



Clearing Permit Decision Report

1 Application details and outcome

1.1. Permit application details

Permit number:	CPS 9936/1
Permit type:	Area permit
Applicant name:	AllTrack 2 WA Pty Ltd
Application received:	31 October 2022
Application area:	13.76 hectares of native vegetation
Purpose of clearing:	Extraction of gravel
Method of clearing:	Mechanical
Property:	Lot 5449 on Deposited Plan 206481
Location (LGA area/s):	Shire of Gingin
Localities (suburb/s):	Gingin

1.2. Description of clearing activities

The proposal is to clear 13.76 hectares (ha) of native vegetation contained within a single contiguous area for the purpose of gravel extraction to be used in the construction of roads as road base. The vegetation is a part of a larger patch of native vegetation on Lot 1 Wannamal Road West. The property is zoned 'General Rural' under Local Planning Scheme No 9, located approximately 7 km east of the intersection between Wannamal Road West and the Brand Highway, Gingin. The Boonanarring Nature Reserve is immediately south of the application area.

1.3. Decision on application

Decision:	Refused
Decision date:	6 February 2024
Decision area:	13.76 hectares

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 three (3) submissions were received. Consideration of matters raised in the public submissions is summarised in Appendix B.

In making this decision, the Delegated Officer had regard for the site characteristics (see Appendix C), information provided by the applicant (see Appendix A), relevant datasets (see Appendix H.1), the findings of flora, vegetation and fauna surveys (see Appendix F), the clearing principles set out in Schedule 5 of the EP Act (see Appendix D), relevant planning instruments and any other matters considered relevant to the assessment (see Section 3). In particular, the Delegated Officer has considered the following:

- The proposed clearing is seriously at variance with principle (b). The application area is within the mapped distribution areas for Carnaby's and Forest red-tailed black cockatoos, as well as the mapped breeding area for Carnaby's cockatoo. The native vegetation proposed to be cleared is dominated by myrtaceous and proteaceous species and assessed by the applicant as mostly in Good condition (Keighery, 1994). Noting the absence of dieback, introduced species and sign of grazing, the Department determines that it is likely to be in Very Good condition (Keighery, 1994) or better and provides very high-quality foraging habitat for the Carnaby's and Forest red-tailed (FRT) cockatoos. The proposed clearing would result in significant residual impacts comprising of the loss of:
 - 13.76 ha of very high-quality black cockatoo foraging habitat with evidence of use.
 - suitable roosting habitat in the form of jarrah and marri trees
 - a minimum of 170 potential breeding trees and stags with a diameter at breast height (DBH) >500 millimetres (mm). A total of 80 trees contain a combined 312 hollows of various sizes, with 52 of these trees containing a combined 114 hollows with an entrance measuring 120 mm in diameter or larger.

The loss of the above habitat values would have significant impacts on the maintenance, viability, and conservation of the threatened black cockatoo species within a local and regional context. Retention of this vegetation is considered critical within the context of the recovery plan for the Carnaby's and FRT black cockatoos.

- The proposed clearing is at variance with principle (a) and may be at variance with principle (c). Conservation significant flora species has been recorded from the local area and within the application area itself. Flora and vegetation surveys conducted in support of the application were carried out outside of the flowering seasons for some Threatened flora species. Several Threatened orchid species that could be present within the application area do not flower every year, therefore multiple surveys would be required to identify their occurrence within the application area. In the absence of information regarding the Threatened and Priority flora species' local and regional population, removal of these species could have significant impact on the conservation status of the flora species and reduce biodiversity.
- The proposed clearing may be at variance with principle (h). The application area is immediately adjacent to the Boonanarring Nature Reserve protected for the conservation of flora and fauna. A larger buffer distance between the application area and Nature Reserve would be recommended.
- The Delegated Officer acknowledged the applicant's effort to mitigate impacts to black cockatoo habitat values through the creation of three exclusion zones each of 50m radius, to retain trees with hollows suitable for Carnaby's breeding. Given the purpose of clearing is for extraction of gravel, the avoidance and minimisation measure are considered insufficient. The islands of exclusion zones would be disconnected from nearby vegetation; and gravel extraction is likely to affect the local hydrography that would in turn decline the condition of the breeding trees and vegetation on the 'islands'.
- The Delegated Officer acknowledged the applicant's intention to provide a land acquisition offset to counterbalance the significant residual impacts which would result from the proposed clearing. The Delegated Officer considered that the significant residual impacts would not be adequately addressed by the proposed offset given the severity of the impacts and noting that the proposed offset would not contribute to an increase in foraging and roosting habitats available to black cockatoos in the short-term.
- The Delegated Officer noted that the Shire of Gingin did not object to the proposed clearing and that the applicant had acquired a Development Approval (DA) under the *Planning and Development Act 2005* and a Works Approval (WA) under Part V Division 3 of the EP Act. The Extractive Industry Licence (EIL) for the proposed gravel extraction had not been issued, with the Shire's decision on the EIL subject to the issuing of a clearing permit.
- The Delegated Officer acknowledged that Basic Raw Materials (BRM) are important in supporting local and regional development, however, noted that the application area is not within the preferred Significant Geological Supply (SGS) nor Basic Raw Material (BRM) maps identified in accordance with the *State Planning Policy 2.4*.

After consideration of the available information and applicant's minimisation and mitigation measures (see Section 3.1), the Delegated Officer determined the proposed clearing is likely to have long-term adverse impacts on the conservation, survival, and viability of breeding and feeding habitat for the Carnaby's and FRT cockatoos within the local and regional contexts. The potential impacts cannot be minimised and managed to provide an acceptable risk to the threatened black cockatoo species within the context of the Recovery Plans for both species. Further, due to the severity of environmental impacts associated with the proposed clearing, the Delegated Officer determined an offset is not considered appropriate.

The Delegated Officer decided to refuse to grant a clearing permit.

1.5. Site map

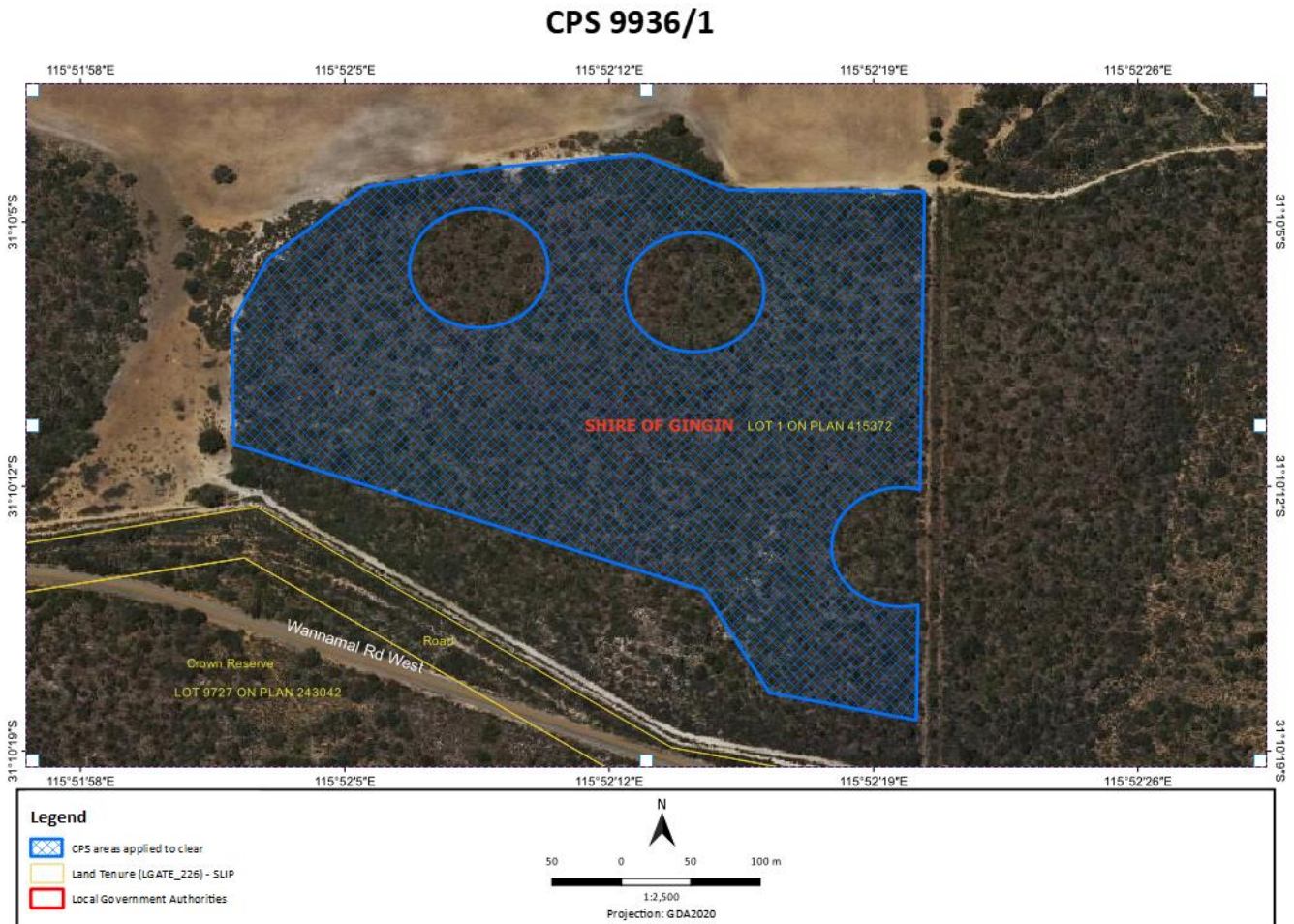


Figure 1 Map of the application area

The area cross-hatched blue indicates area within which clearing activities are proposed.

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)

Relevant policies considered during the assessment include:

- *Environmental Offsets Policy* (2011)

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)

- *Environmental Offsets Guidelines* (August 2014)
- Technical guidance – *Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA, 2016)
- Technical guidance – *Terrestrial Fauna Surveys for Environmental Impact Assessment* (EPA, 2016)

3 Detailed assessment of application

3.1. Avoidance and mitigation measures

The extent of clearing and configuration of the application area was determined by the findings of a Flora and Black Cockatoo Habitat survey and assessment performed over the application area and surrounds in 2019 and 2021 (360 Environmental, 2020 and 2021b, see excerpt in Appendix F). Upon identification of three significant suitable hollows for black cockatoo breeding in the survey area (Figure 11), the applicant retained three areas, each measuring 50 meters in radius, to protect the significant breeding trees. These areas were excluded from the application area (See Figure1). The applicant also provided a setback from Wannamal Road so that the application area is not visible from the road.

The Delegated Officer, however, considered the measures as inadequate to avoid and minimise potential impacts of the proposed clearing on the environmental values, due to:

- the severity of impacts on the maintenance, conservation, and viability of the Carnaby's and Forest Red-tail (FRT) black cockatoo within a local and regional context
- given the proposed purpose of gravel extraction, the creation of circular islands of 50m in radius as exclusion zones for Black cockatoos may not be effective. The gravel extraction is likely to change the hydrology of the site and may affect the root zone of the trees, therefore small islands are likely to collapse over time and are unlikely to remain in a suitable condition for fauna or flora to persist in the long-term (DBCA, 2023).

After consideration of avoidance and mitigation measures, it was determined that offsets are not suitable to counterbalance the significant residual impacts to Carnaby's and FRT black cockatoo habitat 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 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 (see **Error! Reference source not found.**) identified that the impacts of the proposed clearing present a risk to fauna, biodiversity, adjacent conservation areas, and / or land and water resources. The consideration of these impacts, and the extent to which they can be managed through conditions applied in line with sections 51H and 51I of the EP Act, is set out below.

3.2.1. Biological values – Fauna – Clearing Principle (b)

Assessment

Available databases indicates that eight (8) conservation significant fauna species have been recorded from within 10 km of the application area. Black cockatoo habitat assessments were performed over the application area (360 Environmental, 2020 and 2021b), however, no other fauna survey has been performed. The following conservation significant fauna species have been assessed as the most likely to occur over the application area.

Falco peregrinus (Peregrine falcon)

The Peregrine falcon (OS) has been recorded from 2.5 km radius of the application area. The Peregrine falcon may fly over and utilise the vegetation in the application area in its migration. Given the bird's migratory nature and large range in addition to the availability of suitable habitat nearby, the application area is unlikely to comprise a significant habitat for the falcon. The proposed clearing is unlikely to impact on this fauna species.

Neelaps calonotos (Black-striped snake)

The black-striped snake (P3) has been recorded in the local area. The snake inhabits Banksia woodlands with sandy soils which characterise much of the Swan Coastal Plain. Noting that vegetation within the application area contains a mid storey of *Banksia sessilis* shrublands on sandy soils, the application area may contain the habitat for the black-striped snake and the snake may occur in the area. Individuals inhabiting the Banksia woodlands immediately south and east of the application area may also forage into application area. In the absence of an adequate fauna survey, the occurrence of the snake cannot be ruled out. Clearing may remove the habitat of the snake and impact on the conservation value of the fauna species.

Threatened Black cockatoo species: the Carnaby's and Forest Red-tailed Black cockatoo

The application area is within the mapped breeding and foraging Distribution of the Carnaby's black cockatoo (*Zanda latirostis*) and the mapped distribution (Vagrant) of the Forest Red-tailed black cockatoo (FRT – *Calyptorhynchus banksii naso*). Although threatened fauna values in lands adjoining the application area include multiple records of both of these threatened black cockatoo species FRT black cockatoo roosting or breeding are recorded locally (10 km radius of the application area). For the purpose of this assessment, therefore, much of the discussion on impacts on breeding and roosting habitats below focuses on the impacts on the Carnaby's black cockatoo, although it does not exclude impacts on the FRT cockatoo.

Carnaby's black cockatoo (*Zanda latirostis*) is endemic to the southwest of Western Australia. The Carnaby's cockatoo is Endangered under the EPBC Act and is a Matter of National Environmental Significance (MNES) (DOE, 2013). Currently, the overall population trend for all three black cockatoo species including the Carnaby's and FRT black cockatoos is declining and is expected to continue to decline (Garnett & Baker 2021 in DAWE, 2022). The recovery plans for the Carnaby's and FRT black cockatoos note that the reversal of threats, which includes loss of habitat, is required before significant increases in their population can occur (Carnaby's cockatoo Recovery Plan, 2013 and Forest red-tailed black cockatoo Recovery Plan, 2008).

Carnaby's black cockatoo preferred habitat is remnant native eucalypt woodlands, especially those of salmon gum (*Eucalyptus salmonophloia*) and wandoo (*E. wandoo*), and in shrubland or kwongan heathland dominated by plants of the Proteaceae family. It also occurs in forests containing marri, jarrah, karri (*E. diversicolor*) and tuart (*E. gomphocephala*) (Department of Parks and Wildlife, 2013).

The Carnaby's black cockatoo breeds between late July and December in the inland wheatbelt region of its distribution, in areas receiving between 300 and 750 millimetres of annual average rainfall (Saunders, 1974). During the non-breeding season (January to July), the majority of the birds move to the higher rainfall coastal regions of their range including the midwest coast, Swan Coastal Plain and south coast (Saunders, 1980; Saunders, 1990; Berry, 2008; Johnstone *et al.*, 2011). There has been an apparent expansion in the breeding range to include areas further west and south since the middle of last century with a more rapid increase into the jarrah (*E. marginata*) and marri (*Corymbia calophylla*) forests of the southwest (Johnstone and Storr, 1998; Johnstone *et al.*, 2011). This expansion in breeding range is due to threatening processes such as clearing of breeding habitat and competition for suitable breeding hollows. Carnaby's black cockatoo nests in large hollows in tall, living or dead eucalypts. It nests most commonly in smooth-barked wandoo and salmon gum but has also been recorded breeding in red morrel (*E. longicornis*), York gum (*E. loxophleba*), tuart, flooded gum (*E. rudis*), swamp yate (*E. occidentalis*), gimlet (*E. salubris*) and marri, and are said to nest in any species of eucalypt with a suitable hollow (Department of Parks and Wildlife, 2013).

Following breeding, they will flock in search of food, usually within six kilometres of a night roost (DSEWPac 2012; DPaW 2013) but may range up to 20 kilometres though in some cases foraging distances can be greater (DAWE, 2022). Carnaby's black cockatoo night roosts are usually located in the tallest trees of an area, and near both food supply and surface water (DAWE 2022; Le Roux (2017). Flocks will use different night roosts, often for weeks, or until the local food supply is exhausted. Flocks show some fidelity to night roosts with sites used in most years to access high-quality feeding sites. However, not all night-roosts are used in every year (DPaW 2013).

Black cockatoos forage over a large area, feeding on a variety of native and introduced (exotic and non-WA) vegetation species. Not all suitable native vegetation will produce good foraging resources each year, so black cockatoos will vary their foraging strategy depending upon availability. Black cockatoos rely upon the availability of foraging resources across their range, particularly when birds need to build condition after breeding and are teaching juveniles where foraging resources are located. Lack of foraging resources increases the likelihood that birds won't regain condition after breeding, won't breed again the following season, and that juveniles won't survive to become part of the adult population. Food resources within the range of breeding sites and roost sites are critical to sustain populations, and foraging resources are therefore viewed in the context of known breeding and night roosting sites, particularly within 12 kilometres of an impact area (DAWE, 2022). Connecting patches of vegetation between foraging resources, breeding habitat and night roosting habitat are therefore essential to enable black cockatoos to access resources across their range. Therefore, remnant patches of vegetation are considered important in maintaining black cockatoo habitat connectivity across the landscape.

Given the above, impacts of the proposed clearing on black cockatoo habitat must be assessed in terms of breeding habitat, night roosting habitat, and foraging habitat as well as ecological linkage values.

Breeding

The application area is within the mapped breeding area for the Carnaby's black cockatoo. Four confirmed natural hollows breeding sites are located approximately 12 km from the application area (See Figure 2). In addition, one potential breeding hollow is recorded within 12 km using the *WTBC breeding data restricted 2020* spatial layer. Three potential breeding hollows were identified within 50 metres of the application area during the black cockatoo hollow assessment performed by the applicant, one of which has chew marks on the entrance (360 Environmental, 2021b) (See Figure 11). The DBCA (2023) suggested that the number of potential hollows within the surrounding area is likely to be greater should further surveys be carried out within 12 km of the proposed site.

According to the Black Cockatoo Habitat Assessments performed over the application area (360 Environmental, 2020 and 2021b), the application area contains 170 mature marri and jarrah trees and stags with DBH >500 mm. Of these mature trees, 80 trees contain a combined 312 hollows of various sizes, with 52 of these trees containing a combined 114 hollows with an entrance measuring 120 mm in diameter or larger. Figure 3 depicts the locations of the hollowed trees, and representative photographs of the stags and hollowed trees are presented in Figure 7. The black cockatoo breeding suitability assessment performed on the identified hollows (360 Environmental, 2021b) suggested that the hollows are either not of suitable size, or not of suitable condition for black cockatoo breeding.

The limiting factor for the recovery of Carnaby's cockatoo and Forest red-tailed black cockatoos is the availability of breeding hollows (Carnaby's cockatoo Recovery Plan 2013 and Forest red-tailed black cockatoo Recovery Plan, 2008). Whilst the majority of the vegetation proposed to be cleared in the application may not currently support hollows of suitable size for black cockatoos, noting that trees take more than 120 years to develop hollows of suitable size for black cockatoo, preservation of a range of tree ages and maturity, including those yet to form hollows, or to form hollows of suitable size and condition, is important to ensure there is a succession plan in place to conserve black cockatoo breeding habitat (DBCA, 2023). It is also important to note that black cockatoos tend to breed in the next available hollows in the proximity of current or used hollows. Given the records of confirmed breeding sites within the local area, and the presence of at least three potential breeding trees within the property, in addition to the available surface water resources within 2 km radius, the trees containing multiple hollows of various sizes proposed to be cleared are within the range of breeding sites. Consequently, within the context of recovery plans for the Carnaby's black cockatoo, the mature trees containing hollows within the application area comprise critical habitat for the Carnaby's persistence in the region.

Given the above, the removal of the 170 mature marri and jarrah trees and stags, 80 of which contains multiple hollows of various sizes would have significant impact on the availability of Carnaby's breeding habitat, which cannot be reversed within the short-term.

Roosting

The application area contains 170 trees mature marri and jarrah trees, which are known to be some of the preferred tree species for roosting by black cockatoos. The application area is also near foraging and water resources, as well as known breeding sites. Confirmed roosting sites are recorded from within 20 km. The trees proposed to be cleared are therefore considered potential roosting trees for the black cockatoos in the region. Removal of these trees is likely to significantly impact the persistence of black cockatoos in the region.

Foraging

The application area contains 13.76 hectares of native vegetation comprising of *Eucalyptus marginata* (Jarrah) - *Corymbia calophylla* (Marri) woodland over shrubland of *Banksia sessilis* over sparse shrubland of *Xanthorrhoea preissii* likely to be in Very Good condition or better. The vegetation has been assessed as having a Very High-quality foraging value for black cockatoos (360 Environment, 2020 and 2021b). Evidence of foraging by black cockatoo in the form of chewed marri nuts have also been found over the application area (See Figure 9). A flock of foraging black cockatoos was also sighted from 60 m of the application area during a survey in 2019 (360 Environment 2020).

The recovery plan for the Carnaby's and FRT black cockatoo indicates that the limiting factor to population growth is adult and chicks' survival which relates to availability of food resources near to breeding hollows. Sufficient food close to nesting areas (~12km) is required for breeding birds to be able to forage and return to feed nestlings, particularly during the breeding seasons. If the nesting area is not close enough to adequate food or water supplies, Carnaby's cockatoos will not be able to successfully raise young. The area surrounding the proposed clearing site meets the vital criteria to rear young, in terms of proximity to food, water and hollows. Noting the occurrence of confirmed breeding sites in the local area and potential breeding sites within the property, the vegetation proposed to be cleared comprises a significant foraging habitat to support the breeding of Carnaby's cockatoo and migration of FRT cockatoo. The removal of native vegetation within the application area would contribute to the cumulative loss of foraging habitat for both the Carnaby's and FRT black cockatoos.

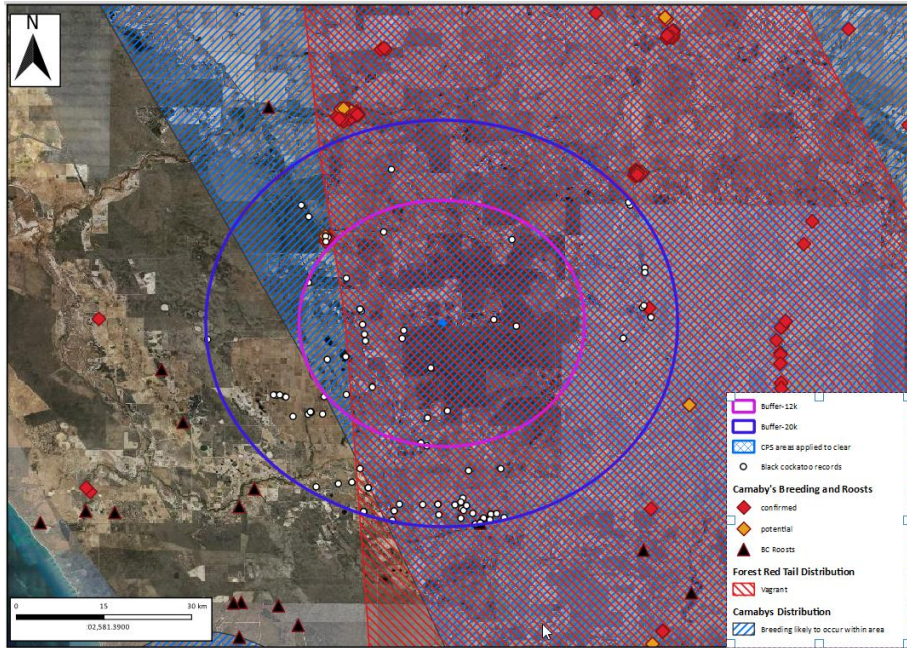


Figure 2. The application area is within the Carnaby’s breeding and Forest Red-tailed black cockatoo ‘s distribution area, surrounded by confirmed breeding and roosts sites.

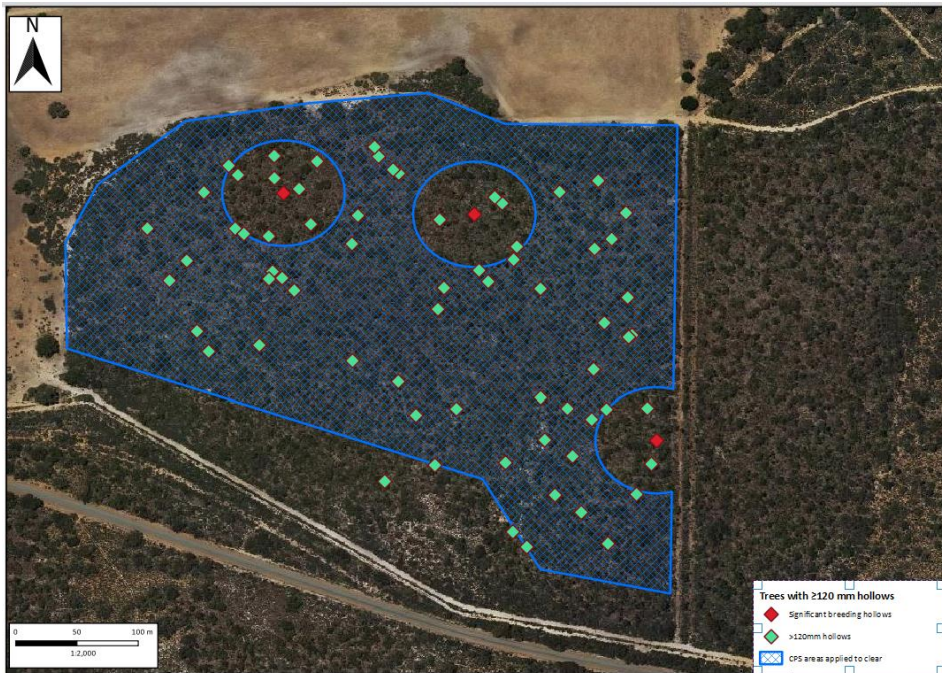


Figure 3. The application area and immediate vicinity contains at least 72 jarrah and marri trees and stags with a combined 162 hollows of 120 mm in diameter or larger. Fifty-two (52) of these trees with a combined 114 large hollows are within the application area and proposed to be cleared.

Ecological linkage

The vegetation within the application area also forms an integral part of an ecological linkage which is important for bird movement. The application area is mapped as having a high Roadside Conservation Committee (RCC) value (10). The RCC aims “to coordinate and promote the conservation and effective management of rail and roadside vegetation for the benefit of the environment and the people of Western Australia”. The RCC identify transport corridor remnants as having special environmental significance as they provide a transect of what the natural landscape looked like prior to broadscale clearing (RCC, 2000).

Carnaby’s and FRT black cockatoos migrate back and forth from the Swan Coastal Plain to the Wheatbelt and Southern Jarrah Forests to the east. The clearing of this patch of vegetation will have implications for the

movement of Carnaby'sand FRT cockatoo across the region. Reconstruction of ecological corridors is difficult and therefore best practice conservation advice is to prioritise identification, protection and maintenance (Bennett 1999).

Given the above, the removal of vegetation within the application area will have a significant impact on vegetation which is important for the migration of the threatened black cockatoo species.

Conclusion

For the reasons set out above, it is considered that the impacts of the proposed clearing on Carnaby's black cockatoo breeding, roosting and foraging habitat, as well as FRT black cockatoo foraging habitat cannot be managed to be environmentally acceptable. It is considered that offsets are not suitable for addressing the significant residual impacts of the clearing, on which basis the proposed clearing should be refused.

Condition: Nil.

3.2.2. Biological value – Biodiversity and Flora – Clearing Principle (a) and (c)

Assessment

Vegetation within the application area has been identified as comprising of *Eucalyptus marginata* (Jarrah) – *Corymbia calophylla* (Marri) woodland over shrubland of *Banksia sessilis* over sparse shrubland of *Xanthorrhoea preissii*. The flora and vegetation survey conducted over the application area (360 Environmental, 2020, 2021a) identified the majority of vegetation being in Good condition (Keighery, 1994), without introduced species or impacts noted from grazing or *Phytophthora*. Noting the absence of introduced species, grazing and / or *Phytophthora*, the Department has assessed the native vegetation over the application area as likely to be in Very Good (Keighery, 1994) condition or better. Being in Very Good condition or better, the application area is likely to provide habitat which supports various conservation significant flora and fauna known to occur in similar habitat profiles.

Thirty-one (31) conservation significant flora species have been recorded from within a 10 km radius of the application area. Of these recorded taxa, twenty-two (22) flora species were found within the same soil and vegetation types as those mapped within the application area (Appendix C3) and are considered likely to occur within the application area. The applicant commissioned 360 Environmental Pty Ltd to perform a targeted survey on 26 – 28 October 2020 (360 Environmental, 2021) to identify the presence of the following conservation significant flora species within the application area:

- *Thelymitra stellata* (EN) –Star Sun Orchid
- *Thelymitra dedmaniarim* (EN) –Cinnamon Sun Orchid.
- *Banksia mimica* (EN)
- *Goodenia arthrotricha* (EN)
- *Conospermum densiflorum* subsp. *unicephalatum* (EN).

The surveys conducted identified two conservation significant flora species, namely *Lasiopetalum venustum* (P3) and *Synaphea grandis* (P4), within the application area at the time of the survey. Based on the location of the records, these plants were to be removed by the proposed clearing. The surveys did not identify Threatened flora species within the application area.

The Department sought DBCA advice (DBCA, 2023) regarding the conservation values of the flora species and possible impacts of the proposed clearing. The Department's assessment of impacts to conservation significant flora is as follows:

- *Lasiopetalum venustum* (P3) – Twenty four (24) plants of this flora species were identified during the survey. This species is only known to DBCA from one location, the Boonanarring area. All specimen records occur within a north-west extent of 9 km and east-west extent of approximately 4 km (a historical record occurs a further 10 km east which is likely to be plotting incorrectly). *L. venustum* occurs on lateritic soils, like that of the application area, which are under increasing threat from gravel extraction. Most records occur adjacent to the application area within the Boonanarring Nature Reserve, where its common in its occurrence. However, due to the species' restricted distribution and the potential threat from further gravel mining, DBCA recommended that all plants should be avoided where possible, until the species distribution has been adequately surveyed. Protection of subpopulations in the local area, including those within the Boonanarring Natural Reserve, should be given a priority by ensuring that gravel extraction would not impact the Reserve, directly or indirectly. Due to its restricted distribution, therefore, all occurrences are considered important for this species survival and the application area

occurs close to the current northern extent of the species range. As such, the taking of this species within the application area may significantly impact the species at a local and regional scale.

- *Synaphea grandis* (P4) – Two plants of this species were identified within the application area during the surveys. This species extent of occurrence is highly fragmented. It occurs on laterite soils, so it is also under potential threat from gravel extraction activities. It has been recorded from 6 general locations, 43 km east to west and 45 km north-south. With historical subpopulations potentially extending this to 70km north-south and 8 locations however, it is uncertain if these subpopulations still exist. Over 80% of the 43 specimen collections are from the Boonanarring area, most of which occur in the Boonanarring Nature Reserve, so it is well represented in the local area. The taking of this species will not significantly impact this species at a local or regional scale, or the conservation status.
- The surveys were undertaken outside the recommended survey period to detect *Goodenia arthrotricha*, noting that the vegetation within the application area is consistent with the habitat of the species. DBCA further asserted that *Thelymitra stellata* and *T. variagata* do not flower every year that it is difficult to accurately conclude that they do not occur in the area if multiple surveys have not been undertaken. A minimum of two surveys during the species flowering period is recommended for orchids, providing there has been adequate rainfall. Consequently, to accurately assess impact of the proposed clearing on the conservation of these Threatened species, further survey for the flora species would be required.

Conclusion

Based on the above assessment and in the absence of adequate flora surveys performed at the appropriate time, the proposed clearing may result in the removal of Threatened flora species *Goodenia arthrotricha*, *Thelymitra stellata* and *T. variagata*. It would also remove almost all known *Lasiopetalum venustum* (P3) in the local area, whose distribution remains unknown. On the basis of current information, the proposed clearing would have a significant impact on priority floras at a local or regional scale.

Conditions: Nil

3.2.3. Biological value – conservation area – Clearing principle (h)

Assessment

The application area is adjacent to the Boonanarring Nature Reserve which is protected for the conservation of flora and fauna. The reserve contains a diverse array of flora, including Threatened and Priority listed flora species (DBCA, 2023). DBCA advised that extraction of gravel after the proposed clearing could indirectly impact on the conditions of the Reserve through the dust caused from the gravel extraction and increased risks of weeds and disease, reduced fauna corridors, and reduced pollinators in the area. Although the impact would be indirect, it could be significant in the absence of proper mitigation.

To avoid impact on the conservation values of the reserve, sufficient vegetation must be retained to maintain connectivity between the reserve and the remnant vegetation through the vegetation on the south and eastern sides of the clearing area. It is noted that the application area has a 40 metre buffer from Wannamal Road which separates it from the reserve, however, a wider southern buffer would be recommended to reduce impacts to the reserve. The appropriate size of the buffer would likely be dependent on further studies regarding dust dispersion and mitigation which would be regulated through the Extractive Industry Licensing processes. In the absence of the further information and sufficient mitigation measures, there is potential for the proposed clearing to have a significant impact on the Boonanarring Nature Reserve.

Conclusion

Based on the above assessment, the proposed clearing may be at variance with this principle.

Conditions: Nil.

3.2.4. Land and water resources (Soils) - Clearing Principles (g)

Assessment

Most of the application area is within the Dandaragan System, characterised by subdued dissected lateritic plateau, undulating low hills and rises with narrow alluvial plains with variable deep sands and sandy gravels plus minor earths, duplexes and clays and marri woodlands and shrublands (Department of Agriculture and Food WA, 2012). The soil profile is porous which according to the applicant will generate little or no runoff under any but the most extreme rainfall conditions (Dykstra, 2022). However, being dominated by sands, the soils in the application area are prone to wind erosion. Clearing would expose the sandy soils when the native vegetation is removed.

Dispersion and deposition of fugitive dusts and soil materials into the environment could impact on the condition of the adjacent native vegetation, including that within the Boonanarring Nature Reserve. As discussed in Section 3.2.3, the assessment of dust impact on the environmental values of the adjacent environment would require further studies to confirm appropriate measures for mitigating dust dispersion.

The risk of erosion due to the gravel extraction operations have been addressed in the assessment for the Works Approval (WA). According to the document submitted for the WA assessment, the application of dust suppressant and drainage management is designed to mitigate the spread of dusts and any runoff resulted from the operations (Dykstra, 2022).

Conclusion

Based on the above assessment, the proposed clearing may increase the risk of wind erosion. Detailed studies regarding dust dispersion would provide more information for the assessment of impacts and mitigation measures.

Conditions: Nil.

3.3. Relevant planning instruments and other matters

In addition to its consideration of the environmental values of the application area, under section 51O(4) of the EP Act, the Department is required to consider planning instruments or other matters considered relevant to the assessment of clearing impacts.

The Delegated Officer has reviewed a copy of the Development approval (DA) issued by the Shire of Gingin under the *Planning and Development Act 2005* for the proposed gravel extraction. It is noted that a Works Approval (WA) under Part V Division 3 of the EP Act. has also been acquired for the proposed project. The Delegated Officer notes that an Extractive Industry Licence (EIL) has been applied for to the Shire of Gingin, the approval of which is subject to a clearing permit being issued. The Shire of Gingin advised DWER that the Shire did not have any objections to the proposed clearing and that the proposed clearing is consistent with the area subject to the Development Approval.

During assessment, the Department was informed by the applicant that it was not economically viable to move the location of the proposed gravel extraction to a cleared area nearby to avoid the clearing of native vegetation. Geological survey performed by the applicant indicated that the proposed clearing area contained gravel resources of higher value, whilst the already cleared areas immediately adjacent were devoid of them (AllTrack, 2023; Dykstra, 2023).

The Department notes that the application area is not within the preferred Significant Geological Supply (SGS) or Basic Raw Material (BRM) maps identified in accordance with the *State Planning Policy 2.4*. The applicant submitted that although not currently within the mapped SGS and BRM, the Kalbarri to Guilderton subregional planning strategy identified gravel as a BRM important for future urban and industrial development. The Shire of Gingin's Local Planning Strategy also outlines that raw materials contribute to economic activity in the area (Dykstra, 2023). The gravel extracted from the project is expected to contribute to the urban development within the Shire and avoid importation of gravel from further away sources (AllTrack, 2023).

While the potential benefits of the proposed gravel extraction are acknowledged, the Department notes that there is no immediate demand for gravel to support developments within the Shire which will deliver significant public benefit. On that basis and within the context of the severity of impacts on environmental values, the Department is of the view that the clearing is not justified when taking into consideration the necessity of the clearing relative to the environmental impacts that would result.

The applicant may have notification responsibilities under the EPBC Act for impacts to the Carnaby's and Forest red-tailed black cockatoos and their habitats, as set out in the EPBC Act. The applicant has been advised to contact the federal Department of Water, Agriculture and the Environment (DAWE) to discuss EPBC Act referral requirements.

The application was advertised for 21 days and three public submissions were received. Issues and matters raised by the submissions are summarised and addressed in Appendix B.

4 Suitability of offsets

It is acknowledged that the applicant indicated a willingness to provide offsets, however, the Delegated Officer determined that due to the severity of environmental impacts associated with the proposed clearing, an offset would not be suitable in counterbalancing these impacts. This position aligns with the WA Environmental Offsets Guidelines, which state that offsets are not appropriate in all circumstances, as some environmental values cannot be offset.

End

Appendix A. Additional information provided by applicant

During assessment DWER requested for further information and an intent to refuse notification (DWER, 2023a and DWER 2023b). The applicant has provided the requested information and comments on the department's notification which are summarised below.

DWER request for information and comments	Summary of comments provided by the applicant	Consideration of comment
Extraction of gravel should be performed on the already cleared area nearby to avoid clearing of native vegetation.	The applicant conducted testing which demonstrated that the gravel within proposed application area is of a certain quantity and value to viably extract. It would not be viable or suitable to extract gravel from the adjoining cleared areas (Dykstra, 2023)	DWER acknowledged this information. Discussed in Section 3.3.
The proposed clearing may impact on Matters of National Environmental Significance and require a referral to the DCCEEW to be assessed under the EPBC Act.	The applicant has held a pre-referral meeting with DCCEEW on 11 August 2020 whereby DCCEEW recommended a Black Cockatoo hollow assessment be conducted in addition to the Black Cockatoo habitat assessment performed in 2019. A referral number is provided. (360 Environmental, January 2023)	DWER acknowledged this information.
Further avoidance and minimisation should be considered.	Avoidance and minimisation have been considered. The creation of the tree exclusion zones measuring 50 m in radius around each suitable breeding trees and a set back of a minimum 40 m from the Wannamal Road are intended to minimise impacts on Black cockatoo and the environmental values (Dykstra, 2023)	Addressed in Section 3.3.
The proposed clearing is seriously at variance with principle (b).	An offset area comprising of vegetation in Excellent condition immediately adjacent to the proposed project area will be provided to counterbalance the significant residual impact on Black cockatoos (Dykstra, 2023, 360 Environment, 2023)	The significant residual impacts on the Carnaby's black cockatoo are highly significant in the context of the recovery plan for the species. The Department is of the view that it is not appropriate to consider offsets given the environmental unacceptability of the clearing as proposed. This position aligns with the WA Environmental Offsets Guidelines, which state that offsets are not appropriate in all circumstances, as some environmental values cannot be offset.
Justification for the significance of the proposed project is required. Within the planning context it is noted that the proposal is not within SPP 2.4 Significant Geological Supplies Map 2022, or within Regional Basic Raw Materials mapping.	The Kalbarri to Guilderton subregional planning strategy identifies gravel as a BRM important for future urban and industrial development. The Shire of Gingin's Local Planning Strategy outlines that raw materials contribute to economic activity in the area (Dykstra, 2023). The gravel extracted from the project will contribute to the urban development within the Shire and avoid importation of gravel from faraway places.	Addressed in Section 3.3.

DWER request for information and comments	Summary of comments provided by the applicant	Consideration of comment
Other relevant approvals will be required.	The proposed project has acquired a Development Approval (DA), Works Approval (WA) and in the process of acquiring the Extractive Industry Licence (EIL) which is pending an approval of the proposed clearing (R. Morris, 2023)	DWER acknowledged that the DA and WA had been obtained by the applicant. It is also noted that both DA and WA refer to the requirement to have a clearing permit prior to clearing of any native vegetation for the project.

Appendix B. Details of public submissions

Three submissions were received during the public submission period (Submission 2023a, 2023 b, 2023c). The issues raised in the submissions are summarised below.

Summary of comments	Consideration of comment
<i>The significance of the project's purposes</i>	
a. There don't seem pressing needs to clear the area for gravel extraction	Addressed in Section 3.3.
b. Lands immediately adjacent to the application area are cleared and most likely have gravel resources	Addressed in Section 3.3.
<i>The proposed clearing is at variance with principle (b)</i>	
a. The native vegetation proposed to be cleared is a native fauna habitat	Addressed in Section 3.2.2
b. The application area contains the essential vegetation for breeding and foraging of two threatened Black Cockatoo species	Addressed in Section 3.2.2.
<i>Priority / Threatened Flora Species are likely present</i>	
a. Flora survey was conducted 2 years ago, leaving large gap of missing knowledge	Addressed in Section 3.2.3
b. Many of the flora species were not in their flowering times when the flora survey was conducted.	Addressed in Section 3.2.3
c. Preservation of priority flora species is not addressed in the application	Addressed in Section 3.2.3
<i>Vegetation</i>	
a. The clearing contributes to the death by a thousand cuts	The refusal of the application does not provide authority for the clearing of native vegetation.
b. Open forest of <i>Eucalyptus marginata</i> and <i>Corymbia calophylla</i> woodland, with a second storey of <i>Banksia grandis</i> is already under threat of decreased rainfall, climate change, disease, weed invasion and habitat fragmentation. Clearing will lead to dieback and weeds invasion and further reduce the extent of remaining 'Gingin 1027' type of vegetation	The refusal of the application does not provide authority for the clearing of native vegetation which could result in the spread of weeds and dieback.
<i>Impacts on land resources</i>	
Clearing contributes to land degradation	Addressed in Section 3.2.4
Rehabilitation of lands are often non-substantial to mitigate the impact	The refusal of the application does not provide authority for the clearing of native vegetation. On that basis, rehabilitation is not relevant in the context of the assessment.

Appendix C. Site characteristics

C.1. Site characteristics

Characteristic	Details
Local context	The area proposed to be cleared is part of a 86.4-hectare patch of native vegetation in the intensive land use zone of Western Australia. It is surrounded by lands zoned for 'General Rural' and is separated by Wannamal Road West from the Boonannaring Natural Reserve. Spatial data indicates the local area (10-kilometre radius from the centre of the area proposed to be cleared) retains approximately 40.8 per cent of the original native vegetation cover.
Ecological linkage	Vegetation in the application area does not comprise a formally mapped ecological linkage. The vegetation is contiguous with part of the roadside vegetation that comprises the roadside conservation resources linking patches of remnant native vegetation in the region, with a high Roadside Conservation Committee (RCC) values of 10 and 11.
Conservation areas	The application area is immediately north of the Boonannaring Natural Reserve, a Class 'C' reserve for the purpose of Conserving Flora and Fauna (DBCA, 2017). The reserve provides a sustainable habitat for small native mammals including <i>P. albocinereus</i> , <i>Sminthopsis</i> sp(p). and <i>T. rostratus</i> , most likely due to its large area of remnant vegetation encompassing many habitat types (Moore et al 2016). The reserve supports two listed TECs and 22 listed threatened species (DBCA, 2017).
Vegetation description	<p>The application area is within the Swan Coastal Plain bioregion of the Interim Biogeographic Regionalisation of Australia (IBRA) and within the Dandaragan Plateau (SWA1) subregion.</p> <p>A flora and vegetation survey over the application area has identified the vegetation as comprising of <i>Eucalyptus marginata</i> (Jarrah) - <i>Corymbia calophylla</i> (Marri) woodland over shrubland of <i>Banksia sessilis</i> over sparse shrubland of <i>Xanthorrhoea preissii</i> (360 Environmental, 2020). Photographs of the vegetation and excerpt of the survey and maps are available in Appendix F.</p> <p>This is consistent with the mapped vegetation type(s):</p> <ul style="list-style-type: none"> • Karamal Complex-South, which is described as open forest of <i>Eucalyptus marginata</i> (Jarrah) - <i>Corymbia calophylla</i> (Marri) with second storey of <i>Banksia grandis</i> (Bull Banksia). <p>The mapped vegetation type/s retain approximately 64 per cent of the original extent (Government of Western Australia, 2019).</p>
Vegetation condition	<p>The flora and vegetation survey over the application area (360 Environmental, 2020) identified the vegetation as being mostly in Good condition (Keighery, 1994) without the presence of introduced species, sign of grazing nor <i>Phytophthora</i>.</p> <p>The full Keighery (1994) condition rating scale is provided in Appendix E. The full survey descriptions and mapping are available in Appendix F.</p> <p>Given the absence of weeds, impacts of grazing or dieback, the Department is of the view that the vegetation is likely to be in Very Good condition or better.</p>
Climate and landform	<p>The climate of the application area is characterised by an average annual rainfall of 620.7 mm with average temperature ranging between the minimum 11.1°C and 25.7°C.</p> <p>The contour of the area ranges between 231 AHD at the lowest point and 264m AHD at the highest point.</p>
Soil description	<p>The soil of the majority of the application area is mapped as:</p> <ul style="list-style-type: none"> • 222Da, described as "Undulating to rolling rises with breakaways. Areas dominated by duricrust (rock outcrop)". <p>A small portion of the application area just outside of the northern perimeter comprises of soil mapped as :</p> <ul style="list-style-type: none"> • 222Cp, which is described as "Drainage depressions and sand rises. Yellow deep sand".

Characteristic	Details
Land degradation risk	Being sandy, the soils at the application can be prone to wind and water erosion over bare ground. Subsurface acidification risk is also high at some parts of the application area.
Waterbodies	The desktop assessment and aerial imagery indicated that no surface water features, watercourse, or geomorphic wetlands occur within the application area. A few non-perennial waterlines, including the Gingin Brook are within one kilometres of the application area.
Hydrogeography	The application area is within the Swan Avon Catchment Area of the Dandaragan Plateau Hydrozone. It is also within the Gingin Groundwater Area, proclaimed under the RIWI Act. Groundwater salinity ranges between 1000 and 3000 mg/l (TDS)
Flora	There are records of 24 conservation significant flora species within 10 kilometres, all of which are found on the same soil type as the application area. A survey conducted in 2019 identified two Priority flora species (360 Environment, 2020). Three Threatened species are likely to occur in the area, however, the timing of the survey was unsuitable for detection of these species.
Ecological communities	The application area is 600 m from a mapped occurrence of Banksia Woodlands TEC. There are 263 patches of Banksia Woodland TEC within 10 km radius of the application area.
Fauna	There are records of 8 fauna species of conservation significance within the local area and black cockatoo roost and breeding sites are confirmed within 12 km of the application area.

C.2. Vegetation extent

	Pre-European extent (ha)	Current extent (ha)	Extent remaining (%)	Current extent in all DBCA managed land (ha)	Current proportion (%) of pre-European extent in all DBCA managed land
IBRA bioregion*					
Swan Coastal Plain	1,501,209.19	587,889.09	39.1	195,834.87	33.33
Vegetation complex					
Karamal Complex-South (Dandaragan Plateau – 61)	24,017	15,385	64	6,986	29
Local area (calculation - delete if not required)					
10km radius	142,200	58,033	40.8	-	-

*Government of Western Australia (2019a)

**Government of Western Australia (2019b)

C.3. Flora analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix H.1), and biological survey information (360 Environment, 2020a, 2020b) impacts to the following conservation significant flora required further consideration.

Species name	Conservation status	Suitable habitat features ? [Y/N]	Suitable vegetation type? [Y/N]	Count within 10 km radius	Distance of closest record to application area (km)	Are surveys adequate to identify? [Y, N, N/A]
<i>Acacia cummingiana</i>	3	Y	Y	2	4.24	Yes
<i>Acacia drummondii</i> subsp. <i>affinis</i>	3	Y	Y	2	5.47	Yes
<i>Acacia pulchella</i> var. <i>reflexa acuminata</i> bracteole variant (R.J. Cumming 882)	3	Y	Y	2	3.19	Yes
<i>Banksia chamaephyton</i>	4	Y	Y	3	5.11	Yes
<i>Banksia kippistiana</i> var. <i>paenepeccata</i>	3	Y	Y	4	3.17	Yes
<i>Banksia mimica</i>	T	Y	Y	2	4.73	Yes
<i>Banksia pteridifolia</i> subsp. <i>vernalis</i>	3	Y	Y	6	4.71	Yes
<i>Caladenia speciosa</i>	4	Y	Y	1	1.37	Yes
<i>Goodenia arthrotricha</i>	T	Y	Y	1	2.95	No – survey was outside of the flowering season
<i>Goodenia xanthotricha</i>	2	Y	Y	2	1.09	Yes
<i>Grevillea saccata</i>	4	Y	Y	5	3.17	Yes
<i>Hibbertia glomerata</i> subsp. <i>ginginensis</i>	2	Y	Y	2	0.29	Yes
<i>Hypolaena robusta</i>	4	Y	Y	5	6.06	Yes
<i>Isopogon autumnalis</i>	3	Y	Y	2	5.92	Yes
<i>Lasiopetalum venustum</i>	3	Y	Y	16	0.00	Yes – 24 plants were identified
<i>Loxocarya gigas</i>	2	Y	Y	2	4.22	Yes
<i>Netrostylis</i> sp. <i>Chandala</i> (G.J. Keighery 17055)	2	Y	Y	1	3.17	Yes
<i>Persoonia rudis</i>	3	Y	Y	1	0.51	Yes
<i>Styphelia allittii</i>	3	Y	Y	1	7.14	Yes
<i>Styphelia filifolia</i>	3	Y	Y	3	0.98	Yes
<i>Synaphea grandis</i>	4	Y	Y	13	0.00	Yes – 2 plants were identified
<i>Thelymitra stellata</i>	T	Y	Y	3	8.35	No – repeated survey may be required.
<i>Tetrateca hirsuta</i> subsp. <i>boonanarring</i>	2	Y	Y	7	0.54	Yes
<i>Verticordia lindleyi</i> subsp. <i>lindleyi</i>	4	Y	Y	1	6.32	Yes

C.4. Fauna 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>Zanda lateriosis</i> (Carnaby's cockatoo)	EN	Y	Y		3.09	18	Y
<i>Calyptorhynchus sp. 'white-tailed black cockatoo'</i> (white-tailed black cockatoo)	EN	Y	Y		4.99	2	Y
<i>Falco peregrinus</i> (Peregrine falcon)	OS	Y	Y		2.48	3	N/A
<i>Hydroprogne caspia</i> (Caspian Tern)	MI	Y	Y		7.87	2	N/A
<i>Neelaps calonotos</i> (black-striped snake, black-striped burrowing snake)	P3	Y	Y		5.74	3	N/A
<i>Notamacropus irma</i> (western brush wallaby)	P4	Y	Y		4.39	2	N/A
<i>Oxyura australis</i> (Blue-billed duck)	P4	N	N		7.45	9	N/A
<i>Tringa nebularia</i> (Common greenshank, greenshank)	MI	Y	Y		8.39	3	N/A

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

C.5. Ecological community analysis table

Community 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]
Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	EN	Y	N	Y	0.06	263	Y

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

C.6. Land degradation risk table

Risk categories	<i>Dandaragan Morabup Subsystem (222Da)</i>	<i>Capitella Gooninong Subsystem (222Cp)</i>
Wind erosion	M2: 30-50% 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	L1: <3% of map unit has a high to extreme water erosion risk	L1: <3% of map unit has a high to extreme water erosion risk
Salinity	L1: <3% of map unit has a moderate to high salinity risk or is presently saline	L1: <3% of map unit has a moderate to high salinity risk or is presently saline
Subsurface Acidification	M2: 30-50% of the map unit has a high susceptibility	H2: >70% of map unit has a high subsurface acidification risk or is presently acid

Flood risk	L1: <3% of the map unit has a moderate to high hazard	M1: 10-30% of the map unit has a moderate to high flood risk
Water logging	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
Phosphorus export risk	L1: <3% of map unit has a high to extreme phosphorus export risk	M1: 10-30% of map unit has a high to extreme phosphorus export 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>Several conservation significant flora species have been recorded from within the application area and surrounds. . Black cockatoo species have been known to forage within the application area which provides high value habitat for the Carnaby’s black cockatoo. The application area is immediately adjacent to the Boonanarring Nature Reserve which is protected to conserve the biodiversity values within the reserve and contributes to the functionality of the roadside ecological linkage. The area proposed to be cleared contains vegetation in Very Good condition that supports locally significant flora and fauna.</p>	At variance	Yes <i>Refer to Section 3.2.2, above.</i>
<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 contains foraging and breeding habitat for the Carnaby’s black cockatoo. The vegetation within the application area is assessed as providing Excellent foraging value for threatened black cockatoo species. Several confirmed roosting and breeding sites for Carnaby’s black cockatoo are known from the local area.</p>	Seriously 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>Threatened flora species have been recorded from the local area. The application area contains habitat and soils that are suitable for the threatened flora species. A survey conducted in 2019 did not record threatened flora species, however, the survey was carried out outside of the flowering seasons for these species. The area proposed to be cleared may contain threatened flora species listed under the BC Act.</p>	May be at variance	Yes <i>Refer to Section 3.2.2, above.</i>
<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>Surveys by 360 Environmental Pty Ltd (2020 and (2021) over the application area concluded that the area proposed to be cleared does not contain species indicative of a threatened ecological community. The nearest mapped ecological community is the Banksia Dominated Woodlands of the Swan Coastal Plain, located approximately 600 m south-east of the</p>	Not likely to be at variance	Yes <i>Refer to Section 3.2.2, above.</i>

Assessment against the clearing principles	Variance level	Is further consideration required?
application area. The proposed clearing is unlikely to directly impact on a threatened ecological community.		
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 vegetation complex occurring within the application area (Karamal South) is 64 percent, and the remaining native vegetation cover in the local area is 40.8 percent. As such, the extents of the mapped vegetation type and native vegetation in the local area are 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> <p>The Boonanarring Nature Reserve is immediately adjacent to the application area. The application area is separated from the conservation area by Wannamal Road to the south. The closest distance between the proposed clearing and the conservation area is approximately 50 m. Whilst clearing is unlikely to have a direct impact on the conservation area, clearing and the subsequent gravel mining may indirectly impact the conservation area.</p>	May be at variance	Yes <i>Refer to Section 3.2.3, above.</i>
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 watercourses or wetlands are recorded within the application area. The vegetation within the application area does not contain species indicative of riparian or wetland vegetation. The proposed clearing is unlikely to impact on any vegetation growing in association with an environment associated with a watercourse or wetland.</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 moderately to highly susceptible to wind erosion and subsurface acidification. Clearing of native vegetation and the subsequent gravel extraction may exacerbate the risks.</p>	May be at variance	Yes <i>Refer to Section 3.2.4, 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 watercourses or wetlands are recorded within the application area, the proposed clearing is unlikely to impact surface water quality. The impact of gravel mining on surface and ground water quality and mitigation efforts are addressed under the assessment of works approval. Given that the</p>	Not likely to be at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
clearing will not intercept groundwater, impacts of clearing on groundwater quality and quantity is likely to be insignificant.		
<p><u>Principle (j)</u>: “Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.”</p> <p><u>Assessment</u>:</p> <p>According to the decision report for the works approval of the project, the soils in the application are porous on which basis the risk associated with flooding is low. The proposed clearing is unlikely to contribute to waterlogging.</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.

Appendix F. Biological survey information excerpts (360 Environmental, 2020, 2021a and 2021b)

The applicant commissioned 360 Environmental to undertake the following surveys:

Surveys	Time of Survey	Study area (ha)	Objectives

Flora and Vegetation Survey (360 Environmental, 2020)	6 September 2019	20.28 ha	<ul style="list-style-type: none"> • Desktop study and background research, investigating relevant literature, • Conduct a detailed single season flora and vegetation survey; • Develop a full species inventory containing all species located within the Impact Area; • Development of maps showing, condition, vegetation communities, locations of any threatened and priority species, significant communities, quadrat locations, invasive species, and background information; • Produce a flora, vegetation, and fauna report of the target area.
Targeted Flora Survey (360 Environmental, 2021a)	26 – 28 October 2020	20.28	<p>The survey was targeting conservation significant species, including two Endangered Orchids:</p> <ul style="list-style-type: none"> ○ <i>Thelymitra stellata</i> (EN) –Star Sun Orchid ○ <i>Thelymitra dedmaniarim</i> (EN) –Cinnamon Sun Orchid; <p>and other conservation significant flora, including but not limited to:</p> <ul style="list-style-type: none"> ○ <i>Banksia mimica</i> (EN) ○ <i>Goodenia arthrotricha</i> (EN) ○ <i>Conospermum densiflorum</i> subsp. <i>unicephalatum</i> (EN).
Black cockatoo habitat assessment (360 Environmental, 2021a)	6 and 13 September 2019	20.28	<p>Identification of habitat trees and any evidence of foraging and opportunistic observation of black cockatoo utilising the study area. Specifically, it identified the following:</p> <ul style="list-style-type: none"> • Native trees (e.g. Jarrah, Tuart, Marri, Wandoo and Salmon Gum) • Diameter at breast height (DBH) of greater than 500 mm (greater than 300 mm for Wandoo and Salmon Gum) regardless of the presence or absence of hollows (DBH is measured approximately 1.3 meters from the ground) • Any trees containing hollows (observed from the ground), which were then categorised as: <ul style="list-style-type: none"> ○ Hollows with an estimated opening diameter of less than 120 mm ○ Hollows with an estimated opening diameter of greater than 120 mm and therefore have the potential to be used by Black Cockatoos for breeding.
Black cockatoo hollow assessment (Greg Harewood) (360 Environmental, 2022)	25-27 September 2020	20.28	<p>Assessment of hollows identified in the Black Cockatoo assessment survey for their suitability for breeding. The parameters recorded for each tree included:</p> <ul style="list-style-type: none"> • Number of hollows • Type (chimney, spout, side entry) • Entrance size (<10, 10 – 15, 15 – 20 or 20+ cm) • Field assessment (no hollow, unsuitable hollow, appears suitable – no signs of use, chewed/chipped hollow, confirmed nest hollow, undecided – review pictures). <p>The survey determined that three trees contains significant suitable hollows, one of which has sign of use.</p>

Maps of survey area; vegetation condition and habitat trees



Figure 4. Maps of survey area, vegetation types and locations of survey quadrats (360 Environmental, 2020)



Figure 5. Map of vegetation conditions over the survey area (360 Environmental, 2020)

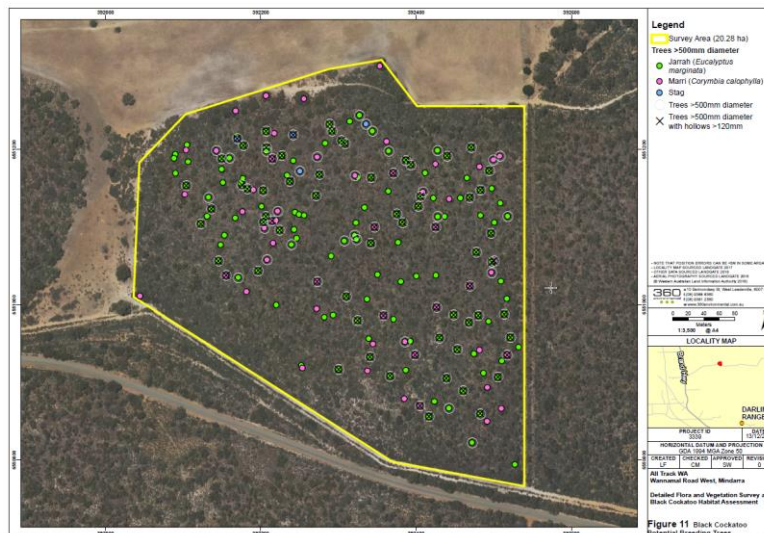


Figure 6. Location and distribution of potential habitat trees with DBH>500mm, their species, and sizes of hollows (360 Environmental, 2020)

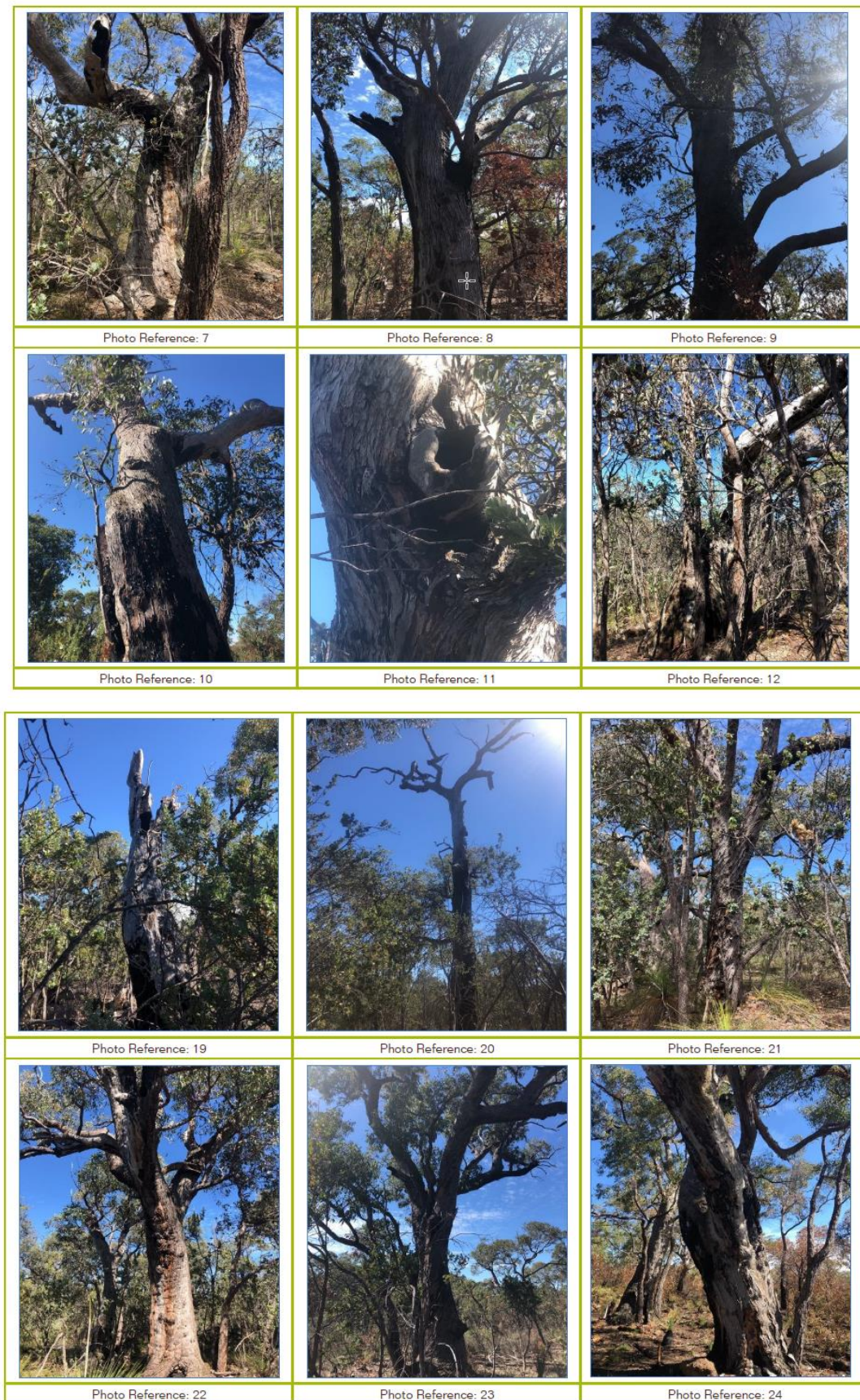


Figure 7. Representative photographs of vegetation, mature trees and stags, and hollows occurring within the survey area (360 Environmental, 2020)



<p>Site: TRQ1</p> <p>Latitude -31.1715791 Longitude 115.8715839</p> <p>Described by: Shenaye Hummerston Date: 2019-09-06 Type: Quadrat 10 x 10 Soil Colour: Brown Soil Type: Gravel,Loam,Sand Habitat: Upper slope Vegetation: <i>Eucalyptus marginata</i> woodland over open shrubland of <i>Banksia sessilis</i> over sparse shrubland of <i>Xanthorrhoea preissii</i> over sparse shrubland of <i>Hibbertia semipilosa</i></p> <p>Veg Condition: I Good Fire Age: > 5 years Fire Evidence: Burnt Trunks</p> <p>Notes</p> <p>Rock Type Laterite Total PFC: 70 % Disturbance Type: Fire evidence,historic logging signs</p> <p>Rock Cover: 1-5 % Bareground: 0 % Leaf Litter: 90 % Logs: 12 %</p>	
<p>Site: TRQ2</p> <p>Latitude -31.1689189 Longitude 115.868566</p> <p>Described by: Shenaye Hummerston Date: 2019-09-06 Type: Quadrat 10x10 Soil Colour: Brown Soil Type: Gravel,Loam,Sand Habitat: Ridge Vegetation: <i>Corymbia calophylla</i> woodland over <i>Banksia sessilis</i> shrubland over sparse shrubland of <i>Xanthorrhoea preissii</i> over sparse oedgeland of <i>Lepidosperma squamatum</i></p> <p>Veg Condition: Good Fire Age: Unknown Fire Evidence: -</p> <p>Notes</p> <p>Rock Type Laterite Total PFC: 80 % Disturbance Type:</p> <p>Rock Cover: 1-5 % Bareground: 0 % Leaf Litter: 95 % Logs: 5 % I</p>	

Figure 8. Representative photographs of the vegetation in the survey area (360 Environmental, 2020)



Figure 9. Foraging debris in the form of chewed marri nuts in the survey area (360 Environmental, 2020).

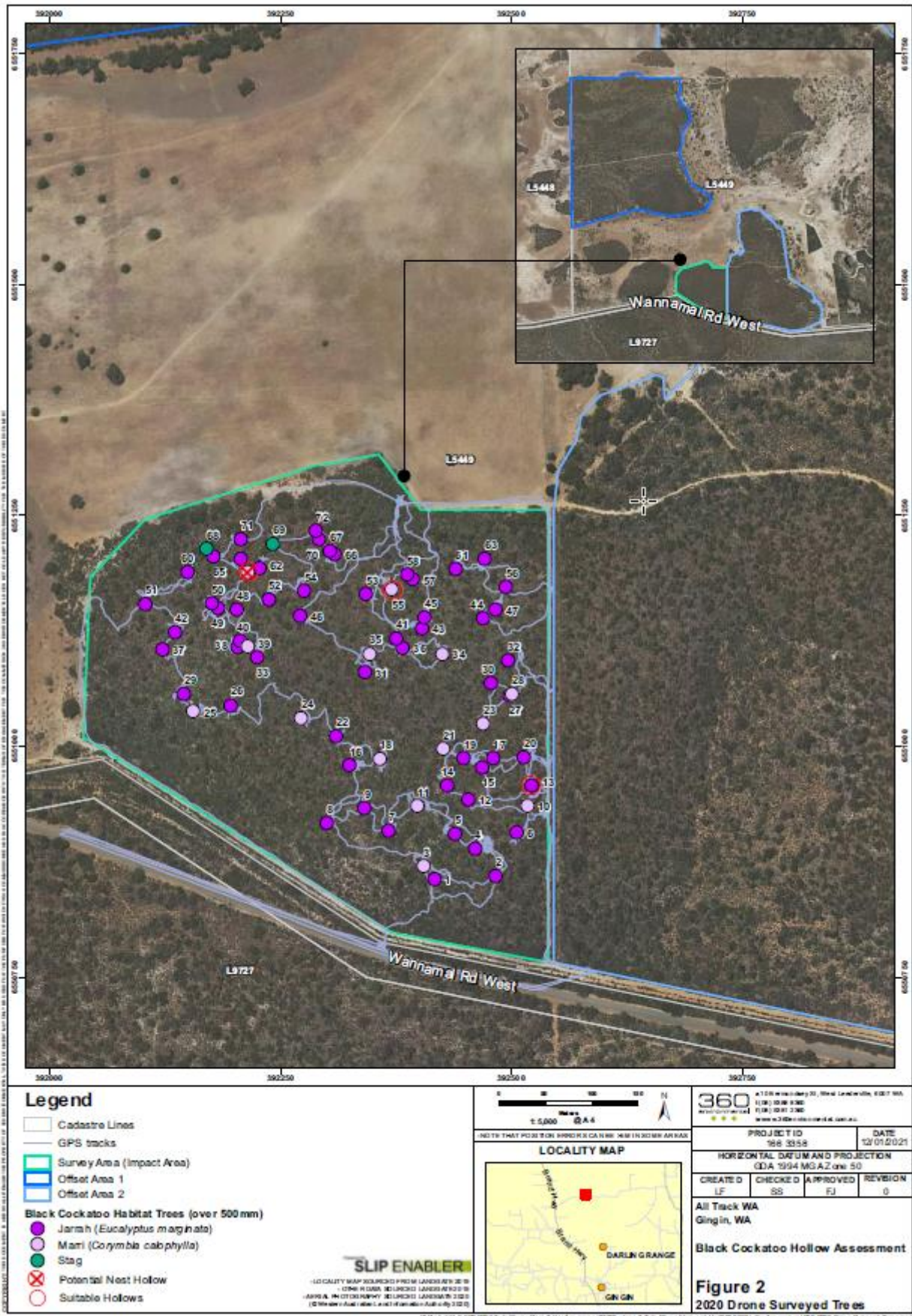


Figure 10. Map of the trees and stags assessed for breeding suitability (360 Environmental, 2021b)



Plate 1: Tree 13 potentially suitable hollow displaying no signs of use



Plate 2: Tree 55 potentially suitable hollow with two minor chips but no conclusive evidence of Black Cockatoo use



Plate 3: Tree 59 Hollow 1 with potential nest hollow

Figure 11. Three potential suitable hollows within the application area. The trees with suitable hollows are excluded from the application area (360 Environmental, 2021b, 2022)

Appendix H. Sources of information

H.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)

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