sp.* (white-tailed black cockatoo) category was created to incorporate these records. The application area is within the mapped distribution area for all three Black cockatoo species. While habitat requirements for the three species of black cockatoos differ, the requirements in general can be categorised as breeding habitat, foraging habitat and night roosting habitat.

Breeding habitat

Breeding habitat for species of black cockatoos described within the 'EPBC Act referral guidelines for four threatened black cockatoo species' (DAWE, 2022) includes trees of species known to support breeding within the range of the species which either, have a suitable nest hollow or are of a suitable diameter at breast height (DBH) to develop a nest hollow. For most tree species, suitable DBH is 500 mm.

The area proposed to be cleared is within the known distribution and predicted breeding range of Carnaby's and Baudin's Cockatoo. Forest red-tailed Black Cockatoo are known to occur and may breed in suitable trees anywhere within their range of occurrence (DAWE, 2022). According to spatial data within the local area, there are two known white-tailed black cockatoo breeding sites, the closest being approximately 2.59 kilometres northeast of the application area. There is one known breeding site for forest red-tailed black cockatoos within the local area that is located approximately 17.56 kilometres from the area proposed to be cleared, within the Mount Lindsey National Park.

In total, nine potential breeding trees were recorded (DBH \geq 500 mm) within the application area, comprising of the tree species *Corymbia calophylla* (four), *Eucalyptus marginata* (two live, one dead) and *Eucalyptus diversicolor* (two). The trees were generally too immature (< 50 years old) to form hollows suitable for black Cockatoos. No hollows with openings greater than 100 millimetres were observed from ground level (Southern Ecology, 2022).

Foraging habitat

Foraging habitat differs between the three species of black cockatoos:

- *Zanda baudinii* (Baudin's black cockatoo) - Primarily seeds of marri, rarely jarrah, in woodlands and forest, and seeds of native proteaceous plant species (for example, *Banksia* spp. and *Hakea* spp.). During the breeding season feed primarily on native vegetation, particularly marri (seeds, flowers, nectar and grubs). Also, insects and insect larvae; pith of *Anigozanthos flavidus* (Kangaroo paw); tips of *Pinus* spp.; *Macadamia* spp., almonds and pecans; seeds of apples and pears; and persimmons.
- *Zanda latirostris* (Carnaby's black cockatoo) - Native shrubland, kwongan heathland and woodland on seeds, flowers and nectar of native proteaceous plant species (*Banksia* spp., *Hakea* spp. and *Grevillea* spp.), as well as *Callistemon* spp. and marri. Also seeds of introduced species including *Pinus* spp., *Erodium* spp., wild radish, canola, almonds, macadamia and pecan nuts; insects and insect larvae; occasionally apples and persimmons; and liquidambar.
- *Calyptorhynchus banksii naso* (forest red-tailed black cockatoo) - Primarily seeds of jarrah and marri in woodlands and forest, and edges of karri forests, including wandoo and blackbutt. Forages on *Allocasuarina* cones, fruits of *Persoonia longifolia* (snottygobble) and *C. haematoxylon* (mountain marri). Other less important foods include blackbutt, bullich, *Allocasuarina fraseriana*, *Hakea* spp., Tuart, *E. decipiens* (redheart moit) and *E. lehmannii* (bushy yate). Also, some introduced eucalypts such as *E. camaldulensis* (river red gum) and *E. grandis* (rose gum). On the Swan Coastal Plain, often feeds on introduced *Melia azedarach* (cape lilac), *E. caesia*, *E. erythrocorys*, Lemon-scented Gum and *Harpephyllum caffrum* (kaffir plum).

Field recording of feeding evidence by black cockatoos was done in a single traverse of the survey area. No recent evidence of feeding (i.e., chewed nuts or species presence) was observed on/under any of the assessed trees. No individual black cockatoos were observed or heard during the brief assessment (Southern Ecology, 2022). However, any area within the range of the Black Cockatoos that contains known food plant species is considered to be potential foraging habitat for the species (DAWE, 2022). Consequently, the survey area is deemed to contain suitable foraging habitat for each species. On a local scale, a large extent of forest dominated by *Eucalyptus marginata* and *Corymbia calophylla* (high-quality foraging habitat) is contiguous to the survey area.

Food resources within the range of roost sites are important to sustain populations of black cockatoos, and foraging resources should therefore be viewed in the context of the proximity to the known night roosting sites to the application area. Available databases show that there are six records of black cockatoo roost sites within the local area but no mapped breeding locations. Black cockatoos will generally forage up to 12 kilometres from an active breeding site. Following breeding, they will flock in search of food, usually within six kilometres of a night roost (DAWE, 2022), but may range up to 20 kilometres.

Noting the application area is within the foraging distance of known roosts, the clearing of 26 trees over the approximate 1.34 kilometre stretch of application area may provide suitable foraging habitat for black cockatoos within the local area. To mitigate the loss of 26 trees, the applicant proposes to plant 40 native seedlings that comprise black cockatoo foraging habitat, with a combination of species of *Corymbia calophylla* (marri), *Eucalyptus marginata* (jarrah), *Allocasuarina decussata* (sheoak), and *Eucalyptus diversicolor* (karri), within the road reserve. The 0.04 hectares of native understorey that is proposed to be cleared does not comprise of black cockatoo foraging species and is therefore not required to be mitigated.

The mitigation planting proposed was input into the *WA Environmental Offsets Metric Calculator* to determine the ratio required to mitigate the loss of 26 trees. From this, the 40 trees proposed to be planted exceeded the minimal requirements and was therefore determined to be a suitable mitigation measure. A significant residual impact does not remain following the mitigation planting. DWER considers the mitigation planting aligns with the *WA Environmental Offsets Policy* (2011) and *WA Environmental Offsets Guideline* (2014).

Night Roost sites

There are seven black cockatoo roosts recorded within the local area, with the closest to the application area being approximately 1.98 kilometres away. Black cockatoo night roosts are usually located in the tallest trees of an area, and in close proximity to both a food supply and surface water (DAWE, 2022). Given the juvenile trees within the application area and the absence of substantial hollows (Southern Ecology, 2022), it is unlikely to provide night roosting habitat for black cockatoos. No roosting trees were observed during the black cockatoo habitat assessment (Southern Ecology, 2022).

Ecological linkage

The application area may function as an ecological linkage for fauna moving between larger remnants of native vegetation within the local area. However, the ecological linkage values will not likely be severed by the proposed clearing, noting native vegetation will remain with the road reserve and additional trees will be planted as a mitigation measure to replace the trees being cleared.

Conclusion

Based on the above assessment, the application area is not considered likely to represent significant habitat for any conservation significant fauna species. However, it is acknowledged that the proposed clearing has the potential to impact fauna present at the time of clearing. Slow, directional clearing will mitigate this impact. The application area includes foraging habitat for black cockatoos. Noting the proposed clearing is for 26 trees and mitigation measures of planting 40 trees with foraging value, clearing of this habitat is not likely to be significant.

For the reasons set out above, it is considered that the impacts of the proposed clearing on biological values can be managed through the avoidance, minimisation and mitigation measures committed to by the applicant, including conditions as specified in the permit.

Conditions

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

- Directional clearing, which ensures slow, progressive, directional clearing is undertaken to allow fauna to move into adjacent vegetation ahead of the clearing activity to minimise impacts to individuals.
- Weeds and dieback management measures as specified in the clearing permit.
- Planting of 40 black cockatoo habitat species seedlings within the road reserve.

3.2.2. Land and water resources – Wind erosion and subsurface acidification risk - Clearing Principle (h)

Assessment

The soils within the application area are mapped as having a high to extreme risk of land degradation due to wind erosion, nutrient export and / or subsurface acidification. Clearing of native vegetation within such area could exacerbate the risk. The application area, however, is surrounded by tracks of vegetation in at least Good condition (Keighery, 1984), which contain approximately 41.20 percent of its original cover. Given the condition of vegetation surrounding the application area, the relatively small extent of clearing area over the approximate 1.34 kilometre stretch of road, the proposed clearing is unlikely to result in increased soil acidity or nutrient export in the area. The proposed clearing is unlikely to lead to land degradation from wind erosion provided the commencement of the roadwork is within three months of the commencement of clearing.

Conclusion

Based on the above assessment, the Delegated Officer has determined that the proposed clearing is unlikely to result in appreciable and long-term land degradation.

Conditions

To address the potential impacts of clearing on land resources in the area, the permit holder is required to commence roadworks no later than three months after undertaking the authorised clearing.

3.2.3. Relevant planning instruments and other matters

The application area occurs within the Lights Road Reserve which is dedicated for the widening and casement of the road. The road reserve is managed by the Shire.

Several Aboriginal sites of significance have been mapped within the local 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



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Appendix A. Additional information provided by applicant

The applicant submitted a black cockatoo habitat assessment report completed by Southern Ecology in November 2022. They supplied information on avoidance and minimisation, reduced the clearing area, provided mitigation measures to balance out the significant residual impact of the clearing on environmental values, and provided photos of the 26 subject trees within the application to be cleared (Appendix F). This information has been taken into consideration by the Delegated Officer in determining the outcome of this application.

Appendix B. Details of public submissions

Summary of comments	Consideration of comment
Clearing of any native vegetation constitutes biodiversity loss and should be assessed accordingly.	The Delegated Officer assessed the application against the ten clearing principles, legislated in accordance with sections 51E and 51O of the EP Act. This assessment considered impacts to biodiversity, and considered that no significant residual remains post management measures. See Appendix D and further detailed in Section 3 of this report.
The vegetation along Lights Road will have more environmental value prior to clearing than it will post-clearing	The Delegated Officer considered the necessity of the application and end land use, when granting the application. Due to the residual impact of the clearing on environmental values, a revegetation condition requiring additional trees be planted in the road reserve post clearing was placed on the permit to mitigate the impact.
Clearing the vegetation along Lights Road will result in a net-habitat loss	The net habitat loss for conservation significant fauna was considered during the application. Due to the habitat loss, a revegetation condition was placed on the permit. The Department acknowledges that the revegetation will take some time to reach the same ecological value. Timeframes for revegetation to have an ecological benefit was considered in determining the number of trees to be planted.
Request to rehabilitate an equivalent area (0.715 hectares) of cleared or degraded land with native vegetation	Based on the revised application area, the Shire proposed the planting of 40 seedlings, of a combination of <i>Corymbia calophylla</i> (marri), <i>Eucalyptus marginata</i> (jarrah), <i>Allocasuarina decussata</i> (sheoak), and <i>Eucalyptus diversicolor</i> (karri), within the road reserve. This has been conditioned on the clearing permit.
Failed to “provide the avoidance and mitigation details” in “5.6 Avoidance and mitigation”	During the assessment process, the applicant provided further avoidance and mitigation details. They reduced the proposed clearing from 31 to 26 trees. This reduced the understorey required to be cleared from 0.42 hectares to 0.04 hectares. The Shire has also agreed to a mitigation measure of revegetation of 40 seedlings within the road reserve. Details can be found in Section 3.1. of this report.
Dismissed the opportunity to “submit a clearing offset proposal” in “Part 6 – Offset”	In this situation, the Delegated Officer dedicated that revegetation within the road reserve, was sufficient to balance the residual impact, using the DWER WA Environmental Offsets Calculator . Following the mitigation hierarchy, an offset was not required following the revegetation activities.
Deemed biological surveys that support the application “not applicable” in “7.1 Biodiversity surveys”	During the assessment process, the applicant provided further fauna habitat surveys of the trees proposed to be cleared. Through this process the applicant reduced the

Summary of comments	Consideration of comment
	proposed clearing from 31 to 26 trees, and provided further details regarding size, growth stage, species, presence/absence of hollows, exact locations and photos of trees proposed to be cleared. These can be found in Appendix F of this report.
Our argument that the proposed clearing will result in net-habitat loss is not aligned with the WA Government's Native Vegetation Policy (2022). The Native Vegetation Policy seeks to achieve "net gain and landscape-scale conservation and restoration".	<p>The Native Vegetation Policy (the policy), net gain requires the sum total improvements in the extent and/or condition of native vegetation to exceed the losses at the landscape-scale (p.7). This takes into account the range of stakeholder actions that influence it – regulated, voluntary and otherwise (p.17).</p> <p>The policy guides State Government agencies to work together to explore how to define, measure and achieve net gain at landscape scale, and to set up the right policy settings to encourage stakeholders to conserve and restore, e.g. through a mix of regulation, funding and economic incentives, services or information (p.15).</p> <p>Importantly, the policy does not introduce net gain as a required outcome of individual proposals, but rather as a goal at landscape scale (p.7). For that reason, single decisions or approvals may not be in conflict to policy's goal of net gain at the landscape level.</p>

Appendix C. 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 DWER at the time of this assessment. This information was used to inform the assessment of the clearing against the Clearing Principles, contained in Appendix D.

C.1 Site characteristics

Characteristic	Details
Local context	<p>The area proposed to be cleared is part of road reserve vegetation in the intensive land use zone of Western Australia. It is surrounded by rural dwellings, farms, and large tracks of native vegetation.</p> <p>Spatial data indicates the local area (20 kilometre radius from the centre of the area proposed to be cleared) retains approximately 41.20 per cent of the original native vegetation cover.</p>
Ecological linkage	<p>The application area and its local area are within the zone of the South Coast Macro corridor – Strategic Zone A, as a part of the Western Australian South Coast Macro Corridor Network.</p> <p>The application area may function as an ecological linkage for fauna moving between larger remnants of native vegetation within the local area.</p> <p>Lights Road, where the proposed clearing is located, was surveyed in October 2010 and November 2011 through Roadside Conservation – Road Centreline (DBCA-030). During both surveys, no weeds were identified.</p>
Conservation areas	<p>The application area is not located within any conservation areas.</p> <p>The application area is closely surrounded by several reserves, within a 1.5 kilometre radius of the area proposed to be cleared. The closest reserve in all directions are as follows:</p> <ul style="list-style-type: none"> - Old Well Heritage Trail - 488 metres - northeast - Mount Hallowell (Conservation and recreation) - 566 metres – southeast - Mouth Shadforth Nature Park (Conservation of Flora and Fauna) - 1083 metres - north - Bushfire Brigade Headquarters and Historic School Site - 1359 metres - west-northwest - William Bay National Park (National Park Act 105 – 1970) - 1414 metres - southwest - Waterway and Camping Reserve - 1418 metres – west-northwest.
Vegetation description	Photographs supplied by the applicant indicate the vegetation within the proposed clearing area consists of <i>Corymbia calophylla</i> (marri), <i>Eucalyptus marginata</i> (jarrah), <i>Callistachys</i>

Characteristic	Details
	<p><i>lanceolata</i> (wonnich), <i>Eucalyptus diversicolor</i> (karri) and <i>Allocasuarina decussata</i> (sheoak) trees over sparse understorey vegetation. The understorey where the trees proposed to be cleared varies from having minimal native understorey to being dominated by <i>Pteridium esculentum</i> (Bracken fern).</p> <p>Available databases indicate that the vegetation complexes found within the application area are:</p> <ul style="list-style-type: none"> • Southern Plain - Hazelvale 135 - Mosaic of a low woodland to woodland of <i>Eucalyptus marginata</i> subsp. <i>marginata</i>-<i>Eucalyptus patens</i>, low forest of <i>Agonis juniperina</i> - <i>Callistachys lanceolata</i> with closed heath of Myrtaceae spp. on sandy plains in the hyperhumid zone. • Darling Plateau - Keystone 161 – Open forest of <i>Eucalyptus marginata</i> subsp. <i>marginata</i> - <i>Corymbia calophylla</i>-<i>Banksia grandis</i> on mild slopes of hills in perhumid zone and open forest to tall open forest of <i>Eucalyptus brevistylis</i> on slopes below outcrops in hyperhumid and perhumid zones. • Darling Plateau - Keystone 165 - Woodland of <i>Eucalyptus marginata</i> subsp. <i>marginata</i> - <i>Allocasuarina fraseriana</i> on lower slopes in hyperhumid and perhumid zones. <p>Representative photos are available in Appendix F.</p> <p>Within a 20 kilometres radius of the application area, the remnant vegetation has retained 41.20 per cent of the pre-european extent (Government of Western Australia, 2019).</p>
Vegetation condition	The vegetation within the proposed clearing area is in Degraded to Good condition (Keighery, 1994). The full Keighery (1994) condition rating scale is provided in Appendix E. The photo with survey descriptions are available in Appendix F.
Climate and landform	The application area is situated on a gentle slope (16 percent) at an elevation of 95 metres above sea level. Mean annual rainfall is 925.2 millimetres, mean temperature ranges between 11.8 and 19.5 degrees celsius.
Soil description	<p>The application area contains three mapped soil subsystems is located within the Jindong fertile flats Phase, which is described as well drained flats with deep red brown sands, loams and light clays (i.e. Marybrook soils) – (soil unit - 213AbJDf) (Schoknecht, <i>et al.</i> 2004). The three soil subsystems are described as:</p> <ul style="list-style-type: none"> - 254WhHA - Hazelvale Subsystem - Narrow sandy plains; slight stream incision. Humus podzols on crests of spurs; teatree scrub. Yellow duplex soils on valley flanks; jarrah-marri low forest. Peaty podzols on minor valley floors; sedges and reeds. - 254WhKYy - Keystone yellow duplex Phase - Gravelly yellow duplex soils; jarrah-marri forest. - 254WhKYs - Keystone podzols Phase - Podzols; teatree heath and jarrah woodland.
Land degradation risk	Please see Section B.4. for a detailed table outlining the land degradation risk categories for all three soil types found within the application area.
Waterbodies	No wetlands are mapped as occurring within the application area.
Hydrogeography	<p>The application area is in the Warren-Denmark hydrological zone which when groundwater rises occur, localised hillside seeps and salinity become evident. The dominant soils are loamy gravel, duplex sandy gravel, wet and semi-wet soil, shallow and deep sandy gravel and grey deep sandy duplexes. Groundwaters are generally low.</p> <p>The application area is located within the South West Division, the Wilson Inlet Catchment and the Denmark Coast Basin (Basin No. 603).</p> <p>According to available databases, the groundwater salinity ranges from 500 to 1000 milligrams per litre total dissolved solids, which is the salinity of most irrigation - adverse effects on ecosystems become apparent.</p> <p>A non-perennial, outer tributary of the Wilson Inlet intersects the application area approximately 20 metres south of one of the trees proposed to be cleared. Typically this creek will dry up a month or so after the last decent spring rainfall and then only flows for a week or</p>

Characteristic	Details
	<p>so after any significant summer rains until late autumn when it starts to flow continually again (Shire of Denmark, 2022). The revised designs of the clearing and future works will improve the natural functioning of the creek. Currently, as a result of the unsealed road, the surrounding drains carry clay fines, into the creek. This is exacerbated currently with the required grading practises where build-up of gravel and clay ends up in the creek (Figure 5).</p> <p>The new design sees the road built with the fall of the land with a one-way crossfall. This will result in local rain shedding in a more natural way across the land (through the vegetation) rather than in concentrated roadside drains. The addition of the sealed surface will also vastly reduce any sediment coming off the road into the vegetation (Shire of Denmark, 2022d).</p>
Flora	Seventy-six conservation significant flora have been recorded within 20 kilometres of the application area. Sixty-nine of these species are listed as priority species and one is listed as Endangered and six are listed as Threatened under the EPBC Act. None of the records were from within one kilometre radius of the application area. No threatened flora is recorded within the application area and surround.
Ecological communities	No threatened or priority ecological communities are mapped within the area proposed to be cleared, or within the local area.
Fauna	<p>Sixty-seven conservation significant fauna have been recorded within 20 kilometres of the application area, many of which are either historical, migratory and / or of marine origins. Forty-one conservation significant fauna have been recorded within ten kilometres of the application area. Black cockatoos have been recorded from just outside a two kilometre radius from the application area, with the closest record from October 2000, 2.26 kilometres away. None of these records are located within the application area.</p> <p>See Appendix B.3. for Fauna analysis table of the conservation species found within the ten kilometre local area.</p>

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**					
Warren	5,667.87	3,590.68	63.35	1,751.94	30.91
Vegetation complex (Mattiske & Havel 1998)*					
Southern Plain - Hazelvale 135	7,276.42	2,982.39	40.99	1,089.06	14.97
Darling Plateau - Keystone 161	1,950.48	1,178.60	60.43	544.13	27.90
Darling Plateau - Keystone 165	15,012.58	13,482.12	89.81	12,332.76	82.15
Remnant vegetation					
Remnant vegetation mapped within 20 kilometres	116,375.62	47,951.51	41.20	-	-

*Government of Western Australia (2019a)

**Government of Western Australia (2019b)

C.3. Fauna analysis table

Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
Atlantic yellow-nosed albatross	VU	N	N	4.55	4	N/A
Australian sea-lion	VU	N	N	5.68	1	N/A
Bar-tailed godwit	MI	N	N	4.77	3	N/A
Baudin's cockatoo	EN	Y	Y	2.63	42	Y
Blue-billed duck	P4	N	N	4.11	2	N/A
Carnaby's cockatoo	EN	Y	Y	2.26	39	Y
Carter's freshwater mussel	VU	N	N	8.73	1	N/A
Caspian Tern	MI	N	N	3.92	38	N/A
Chuditch, western quoll	VU	N	N	2.59	3	N/A
Common greenshank, greenshank	MI	N	N	3.92	16	N/A
Common Sandpiper	MI	N	N	2.83	16	N/A
Crested tern	MI	N	N	2.03	74	N/A
Flesh-footed Shearwater, Flesh-footed Shearwater	VU/MI	N	N	5.61	4	N/A
forest red-tailed black cockatoo	VU	Y	Y	4.62	69	Y
Great knot	CR/MI	N	N	5.23	1	N/A
Greater sand plover, large sand plover	VU/MI	N	N	5.23	1	N/A
Grey plover	MI	N	N	4.55	2	N/A
Hooded plover, hooded dotterel	P4	N	N	2.12	66	N/A
Hutton's shearwater	EN	N	N	6.49	2	N/A
Loggerhead turtle	EN	N	N	6.72	4	N/A
Main's assassin spider	VU	N	N	2.21	12	N/A
Malleefowl	VU	N	Y	2.45	4	N/A
Osprey, eastern osprey	MI	N	N	2.03	40	N/A
Peregrine falcon	OS	Y	Y	4.55	6	N/A
Pouched lamprey	P3	N	N	6.72	9	N/A
Quenda, southwestern brown bandicoot	P4	Y	N	1.10	18	N/A
Quokka	VU	Y	Y	2.56	9	N/A
Red-necked stint	MI	N	N	4.55	11	N/A
Sanderling	MI	N	N	5.15	3	N/A
Sharp-tailed sandpiper	MI	N	N	6.34	1	N/A
Short-nosed snake	P2	N	N	6.15	4	N/A
Short-tailed shearwater	MI	N	N	6.49	2	N/A
South-western brush-tailed phascogale, wambenger	CD	Y	Y	3.52	23	N/A
Sperm whale	VU	N	N	2.46	1	N/A
Water-rat, rakali	P4	N	N	1.24	16	N/A
Western Australian pill millipede	EN	Y	Y	0.42	25	N/A

Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
Western bristlebird	EN	N	N	7.38	3	N/A
Western ground parrot	CR	N	N	2.45	2	N/A
Western ringtail possum, ngwayir	CR	N	N	3.39	3	N/A
White-tailed black cockatoo	EN	Y	Y	3.58	80	Y
White-winged black tern, white-winged tern	MI	N	N	5.09	2	N/A

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority

C.4. Flora analysis table

Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Suitable soil type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
<i>Amanita walpolei</i>	2	N	Y	Y	3.81	1	N/A
<i>Andersonia</i> sp. <i>Virolens</i> (G.J. Keighery 12000)	3	N	Y	Y	3.27	1	N/A
<i>Boronia virgata</i>	4	N	Y	Y	1.64	8	N/A
<i>Caladenia applanata</i> subsp. <i>erubescens</i>	2	N	N	Y	2.24	2	N/A
<i>Drosera fimbriata</i>	4	N	Y	Y	2.14	5	N/A
<i>Gahnia sclerioides</i>	4	N	Y	Y	4.80	4	N/A
<i>Goodenia radicans</i>	1	N	N	Y	5.43	4	N/A
<i>Kennedia glabrata</i>	T	N	N	Y	2.23	5	N/A
<i>Microtis globula</i>	T	N	N	Y	4.88	1	N/A
<i>Thomasia quercifolia</i>	4	N	Y	Y	2.66	8	N/A

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority

C.5. Land degradation risk table

Risk Categories	254WhHA	254WhKYy	254WhKYs
Wind erosion	H1: 50-70% of map unit has a high to extreme wind erosion risk	H1: 50-70% of map unit has a high to extreme wind erosion risk	H2: >70% of map unit has a high to extreme wind erosion risk
Water erosion	M1: 10-30% of map unit has a high to extreme water erosion risk	M1: 10-30% of map unit has a high to extreme water erosion risk	L2: 3-10% of map unit has a high to extreme water erosion risk
Water logging	M2: 30-50% of map unit has a moderate to very high waterlogging risk	L1: <3% of map unit has a moderate to very high waterlogging risk	M1: 10-30% of map unit has a moderate to very high waterlogging risk
Water Repellence	M2: 30-50% of map unit has a high water repellence risk	L1: <3% of map unit has a high water repellence risk	H1: 50-70% of map unit has a high water repellence risk
Sub-surface Acidification	H2: >70% of map unit has a high subsurface acidification risk or is presently acid		
Phosphorous export	H1: 50-70% of map unit has a high to extreme phosphorus export risk		
Salinity	L1: 30-50% of map unit has a moderate to high salinity risk or is presently saline		

Risk Categories	254WhHA	254WhKYy	254WhKYs
Flooding	M1: 10-30% of the map unit has a moderate to high flood risk	L1: <3% of the map unit has a moderate to high flood risk	L1: <3% of the map unit has a moderate to high flood risk

Appendix D. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
Environmental value: biological values		
<p><u>Principle (a):</u> <i>“Native vegetation should not be cleared if it comprises a high level of biodiversity.”</i></p> <p><u>Assessment:</u></p> <p>The area proposed to be cleared does not contain significant flora, fauna, habitats, or assemblages of plants.</p>	Not likely to be at variance	No
<p><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></p> <p><u>Assessment:</u></p> <p>The area proposed to be cleared is within the mapped distribution of the Baudin’s, Carnaby’s and forest red-tailed black cockatoos. No records of conservation significant fauna have been recorded within the application area.</p>	At variance	Yes <i>Refer to Section 3.2.1, above.</i>
<p><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></p> <p><u>Assessment:</u></p> <p>No threatened flora is recorded within 1 kilometre radius from the application area. Assessment based on the available data on the types of soils and habitats of the recorded flora indicated that the application area is unlikely to contain habitat for threatened flora.</p>	Not likely to be at variance	No
<p><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></p> <p><u>Assessment:</u></p> <p>The area proposed to be cleared does not contain species that can indicate a threatened ecological community.</p>	Not at variance	No
Environmental value: significant remnant vegetation and conservation areas		
<p><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></p> <p><u>Assessment:</u></p> <p>The extent of the mapped vegetation 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.</p>	Not likely to be at variance	No
<p><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></p> <p><u>Assessment:</u></p>	Not likely to be at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
Given the distance to the nearest conservation area, the proposed clearing is not likely to have an impact on the environmental values of nearby conservation areas.		
Environmental value: land and water resources		
<p><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></p> <p><u>Assessment</u>:</p> <p>No wetlands are recorded within the application area, however, a non-perennial, outer tributary of the Wilson Inlet intersects the application area 20 metres away from one of the trees being cleared. However, the trees and vegetation proposed to be cleared do not resemble riparian vegetation. The proposed clearing is unlikely to impact on- or off-site hydrology and water quality.</p>	Not likely to be at variance	No
<p><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></p> <p><u>Assessment</u>:</p> <p>The mapped soils are not susceptible to water erosion, water logging, salinity and flooding, however, they are mapped as having a higher risk of wind erosion, sub-surface acidification and phosphorus export. Noting the extent of clearing within the approximate 1.34 kilometre stretch of the application area and the condition of the remaining vegetation, the proposed clearing is not likely to have an appreciable impact on land degradation.</p>	Not likely to be at variance	Yes <i>Refer to Section 3.2.2, above.</i>
<p><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></p> <p><u>Assessment</u>:</p> <p>Given no wetlands or Public Drinking Water Sources are recorded within the application area and the non-perennial, outer tributary of the Wilson Inlet intersects the application area 20 metres away from any tree being cleared, the proposed clearing is unlikely to impact surface or ground water quality.</p>	Not likely to be at variance	No
<p><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></p> <p><u>Assessment</u>:</p> <p>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.</p>	Not likely to be at variance	No

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.



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Appendix F. Biological survey information excerpts and photographs of the vegetation

Tree No	Trunk No	Road Side	Taxon	Ht (m)	DBH (mm)	LIFE STAGE	canopy COVER (Diameter m)	CANOPY SPREAD (m ²)	BREEDING SIZE (Y/N)	HOLLOWES (Y/N)	ROOSTING (Y/N)	FORAGING (Y/N)	COMMENTS	EASTINGS	NORTHINGS
1		L	<i>Corymbia calophylla</i> (Marr)	30-40	740	Mature	12	113.1	Y	N	N	Y	evidence of canker	525627	6127923
2		L	<i>Corymbia calophylla</i> (Marr)	30-40	620	Mature	14	153.9	Y	N	N	Y	healthy	525630	6127918
3		R	<i>Eucalyptus marginata</i> (Jarrah)	30-40	240	Immature	7	38.5	N	N	N	Y	unhealthy - due to rubbing from adjacent tree	525623	6127912
4		R	<i>Corymbia calophylla</i> (Marr)	30-40	740	Mature	14	153.9	Y	N	N	Y	20% canopy loss due to Jarrah under same canopy space	525642	6127895
5		L	<i>Eucalyptus marginata</i> (Jarrah)	30-40	580	Mature	12	113.1	Y	N	N	Y	healthy	525634	6127894
6	A	L	<i>Eucalyptus marginata</i> (Jarrah)	30-40	530	Dead	8		Y	N	N	N	double trunk	525658	6127862
6	B	L	<i>Eucalyptus marginata</i> (Jarrah)	30-40	<500	Dead			N	N	N	N	second stem (inc. in trunk A canopy)	525658	6127862
7		R	<i>Eucalyptus marginata</i> (Jarrah)	30-40	250	Immature	6	28.3	N	N	N	Y	healthy	525656	6127850
8	A	R	<i>Eucalyptus marginata</i> (Jarrah)	30-40	370	Mature	12	113.1	N	N	N	Y	double trunk - healthy	525659	6127843
8	B	R	<i>Eucalyptus marginata</i> (Jarrah)	30-40	330	Mature			N	N	N	Y	second stem (inc. in trunk A canopy)	525659	6127843
9		L	<i>Corymbia calophylla</i> (Marr)	30-40	460	Mature	8	50.3	N	N	N	Y	healthy	525686	6127807
10	A	L	<i>Corymbia calophylla</i> (Marr)	30-40	470	Senescing	9	63.6	N	N	N	Y	double trunk; extensive damage sustained	525690	6127799
10	B	L	<i>Corymbia calophylla</i> (Marr)	30-40	460	Senescing			N	N	N	Y	second stem - unhealthy (inc. in trunk A canopy)	525690	6127799
11		R	<i>Allocasuarina decussata</i> (Sheoak)	20	400	Dead			N	N	N	N	exclude from canopy cover	525690	6127782
12		R	<i>Allocasuarina decussata</i> (Sheoak)	20	600	Mature	9	63.6	N	N	N	Y(RT)	foraging for red-tailed cockatoos only	525690	6127784
13		L	<i>Eucalyptus marginata</i> (Jarrah)	30-40	190	Dead			N	N	N	N	exclude from canopy cover	525701	6127775

Figure 5a: Extract from Lights Road Fauna Habitat Assessment Report cockatoo habitat assessment on the trees proposed to be cleared (Southern Ecology, 2022)

14	L	<i>Eucalyptus marginata</i> (Jarrah)	30-40	360	Dead			N	N	N	N	damage sustained - exclude from canopy cover	525702	6127772
15	L	<i>Eucalyptus marginata</i> (Jarrah)	30-40	510	Mature	7	38.5	Y	N	N	Y	healthy	525704	6127770
16	L	<i>Corymbia calophylla</i> (Marr)	30-40	410	Mature	3	7.1	N	N	N	Y	80% unhealthy canopy cover	525705	6127768
27	L	<i>Eucalyptus marginata</i> (Jarrah)	30-40	200	Mature	4	12.6	N	N	N	Y	healthy	525705	6127768
17	L	<i>Corymbia calophylla</i> (Marr)	30-40	400	Mature	10	78.5	N	N	N	Y	rubbing against karr	525709	6127719
18	L	<i>Corymbia calophylla</i> (Marr)	30-40	420	Mature	8	50.3	N	N	N	Y	healthy	525703	6127701
28	L	<i>Allocasuarina decussata</i> (Sheoak)	20	<500	Mature	8	50.3	N	N	N	Y(RT)	foraging for red-tailed cockatoos only	525683	6127657
19	L	<i>Eucalyptus diversicolor</i> (Karr)	40-50	720	Mature	22	380.1	Y	N	N	Y	healthy	525674	6127636
20	R	<i>Callistachys lanceolata</i> (Wonnich)	10	300	Mature			N	N	N	N	removal required due to drainage, not Cockatoo habitat	525670	6127497
21	R	<i>Corymbia calophylla</i> (Marr)	30-40	530	Mature	6	28.3	Y	N	N	Y	damaged at trunk base	525592	6127313
22	L	<i>Corymbia calophylla</i> (Marr)	30-40	420	Mature	4	12.6	N	N	N	Y	damage sustained	525537	6127310
23	L	<i>Corymbia calophylla</i> (Marr)	30-40	310	Immature	3	7.1	N	N	N	Y	minimal canopy cover	525467	6127313
24	L	<i>Eucalyptus diversicolor</i> (Karr)	40-50	600	Mature	12	113.1	Y	N	N	Y	minimal canopy cover	525440	6127314
25	L	<i>Allocasuarina decussata</i> (Sheoak)	20	350	Mature	5	19.6	N	N	N	Y(RT)	foraging for red-tailed cockatoos only	525409	6127316
26	R	<i>Corymbia calophylla</i> (Marr)	30-40	410	Mature	10	78.5	N	N	N	Y	healthy	525343	6127322

Figure 5b: Extract from Lights Road Fauna Habitat Assessment Report cockatoo habitat assessment on the trees proposed to be cleared (Southern Ecology, 2022)



Figure 6: Photo supplied by the Shire of Denmark of the non-perennial, outer tributary of the Wilson Inlet that intersects the application area approximately 20 metres south of one of the trees proposed to be cleared (left) and a photo showing the clay fines that currently get washed into the creek from the unmade road (right) (Shire of Denmark, 2022d)



Figure 7: Photos of trees 1 to 4 proposed to be cleared (Southern Ecology, 2022)



Figure 8: Photos of trees 5 to 8 proposed to be cleared (Southern Ecology, 2022)



Figure 9: Photos of trees 9 to 12 proposed to be cleared (Southern Ecology, 2022)



Figure 10: Photos of trees 13 to 16 proposed to be cleared (Southern Ecology, 2022)



Figure 11: Photos of trees 17 to 20 proposed to be cleared (Southern Ecology, 2022)



Figure 12: Photos of trees 21 to 24 proposed to be cleared (Southern Ecology, 2022)



Tree ID: 25a



Tree ID: 25b



Tree ID: 26a



Tree ID: 26b

Figure 13: Photos of trees 25 to 26 proposed to be cleared (Southern Ecology, 2022)



Lights Road northern section



Lights Road bend



Lights Rd verge and neighbouring bush

Figure 14: Photos of the stretch of Lights Road where the application area is located (Southern Ecology, 2022)



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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)
- 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)
- 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

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)

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