Government of Western Australia
Department of Water and Environmental Regulation

Clearing Permit Decision Report

1 Application details and outcome

1.1. Permit application details

Permit number:	CPS 9625/1
Permit type:	Purpose permit
Applicant name:	Holcim (Australia) Pty Ltd
Application received:	8 March 2022
Application area:	6.74 hectares of native vegetation
Purpose of clearing:	Expansion of Gosnells quarry and construction of an amenity bund.
Method of clearing:	Mechanical
Property:	Lot 3 on Plan 14769
Location (LGA area/s):	City of Gosnells
Localities (suburb/s):	Martin

1.2. Description of clearing activities

The application area is distributed across an area of 6.74 hectares and is for the purpose of the expansion of the Gosnell's quarry and construction of an amenity bund (see Figure 1, Section 1.3). The clearing is consistent with the Development Approval granted to the applicant for extractive industry and the associated amenity bund.

1.3. Decision on application

Decision:	Granted
Decision date:	23 December 2022
Decision area:	6.74 hectares of native vegetation, as depicted in Section 1.5, below.

1.4. Reasons for decision

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

In making this decision, the Delegated Officer had regard for:

- the site characteristics (see Appendix C),
- relevant datasets (see Appendix H.1),
- the findings of flora and fauna surveys (see 0),
- the clearing principles set out in Schedule 5 of the EP Act (see Appendix D),
- actions taken by Holcim which resulted in the avoidance, minimisation or mitigation of impacts to native vegetation (section 3.1 of this report),
- advice from the Department of Biodiversity, Conservation and Attractions (DBCA) on the impacts of the proposed clearing on conservation significant flora, and
- relevant planning instruments and any other matters considered relevant to the assessment (see Section 3).

After consideration of the above information, as well as the avoidance, minimisation and mitigation actions taken by Holcim, the Delegated Officer determined that the proposed clearing will result in the following significant residual impacts (SRI):

- the loss of 5.21 hectares of native vegetation that provides significant foraging habitat and suitable roosting habitat for Carnaby's cockatoo (*Zanda latirostris*), Baudin's cockatoo (*Zanda* baudinii) and forest red-tailed black cockatoo (*Calyptorhynchus banksia* subsp. *naso*) (collectively referred to as black cockatoos herein this report)
- the loss of one tree with one suitable breeding hollow for black cockatoos (no signs of use within this hollow identified).

To address the above SRIs, the Delegated Officer determined that the following rehabilitation/revegetation as mitigation and land acquisition (through monetary contribution) offset, are required to counterbalance the impacts of the clearing:

- revegetation and rehabilitation of 6.74 hectares of native vegetation, improving the condition of the vegetation from complexly degraded to good (Keighery, 1994) with native vegetation comprising suitable foraging habitat for black cockatoos.
- provide a monetary contribution of $54,000 for the acquisition and conservation (in perpetuity) of 25 hectares of native vegetation that consist of foraging habitat for black cockatoos in very good (Keighley 1994) condition.
- Installation of one artificial hollow within an area conserved in perpetuity under a conservation covenant.

In consideration of the above offset and mitigation actions, the DWER undertook a calculation using the WA Environmental Offset Metric. Consistent with the Government of Western Australia's *Environmental Offsets Policy* and *Environmental Offsets Guidelines*, the Delegated Officer considered the SRIs have been addressed through the conditioning of environmental offset requirements on the permit.

The Delegated Officer determined that the proposed clearing will also result in the following impacts:

- the loss of 5.14 hectares of the priority 4 'Central Northern Darling Scarp Granite Shrubland Community' priority ecological community (PEC).
- the loss of native vegetation that contains high biodiversity and provides habitat for priority flora species.
- may introducte and spread weeds and dieback into adjacent native vegetation, including within the adjacent regional park.
- may cause direct impacts to fauna utilising the application area during the time of clearing.

The Delegated Officer therefore decided to grant a clearing permit subject to the following conditions, which have been imposed on the clearing permit, to manage and address the impacts of clearing:

- avoid and minimise measures to reduce the impacts and extent of the clearing;
- take hygiene steps to minimise the risk of the introduction and spread of weeds and dieback;
- undertake slow, progressive one directional clearing to allow territorial fauna to move into adjacent habitat ahead of clearing activity,
- install artificial black cockatoo nest hollows within a nearby conservation covenant area at a 1:1 ratio to those being removed,
- provide a 15-metre buffer between the clearing area and the adjacent regional park to reduce indirect impact through dust and spread of weeds.
- fauna management measures to inspect habitat trees for evidence of current breeding by black cockatoo species and avoid in-use trees for the duration of the breeding season,
- submission of a rehabilitation plan for the mitigation rehabilitation as described above, and
- a monetary offset contribution for land acquisition, as described above.

Given the above and noting that the offset proposed (see section 4) counterbalances the impacts to black cockatoo habitat, the Delegated Officer determined that the proposed clearing is unlikely to lead to an unacceptable risk to the environment.

1.5. Site map

Figure 1 - Map of the application area. The area cross-hatched yellow indicates the area authorised to be cleared under the granted clearing permit.

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; and
- the polluter pays principle.

Other legislation of relevance for this assessment include:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- *Planning and Development Act 2005* (WA) (P&D Act)
- *Town Planning and Development Act 1928 (WA) (Repealed)*
- *Environmental Protection Act 1971 (WA) (EP Act 1971) (Repealed)*

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* (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

Consideration of alternatives

The applicant has advised that no alternatives can be pursued to avoid or minimise the clearing of native vegetation as the application area is required for the construction of a visual amenity bund to minimise visual impact to the southwest in accordance with the approved project (quarry development within Lot 3) described in the Environmental Review and Management Programme (ERMP) (Readymix, 1982). The ERMP was assessed by the Environmental Protection Authority under the *Environmental Protection Act* 1971 and led to a Development Approval issued by the then Minister of Planning under the Metropolitan Regional Planning Authority in 1984. Four alternatives were reviewed and assessed in the ERMP and the preferred project chosen which lead to a land swap with the State Government in 1985 to allow pit development to progress behind the front face of the pit as opposed to across the scarp to minimise visual impact (Holcim, 2022).

Avoidance and mitigation

The applicant advised that the proposed clearing has been minimised to as small an area as possible (Holcim, 2022). Holcim also operates in accordance with an existing Environmental Management Plan (EMP). The EMP provides mitigation measures for potential impacts of clearing on environmental values, including the following:

- Management processes in place to control any runoff or increase in sediment load as a result of clearing. Roads will have appropriate gullying and surface water infrastructure will be installed if required;
- Dieback and Weed Management Plan in place as part of the EMP to reduce the spread of weeds and dieback;
- Dust related impacts will be controlled by the following mitigation measures:
  - Regularly wet down with water cart / truck dust prone unsealed surfaces.
  - Undertake progressive rehabilitation in accordance with the Progressive Rehabilitation Plan (PRP).
  - Undertake dust monitoring as per the Dust Management Plan. Undertake progressive rehabilitation in accordance with the PRP.
  - Implementing additional dust control measures.

The applicant has also advised that they will:

- replace hollows of suitable size for black cockatoos with artificial hollows within an area that will be protected in perpetuity under a conservation covenant.
- ensure that a 15-metre buffer between the proposal and the adjacent regional park will be maintained to reduce impact to this conservation area through weeds and /or dieback.

Revegetation as mitigation

The applicant has also committed to:

- rehabilitating the visual amenity bund with vegetation suitable for black cockatoo habitat, post clearing, to reduce the residual impact to black cockatoo habitat.
- to maximise the revegetation success, a condition has been placed on the permit to ensure that a comprehensive revegetation plan, in accordance with the DWER's *Guide to Preparing Revegetation Plan for Clearing Permits,* is developed, implement, and approved, within 6 months of commencement of clearing.

Conclusion

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.

After consideration of avoidance and mitigation measures, it was determined that offsets to counterbalance the SRI to habitat for threatened black cockatoo species, an offset was necessary. In accordance with the Government of Western Australia's *Environmental Offsets Policy* and *Environmental Offsets Guidelines*, these SRIs have been addressed through the conditioning of environmental offset requirements on the permit. The nature and suitability of the offset provided is summarised in Section 4.

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, and land and water resource values.

The assessment against the clearing principles (see Appendix D) identified that the impacts of the proposed clearing present a risk to biological values (fauna, adjacent flora and vegetation) and conservation areas. 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. Environmental value: biological values (flora, vegetation, and biodiversity) – Clearing Principles (a), (c) and (d)

Assessment:

According to available databases, a total of 23 Threatened, 75 Priority flora species and one presume extinct flora species are mapped within the local area. Based on the similarities shared between the soil and vegetation types in habitats for these flora taxa and within the application area, eight threatened and 31 Priority flora had a potential to occur within the application area.

In total, nine flora and vegetation surveys have been completed in relation to Lot 3 at Holcim's Gosnells Quarry from 2005 to 2017. With the most recent survey been conducted by AECOM Australia Pty Ltd (AECOM, 2017) within Holcim's maximum development area for the Gosnells Quarry (Quarry area), which encompasses the application area.

A total of 319 vascular flora species from 50 plant families and 150 genera were recorded within the Quarry area, including 305 native species and 14 weed species (AECOM, 2017). A total of nine vegetation communities were also mapped within the Quarry area, including four heath communities associated with granite, considered locally significant due to their unique and highly diverse floristic composition of shrubs and forbs (AECOM, 2017). Three of these health communities occurs within the application area.

An occurrence of the priority 4 'Central Northern Darling Scarp Granite Shrubland Community' PEC occurs approximately 989 metres northeast of the application area. Ecological communities that are adequately known and are rare but not threatened or meet criteria for near threatened, or that have been recently removed from the

threatened list, are considered priority 4 by DBCA (DBCA, 2021). This community consists of heterogeneous assemblages of shrublands and heath on grey to yellow sandy/loamy soils derived from granite or occasionally Ridge Hill Shelf soils. The community has been located from John Forest National Park to Ellis Brook Valley, where approximately 375 hectares occur (DBCA, 2022).

The most recent flora survey stated that no priority or threatened ecological vegetation communities have been identified within the application area or adjoining vegetation (AECOM, 2017). However, advice was sort from DBCA regarding the potential presence of this PEC within the application area, as some species recorded during the survey form components of this PEC. DBCA advised that the presence/absence of this PEC within the application cannot be confirmed as it appears the floristic/cluster analysis of quantitative quadrat data from the survey did not include species quadrat data held in Markey (1997), who first described this PEC. As this comparison has not been done, the presence of this PEC within the application area cannot be ruled out (DBCA, 2022). The proposed clearing of up to 5.19 hectares of heath communities associated with granite, identified within the application area, may represent this PEC. The proposed clearing of 5.19 hectares of this PEC is not considered to significantly impact the conservation status of this PEC at a regional or local level given that 375 hectares of this PEC occurs 1 km east of the application area and will not be impacted by the proposed clearing.

Table 1: Species richness of plant communities within the application area (AECOM, 2017)

Vegetation community	Species richness	Amount (ha) in application area)
HeSb (heath community)	122	4.58
BpSr (heath community	52	0.27
VaBs (heath community)	75	0.07
CcCrTc	42	0.29

The surveys recorded five flora species of conservation significance within the application area (AECOM, 2017):

- *Acacia horridula* (Priority 3);
- *Asteridea gracilis* (Priority 3);
- *Beaufortia purpurea* (Priority 3);
- *Lasiopetalum glutinosum* subsp. *glutinosum* (Priority 3); and
- *Acacia oncinophylla* subsp. *patulifolia* (Priority 4).

Acacia horridula occurs in gravelly soils over granite, sand and rocky hillsides (Western Australian Herbarium, 1998-). This species was recorded at one location within the Quarry area, within the area under application, comprising six individuals over a 0.009 ha area despite extensive searching (AECOM, 2017) in a spring 2016 survey. DBCA advice state that this species is known from numerous locations with a range of approximately 180 km north-south and 90 km east-west. The population within the application area is within the known range of the species. Populations have been recorded in adjacent Ellis Brook Velley Reserve with several large populations at that location. Impacts of the proposed clearing are unlikely to be significant at the local or regional scale (DBCA, 2022).

Asteridea gracilis is known to occur in sand, clay and gravelly soils (Western Australian Herbarium, 1998-). Two distinct populations of this species were recorded within the Quarry area, one south (~5 individuals) and one northeast (~15 individuals) of the existing pit. The southern population was recorded within and adjacent to the application area. It is estimated that approximately 3 out of 5 individuals within this southern population will be impacted by the proposed clearing. Available databases show that this species occurs from seven locations with a range of 350 km north south and 320 km east west. DBCA advice states that the two populations at the Gosnells Quarry site occur within the known range for this species however there is a lack of recent and local occurrences of this species, the populations at Gosnells Quarry may be locally significant (DBCA, 2022). However, given that the proposed clearing will only impact 23 per cent of the population at the quarry site, the proposed clearing is not considered to significantly impact the occurrence of this species.

Beaufortia purpurea grows in lateritic or granitic soils and rocky slopes (Western Australian Herbarium, 1998-). An estimated 17,198 individuals occur within three distinct populations in the Quarry area (AECOM, 2017). This species was recorded in heath communities including BpSe, and some of VaBs and HeSb, with some isolated occurrences in adjacent woodlands of EmKaLm and EmBsBd. *B. purpurea* was found to be common within the vegetation community BpSe, (AECOM, 2017). The application area contains the majority of one of these distinct populations of this species and it is estimated that 3,500 individuals will be impacted. This represents a 21 per cent loss of the species at the quarry sites. DBCA advised that this species is locally frequent at a number of nearby reserves and

given that a considerable portion of the known plants at the quarry site occur outside the application area, the proposed clearing is unlikely to impact this species significantly at a local or regional level (DBCA, 2022)

Lasiopetalum glutinosum subsp. *glutinosum* have previously been recorded in various soil types including lateritic gravel and clay or brown, clayey sand with laterite (Western Australian Herbarium, 1998-). Six populations comprising 313 individuals were recorded in the Quarry area (AECOM, 2017). This species was recorded in heath communities associated with granite outcrops including VaBs, HeSb and BpSe. It is estimated that approximately 25 individuals occur within the application area and will be impacted on by the proposed clearing, which represents a 8 per cent loss. The impacts to this species are unlikely to be significant at the local or regional scale due to the numbers present outside the application area (DBCA, 2022).

Acacia oncinophylla subsp. *patulifolia* occurs in granitic soils, occasionally on laterite (Western Australian Herbarium, 1998-). This species was recorded extensively in VaBs and IdBc communities, both associated with granite outcrops on upper slopes and the majority of which, occur outside of the application area within the quarry site. Five populations were recorded, comprising a minimum 3,533 individuals within the Gosnells quarry area (AECOM, 2017). It is estimated that approximately 125-200 individuals occur at two locations within the application area which is a total of 6 per cent of the species distribution within the quarry site. This species has a wide distribution including the following local government areas: Armadale, Bridgetown-Greenbushes, Gosnells, Harvey, Kalamunda, Murray, Swan, Wandering. DBCA advice states that the clearing is unlikely to significantly impact this species at a local or regional scale due to the numerous records in the locality and within the adjacent Ellis Brook Reserve (DBCA, 2022).

An additional targeted flora survey for orchid species that were considered likely to occur, based on habitat preference, was undertaken in spring 2014. The species that were targeted were *Thelymitra magnifica* (P1) and *Thelymitra stellata* (Endangered under the EPBC Act). No conservations significant orchid species were observed during the survey, and it is not considered likely for the proposed clearing to impact these species.

Noting the survey efforts, survey timing and flowering periods of the species considered as potentially occurring within the application area, it is considered that the application area is unlikely to provide habitat for other priority or threatened flora known to occur within the local area.

Outcome:
The proposed clearing will impact on vegetation that provides habitat for priority flora and possible habitat for a PEC and therefore is considered an area that contains high biodiversity. The proposed clearing may also impact adjacent vegetation through the spread and increase of weeds and *Phytophthora* dieback.

Conditions:
The Delegated Officer determined that the proposed clearing requires management conditions in relation to these environmental values. Therefore, the following management measures will be required as conditions on the permit:

- a weed and dieback management condition on the clearing permit to minimise the risk of introduction and spread of weeds and dieback.
- avoid and minimise clearing condition

3.2.2. Environmental value: biological values (fauna) – Clearing Principle (b)

Assessment
According to available databases, a total of 34 conservation significant fauna species have been recorded within the local area. Noting the habitat requirements, distribution of the recorded species, the mapped vegetation type, the condition of the vegetation within the application area, as well as the findings of a black cockatoo habitat assessment (iNSiGHT Ornithology, 2022) and fauna assessment (Bamford 2017), the application area is likely to comprise suitable habitat for the following species:

- Baudin's cockatoo (*Zanda baudinii*)
- Carnaby's cockatoo (*Zanda latirostris*)
- Chuditch (*Dasyurus geoffroii*)
- Dell's skink, Darling range southwest ctenotus (*Ctenotus delli*)
- forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*)
- peregrine falcon (*Falco peregrinus*)
- quenda, southwestern brown bandicoot (*Isoodon fusciventer*)
- southern death adder (*Acanthophis antarcticus*)

- south-western brush-tailed phascogale, wambenger (*Phascogale tapoatafa wambenger*)
- western brush wallaby (*Notamacropus irma*); and
- western rosella (inland) (*Platycercus icterotis xanthogenys*).

These species are discussed below:

Black cockatoos

The application area falls within the modelled distribution of Carnaby's cockatoo (*Calyptorhynchus latirostris*), forest red-tailed black cockatoo (*Calyptorhynchus banksia* subsp. *naso*) and Baudin's cockatoo (*Calyptorhynchus baudinii*) (collectively referred to as 'black cockatoos' herein this report). Black cockatoos are classified as threatened under the BC Act. Under the EPBC Act, the Carnaby's and Baudin's cockatoo are listed as Endangered, and the forest red-tailed black cockatoo is listed as Vulnerable. The seasonal movements of black cockatoos mean they require large areas of habitat for breeding, night roosting and foraging, as well as connectivity between these habitats to assist their movement through the landscape (Commonwealth of Australia, 2012). The assessment has considered the potential impacts of the proposed clearing on all types of black cockatoo habitat.

Foraging

Carnaby's cockatoo feeds on the seeds, nuts and flowers of a large variety of plants including Proteaceous species (*Banksia*, *Hakea* and *Grevillea*), as well as *Allocasuarina* and *Eucalyptus* species, *Corymbia calophylla* (marri) and a range of introduced species (Valentine and Stock, 2008).

Forest red-tailed black cockatoo forages within jarrah and marri woodlands and forest, and edges of karri forests including wandoo and blackbutt, within the range of the subspecies. The species largely feeds on seeds of marri and jarrah, as well as other *Eucalyptus* species and *Allocasuarina* cones (Commonwealth of Australia, 2012). Baudin's cockatoos prefer foraging within Eucalypt woodlands and forest, and proteaceous woodland and heath. During the breeding season (October to late January/early February) this species prefers marri seeds. Outside the breeding season the species may feed in fruit orchards and tips of Pinus spp. (Commonwealth of Australia, 2012).

A fauna habitat assessment conducted by Bamford (2017) identified 5.21 hectares of foraging habitat within the application area.

Breeding

The application area provides suitable breeding habitat for black cockatoos. Suitable breeding habitat for these species includes trees which either have a suitable nest hollow or are of a suitable diameter at breast height (DBH) to develop a nest hollow. Suitable DBH for nest hollows is 50 centimetres for most tree species, however, is reduced to 30 centimetres for wandoo and salmon gum (Commonwealth of Australia, 2012). Carnaby's cockatoo typically nests in eucalypt woodlands, primarily in the hollows of wandoo (*Eucalyptus wandoo*), salmon gum (*E. salmonophloia*) and marri (*Corymbia calophylla)* (Commonwealth of Australia, 2012). The most important breeding trees for forest red-tailed black cockatoos and Baudin's throughout their range are large, mature marri trees (Johnston, Kirkby and Sarti, 2013).

iNSiGHT Ornithology (2022) identified 10 potential habitat trees within the application area. Only one with the total of two hollows was identified. The characteristics of the hollows identified from the ground were then inspected closely using a high resolution camera attached to a telescopic pole, with particular focus on detecting heavy chew-marks at the entrance and inside the hollow consistent with evidence of black cockatoo use (Figure 2). The first hollow was a large, vertical spout approximately six metres above the ground which after inspection with a camera turned out to be a solid platform. The second hollow was a medium-sized, oblique entrance to a vertical, hollow limb with the diameter approximately 250 millimetres with some chew-marks apparent from the ground. This hollow had a lining inside the next chamber of green gum-leaves indicating it was inactive but recently used Galah nest. The hollows still falls within the range of a potential black cockatoo nest, particularly for forest red-tailed black cockatoo (iNSiGHT Ornithology, 2022).

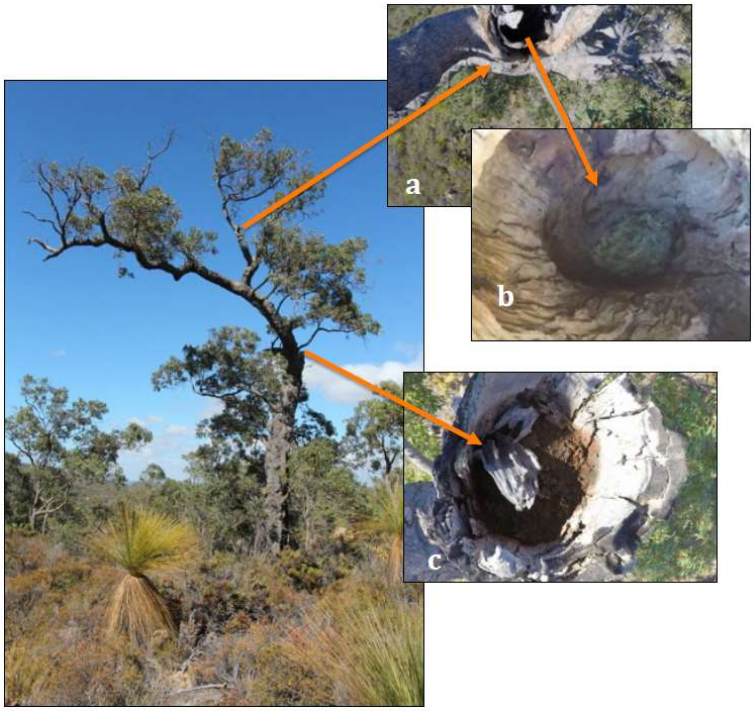

Figure 2: Black cockatoo habitat tree with suitably sized hollows for nesting (iNSiGHT Ornithology, 2022)

The application area occurs within the Jarrah bioregion, which is characterised by Jarrah and Marri Forest, with Marri-Wandoo woodlands towards the eastern edge. All three black cockatoo species breed in this region, and this is the main area used by Baudin's Cockatoo and the Forest Red-tailed Black-cockatoo for breeding. Baudin's Cockatoo also has key foraging and wintering areas in this region. Marri is a primary foraging species for Baudin's Cockatoo and the Forest Red-tailed Black cockatoo. Foraging areas associated with breeding are critical for all species (DCCEEW, 2022).

The vegetation within application area contains black cockatoo foraging habitat which supports its breeding. While breeding, black cockatoos will generally forage within a 6–12-kilometre radius of their nesting site (Commonwealth of Australia, 2012). The application area is not located within the mapped confirmed breeding area for Carnaby's cockatoo. However, it has also been noted that the breeding range of Carnaby's cockatoo has shifted in the last 10-30 years, with increased records in the jarrah-marri forests of the Darling Scarp and the tuart forests of the Swan Coastal Plain (Johnstone and Kirkby, 2008). Given the proximity of the application area to confirmed breeding sites and the shifting breeding range of the species, it is considered possible for Carnaby's cockatoos to utilise the application area for breeding, where suitable hollows persist. According to available databases, there is one natural, confirmed black cockatoo breeding points within the local area. This site is mapped approximately 2.5 kilometres southeast of the application area.

Roosting

The assessment further identified that the application area is likely to provide foraging habitat that supports black cockatoo roosting. Roosting habitat is defined as a suitable tree (generally the tallest) or group of tall trees, native or introduced, usually close to an important water source, within an area of quality foraging habitat within the range of each black cockatoo species which provide black cockatoos with shelter during the heat of the day and safe resting places at night (Department of the Environment and Energy, 2017). Individual night roosting sites need suitable foraging habitat and water within six kilometres (EPA, 2019). Overlapping foraging ranges within 12 kilometres also support roosting sites and maintain habitat connectivity and movement across the landscape (EPA, 2019). There are 15 black cockatoo roosting sites mapped within the local area. Six-kilometre buffers of some of these sites retain less than 30 per cent of their original vegetation extent which is a threshold below which species loss appears to accelerate exponentially at an ecosystem level (Commonwealth of Australia, 2001).

Given the above, the application area is considered to provide critical foraging habitat for black cockatoo species that supports breeding and roosting habitat located in the local area. The proposed clearing is considered to have a significant residual impact on habitat that supports threatened black cockatoo species.

The applicant may have notification responsibilities under the EPBC Act for impacts to black cockatoos and their habitats. The applicant has been advised to contact the federal Department of Climate Change, Energy, the Environment and Water (DCCEEW) to discuss EPBC Act referral requirements.

Peregrine falcon

The species is found in most habitats, from rainforests to the arid zone and at most altitudes, from the coast to alpine areas. It requires abundant prey and secure nest sites and prefers coastal and inland cliffs or open woodlands near water and may even be found nesting on high city buildings (Australian Museum, 2020a). This species is widespread, highly mobile and is found in various habitats. The application area may comprise suitable habitat for this species, however, noting habitat preferences and the small extent of the proposed clearing, the application area is unlikely to comprise a significant habitat for this species.

Chuditch

Chuditch use a range of habitats including forest, mallee shrublands, woodland and desert. The densest populations have been found in riparian jarrah forest. Chuditch require adequate numbers of suitable den and refuge sites (horizontal hollow logs or earth burrows) and sufficient prey biomass (large invertebrates, reptiles and small mammals) to survive. They are capable of travelling long distances and have large home ranges, and even at their most abundant, chuditch are generally present in low numbers (Department of Environment and Conservation, 2012a). Habitat for this species is likely to be represented in the adjacent conservation areas and in similar vegetation complexes in the Darling Range.

Darling range south-west ctenotus

Darling range south-west ctenotus inhabits jarrah and marri forest on lateritic, clay and sandy soils and is occasionally found on granite outcrop (Craig et al., 2017). This species was not recorded during surveys (Bamford, Moore and Chuk, 2017), however it is noted that surveys did not include pitfall/funnel trapping or hand searching. Darling range south-west ctenotus is considered resident in the Quarry area due to the presence of suitable habitat.

Masked owl (southwest)

Masked owl inhabits forests, woodlands, timbered waterways and open country on the fringe of these areas and usually roosts in vertical hollows in large trees. The main requirements are tall trees with suitable hollows for nesting and roosting and adjacent areas for foraging (Birdlife Australia, 2020).

Quenda

Quenda is known to inhabit scrubby, swampy vegetation with low, dense understorey, located nearby water courses, pasture, or forest/woodland that is regularly burnt and is in areas of pasture and cropland lying close to dense cover. Populations which inhabit jarrah and wandoo forests are usually associated with watercourses (Department of Conservation, 2012b).

Southern death adder

The southern death adder is found in open woodland, heathland and shrubland throughout the Darling Range. This species is considered resident in the Quarry area due to the presence of suitable habitat. Habitat for this species is likely to be represented in the adjacent conservation areas and in similar vegetation complexes in the Darling Range (Bamford, 2017).

South-western brush-tailed phascogale

In Western Australia the brush-tailed phascogale is now known to occur in the south west between Perth and Albany. It occurs at low densities in the northern Jarrah forest. Highest densities occur in the Perup/Kingston area, Collie River valley, and near Margaret River and Busselton. The preferred habitat for south-western brush-tailed phascogale is within dry sclerophyll forests and open woodlands that contain hollow bearing trees but a sparse groundcover (Department of Environment and Conservation, 2012c).

Western brush wallaby

Western brush wallaby tends to occupy a wide range of open forest and woodland habitats, preferring areas with modest densities of ground cover (DBCA, 2018). It is also found in some areas of mallee and heath-land (DEC, 2012). The species was recorded on the motion-sensitive cameras in the Quarry area and is likely to be resident in eucalypt woodland in the region. Habitat for this species is likely to be represented in the adjacent conservation areas and in similar vegetation complexes in the Darling Range (Bamford, 2017).

Western rosella (inland)

Western rosellas are found in open eucalypt forest and timbered areas, including cultivated land and orchards. The nominate *icterotis* is found in high rainfall areas and the other subspecies, *xanthogenys*, in drier woodland, with a heath understorey (Australian Museum, 2020b).

Noting the vegetation identified (AECOM, 2017; Bamford, 2017) within the application area and its quality, the habitat requirements and distribution of the above species, the application area provides suitable habitat for each of these species listed above. Taking into consideration the small extent of the proposed clearing relative to the surrounding native vegetation and the abundance of native vegetation within lands managed by DBCA for conservation, which are likely to comprise vegetation in similar or better condition than that present within the application area, the habitat within the application area is not considered significant in the local context. Whilst not considered significant habitat, impacts to individuals of Chuditch, Darling range south-west ctenotus, masked owl (southwest), quenda, southern death adder, south-western brush-tailed phascogale, western brush wallaby and western rosella (inland) may occur at the time of clearing. To minimise these potential impacts, the applicant will be required to undertake slow, progressive one directional clearing to allow terrestrial fauna to disperse ahead of the clearing activity should they occur on site at the time of clearing.

Outcome

The proposed clearing will impact on vegetation that provides significant foraging habitat for black cockatoo species and may impact individuals of other fauna species that may occur at the time of clearing.

Conditions

The Delegated Officer determined that the proposed clearing requires management and offset conditions in relation to these environmental values. Therefore, the following management/offset measures will be required as conditions on the permit:

- Slow, progressive one directional clearing to allow fauna to move into adjacent habitat ahead of clearing activity
- Black cockatoo habitat tree inspection prior to clearing to ensure tree is not in use, clearing of tree to not occur if in use.
- Artificial hollow installation to replace suitable black cockatoo habitat trees.
- Offset condition to counterbalance the residual impact to black cockatoo habitat (see section 4).
- Revegetation of the application area post construction of the amenity bund, with vegetation that provides suitable habitat for black cockatoo species.

3.2.3.Environmental value: Conservation areas – Clearing Principle (h)

Assessment

There are a number of conservation areas within the local area, including the following:

- Banyowla Regional Park, to the north, east of the application area. The application area is directly adjacent to the Banyowla Regional Park.
- Korung National Park, approximately 200 metres southeast of the application area.
- Jarrahdale State Forest, approximately five kilometres east of the application area; and
- Stinton Cascades Nature reserve, approximately seven kilometres southeast of the application area.

Due to the application area's proximity to Banyowla Regional Park and the fact that it is connected through continuous native vegetation to Korung National Park, the proposed clearing has the potential to impact these conservation areas through the introduction and spread of weed and dieback.

Outcome

The proposed clearing may impact adjacent conservation areas through the spread and increase of weeds and *Phytophthora* dieback.

Conditions

Based on the above assessment, the Delegated Officer has determined that subject to relevant conditions the proposed clearing is not likely to have a significant impact to this environmental value. The following management measures will be required as conditions on the permit:

- Weed and dieback management assist in minimising the risk of the proposed clearing resulting in the spread of weeds and dieback into adjacent conservation areas.
- Buffer of 15 meters to Banyowla Regional Park.

3.3. Relevant planning instruments and other matters

Development Approval for the Gosnell's quarry operations was obtained, under the Metropolitan Region Scheme and *Town Planning and Development Act 1928* (issued by the MRPA and the City of Gosnells in 1984), following the submission of Environmental Review and Management Programme (ERMP) to the Environmental Protection Authority (EPA) by Readymix in 1982 under the *Environmental Protection Act 1971* (EP Act 1971 - repealed) (Readymix, 1982; EPA Bulletin 120). As part of this approval, the applicant swapped 236.8 ha of land owned by the applicant for 143 ha of land owned by the State of Western Australia. The Maximum Development Envelope (MDE) for the quarry refers to the maximum pit envelope for the project. Although within the approved project described in the ERMP, it also refers to the placement of overburden along the perimeter of the pit between the pit and lot boundary for development of a visual amenity bund to reduce visual impact. The proposed clearing is consistent with the MDE and location of the amenity bund as outlined in the Development Approval for the quarry.

The applicant has obtained an Extractive Industry Licence (EIL) (issued by the City of Gosnells) for the proposed pit expansion and creation of a visual amenity bund. The clearing is consistent with the EIL and does not require further local government approvals.

The application area falls within the City of Gosnells Local Planning Strategy. Under this planning strategy the application area falls within an extractive industry and employment zone. The City's adopted Foothills Rural Strategy provides recommendations to ensure the protection of the two existing hard rock quarries (including Gosnells Quarry) from adjacent inappropriate land uses. A 1-kilometre-wide buffer exists around the quarries to ensure that sensitive land uses such as residential dwellings are not permitted within this area.

The application area is zoned rural under the Metropolitan Regional Scheme and has been defined as a Key Extraction Area and as a Significant Geological Supplies, in the State of Planning Policy No. 2.4 Basic Raw Materials (Western Australian Planning Commission, 2000). This policy sets out the matters which are to be taken into account and given effect to by the WAPC and local governments in considering zoning, subdivision and development applications for extractive industries. The objectives of this policy are:

- To protect priority resource locations, key extraction areas and surrounding buffer areas from being developed for incompatible land uses which could limit future exploitation.
- To ensure that the use and development of land for the extraction of basic raw materials does not adversely affect the environment or amenity in the locality of the operation during or after extraction;
- To provide a consistent planning approval process for extractive industry proposals including the early consideration of sequential land uses.

The applicant may have notification responsibilities under the EPBC Act for impacts to Baudin's cockatoo, Carnaby's cockatoo, forest red-tailed black cockatoo, and their habitats, as set out in the relevant EPBC Act referral guidelines for these species. The applicant has been advised to contact the federal DCCEEW to discuss EPBC Act referral requirements.

The application area is mapped within one registered Aboriginal site of significance. 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.

4 Suitability of offsets

Through the detailed assessment outlined in Section 3.2 above, the Delegated Officer has determined that the following SRI remain after the application of the avoidance and mitigation measures summarised in Section 3.1:

- Loss of 5.21 ha of black cockatoo habitat, contain foraging habitat and one potential breeding tree.

The applicant advised that offset options such as placing a conservation covenant over native vegetation remaining or revegetating degraded land on Lot 3 is not possible as the remaining areas within Lot 3 are required for current quarry expansion or operation. Following discussions between DWER and the applicant during the assessment process, and to counterbalance the above impacts, the applicant proposed the following mitigation and offset as summarised below.

Mitigation – rehabilitation and revegetation of amenity bund

The applicant has committed to rehabilitation of the cleared area (up to 6.74-hectares) post construction of the visual amenity bund with vegetation that provides foraging habitat for black cockatoo species.

As a condition of the clearing permit the applicant will be required to provide a comprehensive rehabilitation plan which commits to specific revegetation activities, including completion criteria, in accordance with DWER's '*A Guide to Preparing Revegetation Plans for Clearing Permits*'.

The revegetation site is zoned for extractive industry, however following extractive activities and rehabilitation of the site, it is considered that there will be a low likelihood that the site will be impacted for another activity in the future as it will not be consistent with the zoning.

Offset – monetary offset contribution for land acquisition

The applicant has committed to providing $54,000 as a monetary contribution to fund the purchase of 25-hectare land parcel in the Shire of Beverley, to be conserved in perpetuity. The land acquired will contain the following values:

- 25 hectares of native vegetation containing significant foraging and breeding habitat for black cockatoo species.

Summary

In assessing whether the proposed offset is adequately proportionate to the significance of the environmental values being impacted, DWER undertook a calculation using the WA Environmental Offset Metric. The calculator indicated that the above offset strategy will address 100 per cent of the SRI of the proposed clearing and is consistent with the *WA Environmental Offsets Policy* (2011). Appendix E provides the justification for the values used in the offset calculation.

The Delegated Officer determined that the implementation of the above offset strategy will adequately counterbalance the SRI of the proposed clearing.

Appendix A – Additional information provided by applicant

Summary of comments	Consideration of comment
Additional information regarding consideration of alternatives and avoidance and mitigation measures provided by the applicant. This included agreement to provide an offset to counterbalance the impacts of the proposed clearing, the provision of a 15-metre buffer to the adjacent conservation area and proposing to rehabilitate the amenity bund post construction with black cockatoo foraging species to mitigate a portion of the residual impact to black cockatoo habitat.	Additional information has been taken into account by the Delegated Officer and considered under section 3.1 of this report.

Summary of comments	Consideration of comment
Provision of an offset proposal to provide monetary contribution to the offset fund to counterbalance impact to black cockatoo habitat and clarification regarding the approved development approval and extractive industry licence for the proposal.	Offset proposal has been considered by the Delegated Officer and addressed under section 4 of this report. The Delegated Officer also considered the information provided on the development approval under section 3.3 of this report.

Appendix B. Details of public submissions

Table 1 - Summary of public submissions

Summary of comments	Consideration of comments
Public submission one raised concerns regarding the clearing of vegetation within the application area. They include: • Application area likely to be a breeding site for black cockatoos • Is part of a breeding movement corridor for Baudin's and forest red-tailed black cockatoos • Provides important foraging habitat to support breeding and roosting habitat • concerns that the ERMP is outdated • concerns regarding the lack of clarity in the clearing application; • concerns regarding the initial (1982) assessment and its finding that the offset was of higher conservation value than the land given to HAUS by the State; • importance of considering Cumulative Impacts; • concern regarding risks to black cockatoo sustainability if regulatory authorities rely primarily on current Clearing Principles – which appear not to be able to effectively regulate risks from cumulative impacts; • concern at the proponents' lack of acknowledgment that proposed clearing must be assessed and regulated according to today's environmental standards, regulations and scientific knowledge; and • need for mitigation measures that are effective for black cockatoo conservation.	While the proposal for Gosnells Quarry was referred and assessed under the *Environmental Protection Act 1971,* it does not affect the operation of the *Environmental Protection Act 1986* (the EP Act 1986) as there are no transitional provisions in the 1986 Act that give recommendations made by the EPA under the 1971 Act continuing legal effect, or that exempt a project from the operation of the 1986 Act. Therefore, a clearing permit assessment is required for any clearing for the Gosnell's quarry if not exempt under section 51C of the EP Act 1986. The clearing assessment undertaken as a part of this application considers the most recent available information and standards available to DWER. A black cockatoo habitat tree survey was undertaken by Insight in 2022 which identified 10 trees with DBH of >500mm with one tree providing one suitable hollow for breeding by black cockatoos. No evidence of current or past use by Black cockatoos were identified and it was considered to be in use by Galahs (Insight, 2022). Further details can be found in section 3.2.2 of this report. Section 3.2.2 of this report details the assessment of impacts of the proposed clearing on black cockatoo species. To offset/mitigate impacts to black cockatoo, under the conditions of the clearing permit, the permit holder will be required to rehabilitate 6.74 hectares of foraging habitat for these species, install artificial hollows, check all hollows prior to clearing and provide a monetary offset for land acquisition of black cockatoo habitat to be conserved in perpetuity (see section 4).
Public submission two raised concerns regarding the clearing of vegetation within the application area. They include: • Original assessments of the area and permits to clear it are outdated (30 years ago) and should not be taken into consideration since they do not comply with the EPBC Act or are relevant in regard to current environmental knowledge. • It is the proponents intention to clear the entire area and aims to do so through smaller clearing permit applications • The application area contains Black cockatoo breeding habitat which should be retained • The proposed land swap area is of lesser value than the land proposed to be cleared and only contains a small percentage more native vegetation. The land swap is therefore inadequate and this should be re-evaluated.	Please see above response for many of the points raised. The DWER understands that the remainder of Lot 3 may be developed in the future by Holcim. The impacts on black cockatoos and priority flora (including cumulative impacts of previous proposals) from the clearing will be taken into consideration at the time of application.

Summary of comments	Consideration of comments
• The arguments made in the application go against Clearing Principle A and B and a clearing permit should therefore not be granted. • The figures presented in the application are misleading and not very clear, it appears that the proponent plans on clearing a lot more than what is stated in the application.	

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	The application area occurs approximately 20 kilometres southeast of the Perth Central Business District within the Jarrah Forest Interim Biogeographic Regionalisation for Australia (IBRA) bioregion, Northern Jarrah Forest subregion. Spatial data indicate the local area (10-kilometre radius of the application area, which is equal to approximately 32,685.45 hectares) retains approximately 40.72 per cent (13,309.60 hectares) of the original native vegetation cover.
Ecological linkage	The application area is not mapped within ecological linkages. Proposed clearing will not sever any ecological linkages. The closest ecological linkage is Perth Regional Ecological Linkage identified by WALGA's Biodiversity Projects (Del Marco et al., 2004). The linkage is mapped approximately 814 metres east of the application area.
Conservation areas	Approximately 21.21 per cent of the local area (approximately 6,932.29 hectares) occurs within DBCA managed estate. The application area does not occur in any conservation areas but is adjacent to Banyowla Regional Park.
Vegetation description	AECOM (2017) mapped the vegetation communities detailed in Table 1 within the application area. **Table 2:** Vegetation communities mapped in application area (AECOM, 2017)

Vegetation communities	Description	Extent of application area (ha)	Extent of application area (%)
HeSb	*Eucalyptus wandoo* low isolated trees over *Hakea erinacea, Verticordia acerosa* var. *acerosa, Leucopogon sprengelioides, Melaleuca radula* and *Xanthorrhoea drummondii* mid shrubland over *Hibbertia hypericoides, Melaleuca parviceps, Babingtonia camphorosmae, Beaufortia purpurea* and *Hakea incrassate* low shrubland over *Stylidium bulbiferum, Stylidium calcaratum, Cassytha racemosa* forma *racemosa, Stylidium eriopodum* and *Drosera glanduligera* low sparse forbland.	4.58	68.0
Rehab		0.65	9.7
Cleared		0.62	9.2

Characteristic	Details			
	CcCrTc	*Corymbia calophylla* mid isolated trees over *Calothamnus rupestris, Xanthorrhoea preissii* and *Hakea undulata* tall closed shrubland over *Hibbertia hypericoides, Banksia dallanneyi* var. *dallanneyi, Gompholobium tomentosum, Synaphea acutiloba* and *Hakea amplexicaulis* low sparse shrubland with *Tetraria capillaris* and *Tetraria octandra* low sparse sedgeland with *Stylidium piliferum, Stylidium bulbiferum, Trichocline spathulata, Dampiera alata* and *Patersonia occidentalis* low sparse forbland.	0.29	4.3
	BpSr	*Beaufortia purpurea, Hakea uncinata, Verticordia acerosa* var. *acerosa, Petrophile squamata* subsp. *squamata* and *Allocasuarina humilis* mid shrubland over *Beaufortia macrostemon, Banksia armata* var. *armata, Astroloma glaucescens, Babingtonia pelloeae* and *Hibbertia hypericoides* low open shrubland over *Stylidium repens, Thysanotus manglesianus, Goodenia coerulea* and *Stylidium bulbiferum* low sparse forbland.	0.27	4.0
	VaBs	*Acacia oncinophylla* subsp. *patulifolia* and *Melaleuca holosericea* tall sparse shrubs over *Verticordia acerosa* var. *acerosa, Verticordia insignis* subsp. *insignis*, *Verticordia plumosa* var. *plumosa* and *Hakea erinacea* mid shrubland over *Borya sphaerocephala, Stylidium bulbiferum*, *Drosera gigantea, Glischrocaryon aureum* and *Pterochaeta paniculate* low open forbland.	0.07	1.1
	Total		6.74	100
	The full survey descriptions and maps are available in Appendix G. Mattiske and Havel (1998) mapped the South-West Forest Darling Scarp DS2 vegetation complex as occurring within the application area. This complex is described as mosaic of open forest of *Eucalyptus marginata* subsp. *marginata-Corymbia calophylla*, with some admixtures with *Eucalyptus laeliae* in the north (subhumid zone), with occasional *Eucalyptus marginata* subsp. *marginata* (mainly in subhumid zone) and *Corymbia haematoxylon* in the south (humid zone) on deeper soils adjacent to outcrops, woodland of *Eucalyptus wandoo* (subhumid and semiarid zones), low woodland of *Allocasuarina huegeliana* on shallow soils over granite outcrops, closed heath of *Myrtaceae-Proteaceae* species and lithic complex on or near granite outcrops in all climate zones. The mapped vegetation complex retains approximately 42 per cent of the original extent (Government of Western Australia, 2019b).			
Vegetation condition	AECOM mapped the vegetation condition (Keighery, 1994) as described in Table 2 within the application area. **Table 3:** Vegetation condition mapped in application area (AECOM, 2017) Vegetation condition / Extent of application area (ha) / Extent of application area (%) Excellent / 4.32 / 64.1 Very good / 0.66 / 9.8 Good / 0.01 / 0.1 Degraded / 1.13 / 16.8 Cleared / 0.62 / 9.2 Total / 6.74 / 100 The full Keighery (1994) condition rating scale is provided in Appendix E.			

<table>
<tr><th>Characteristic</th><th>Details</th></tr>
<tr><td>Climate and landform</td><td>

Rainfall – Mean Annual: 1,000 millimetres
Evapotranspiration – Areal Actual: 800 millimetres
Topography: the site slopes down from a high point at around 220 metre Australian Height Datum (AHD) in the north-central portion of the application area down towards eastern and western boundary at an elevation of around 200 and 165 metres AHD
Groundwater Salinity (Total Dissolved Solids): 500-1000 milligrams per litre total dissolved solids. This level of salinity is described by Mayer, Ruprecht and Bari (2005) as marginal.

</td></tr>
<tr><td>Soil description</td><td>
The Department of Primary Industries and Regional Development (DPIRD) (2022) mapped the soil types as described in Table 4 within the application area.

Table 4: Mapped soil type descriptions within the application area
<table>
<tr><th>Soil types</th><th>Description (Schoknecht et al., 2004)</th><th>Extent of application area (ha)</th><th>Extent of application area (%)</th></tr>
<tr><td>Myara 1 Phase</td><td>Gentle to steep valley sideslopes (5-35%) and narrow incised valley floors. Variable well drained duplex and gradational soils. Common rock outcrop. E. wandoo, E. accedens and E. marginata on sandy gravels and Acacia spp. On shallow soils.</td><td>5.12</td><td>75.9</td></tr>
<tr><td>Mambup 1 Phase</td><td>Gently undulating ridge crests and benches with slopes</td><td>1.62</td><td>24.1</td></tr>
<tr><td>Total</td><td></td><td>6.74</td><td>100</td></tr>
</table>
</td></tr>
<tr><td>Land degradation risk</td><td>Myara 1 Phase has a moderate risk of excavation ease, acidification and microbial purification. Mambup 1 Phase has a relatively high risks of acidification and sub surface compaction, and moderate risk of excavation ease and water repel. Both mapped soil types have low risks of land degradation in the form of water erosion, salinity, eutrophication and flooding (including waterlogging) (DPIRD, 2022).</td></tr>
<tr><td>Waterbodies</td><td>A minor, non-perennial tributary of Canning River is mapped within the north-eastern portion of the application area.

The flora survey (AECOM, 2017) did not identify any riparian vegetation within the application area.

No wetlands have been mapped within the application area or its proximity. The closest wetland is a multiple use wetland mapped approximately 1.3 kilometres west of the application area.</td></tr>
<tr><td>Hydrogeography</td><td>According to available databases, the application area does not occur within:

surface and groundwater areas proclaimed under RIWI Act; or
a public drinking water source area.

</td></tr>
<tr><td>Flora</td><td>According to available databases, a total of 23 flora species listed as threatened under the BC Act and 75 Priority listed flora by DBCA have been recorded within the local area. Based on the similarities shared between the soil and vegetation types in habitats for these flora taxa and within the application area, several flora species as detailed in Appendix B may occur within the application area.

The flora survey (AECOM, 2017) identified 5 priority flora species within the application area (see section 3.2).</td></tr>
<tr><td>Ecological communities</td><td>No threatened (TEC) or priority ecological communities (PEC) are mapped within the application area and none were identified during the flora survey (AECOM, 2017). However, based on species assemblages, the Priority 4 PEC 4 ‘Central Northern Darling Scarp Granite Shrubland Community’ has been inferred as occurring on site (DBCA, 2022)</td></tr>
</table>

Characteristic	Details
	The closest mapped PEC is the priority 4 'Central Northern Darling Scarp Granite Shrubland Community' which occurs approximately 989 metres northeast of the application area.
Fauna	According to available databases, a total of 34 conservation significant fauna species have been recorded within the local area (DBCA, 2021). Noting the habitat requirements, distribution of the recorded species, the mapped vegetation type, the condition of the vegetation within the application area, and the findings of the fauna survey (Bamford, 2017), the application area is likely to comprise suitable habitat for 11 fauna species of conservation significance (see section C4).

C.2. Vegetation extent

	Pre-European extent (ha)	Current extent (ha)	Extent remaining (%)	Current extent in all DBCA managed land (ha)	Current proportion (%) of pre-European extent in all DBCA managed land
IBRA bioregion*					
Jarrah Forest	4,506,660.25	2,399,838.15	53.25	69.74	37.14
Vegetation complex in IBRA bioregion					
Darling Scarp DS2 **	32,448.29	13,586.40	41.87	3,287.66	10.13
Local area (calculation - delete if not required)					
10km radius	32,685.45	13,309.60	40.72	-	-

*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 (AECOM, 2017), impacts to the following conservation significant flora required further consideration.

Species name	Conservation status	Suitable habitat features?	Suitable vegetation type?	Suitable soil type?	Distance of closest record to application area (m)	Are surveys adequate to identify?
Acacia horridula	P3	Y	Y	Y	within	Y
Asteridea gracilis	P3	Y	Y	Y	within	Y
Beaufortia purpurea	P3	Y	Y	Y	within	Y
Lasiopetalum glutinosum subsp. *glutinosum* and	P3	Y	Y	Y	within	Y
Acacia oncinophylla subsp. *patulifolia*	P4	Y	Y	Y	within	Y

C.4. Fauna analysis table

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

Species name	Conservation status	Suitable habitat features?	Distance of closest record to application area (km)	Are surveys adequate to identify?
Baudin's cockatoo (*Zanda baudinii*)	EN	Y	0.5	Y
Carnaby's cockatoo (*Zanda latirostris*)	EN	Y	0.5	Y
Chuditch (*Dasyurus geoffroii*)	VU	Y	1.6	Y
Dell's skink, Darling range southwest ctenotus (*Ctenotus delli*)	P4	Y	7.6	N
forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*)	VU	Y	0.5	Y
peregrine falcon (*Falco peregrinus*)	OS	Y	Recorded within Quarry area	Y
quenda, southwestern brown bandicoot (*Isoodon fusciventer*)	P4	Y	Recorded within Quarry area	Y
southern death adder (*Acanthophis antarcticus*)	P3	Y	4.6	N
south-western brush-tailed phascogale, wambenger (*Phascogale tapoatafa wambenger*)	CD	Y	Recorded within Quarry area	Y
western brush wallaby (*Notamacropus irma*); and	P4	Y	Recorded within Quarry area	Y
western rosella (inland) (*Platycercus icterotis xanthogenys*).	PA	Y	9.6	Y

CR: critically endangered, EN: endangered, VU: vulnerable, EX: Presumed extinct species, IA (M) Migratory birds protected under an international agreement, CD: Conservation dependent fauna, OS: Other specially protected fauna

C.5. Ecological community analysis table

Based on species assemblages, the Priority 4 PEC 4 'Central Northern Darling Scarp Granite Shrubland Community' has been inferred as occurring on site. No TECS are considered to occur on site.

Community name	Conservation status	Suitable habitat features?	Suitable vegetation type?	Suitable soil type?	Distance of closest record to application area (km)	Are surveys adequate to identify?
Central Northern Darling Scarp Granite Shrubland Community	P4	N	Y	Y	0.99	Y

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

Appendix D. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
Environmental value: biological values		
Principle (a): *"Native vegetation should not be cleared if it comprises a high level of biodiversity."* Assessment: A total of nine vegetation communities were described and mapped within the study area. This included four heath communities, considered locally significant due to their unique and highly diverse floristic composition of shrubs and forbs. These communities also support the majority of Priority flora species.	At variance	Yes Refer to Section 3.2.1, above.
Principle (b): *"Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna."* Assessment: The proposed clearing area contains significant foraging habitat for Black cockatoos. Ground dwelling conservation significant fauna may also utilise the application area.	At variance	Yes Refer to Section 3.2.2, above.
Principle (c): *"Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora."* Assessment: Noting the findings of the flora survey (AECOM, 2017), the application area is unlikely to contain habitat for threatened flora.	Not likely to be at variance	No
Principle (d): *"Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community."* Assessment: The proposed clearing area does not contain species composition indicative of a TEC listed under the BC Act or EPBC Act.	Not likely to be at variance	No
Environmental value: significant remnant vegetation and conservation areas		
Principle (e): *"Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared."* Assessment: The extent of the mapped vegetation type is consistent with the national objectives and targets for biodiversity conservation in Australia. Vegetation in the proposed clearing area is not considered to be part of a significant ecological linkage in the local area. Approximately 41 per cent of native vegetation extent occurs within the local area and therefore it is not considered for the application area to occur within an extensively cleared area.	Not likely to be at variance	No
Principle (h): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area."*	May be at variance	Yes Refer to Section 3.2.3, above.

Assessment against the clearing principles	Variance level	Is further consideration required?
Assessment: The application area does not occur in any conservation areas but is adjacent to Banyowla Regional Park. The proposed clearing may indirectly impact this conservation area through introduction and spread of weeds and dieback.		
Environmental value: land and water resources		
Principle (f): *"Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland."* Assessment: The vegetation proposed to be cleared is growing in an environment associated with a minor, non-perennial tributary of Canning River. No vegetation associated with this watercourse was identified in the application area however (AECOM, 2017). On this basis, no long-term adverse impacts on the ecological functions of the tributary are anticipated.	May be at variance	No
Principle (g): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation."* Assessment: The mapped soils are not susceptible to land degradation in the form of soil erosion, salinity and eutrophication. Noting the extent of the application area and native vegetation within the local area, the proposed clearing is not likely to have an appreciable impact on land degradation.	Not likely to be at variance	No
Principle (i): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water."* Assessment: Given the abundance of native vegetation in the local area and marginal (Mayer et al., 2005) level of salinity mapped within the application area, the proposed clearing will unlikely lead to a perceptible rise in the water table and an increase in groundwater salinity levels. Noting this, and that no vegetation growing in association with wetlands or watercourses, the proposed clearing is unlikely to impact surface or groundwater quality.	Not likely to be at variance	No
Principle (j): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding."* Assessment: The mapped soils and topographic contours in the surrounding area do not indicate the proposed clearing is likely to contribute to increased incidence or intensity of flooding.	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: Offset calculator value justification

Scores used in offset calculator for revegetation mitigation

Calculation	Score (Area)	Rationale
Conservation significance		
Description	Black cockatoo habitat	Application area contains significant foraging habitat for Carnaby's cockatoo (*Calyptorhynchus latirostris*), forest red-tailed black cockatoo (*Calyptorhynchus banksia* subsp. *naso*) and Baudin's cockatoo (*Calyptorhynchus baudinii*).
Type of environmental value	Species (fauna)	Supporting foraging habitat for all three species of black cockatoo, including supporting breeding
Conservation significance of environmental value	Rare/threatened species - endangered	Carnaby's cockatoo is listed as endangered under the BC Act and EPBC Act, so have used the highest conservation ranking.
Landscape level value impacted	Yes/No	Yes
Significant impact		
Description	Black cockatoo foraging habitat	Low to moderate quality foraging habitat was identified within the application area.
Significant impact (hectares)	5.21	5.21 hectares of suitable foraging habitat for black cockatoos
Quality (scale)	6.00	Habitat assessment determined moderate to low value foraging habitat for black cockatoo species within application area. Foraging habitat is located in close proximity to known breeding and roosting habitat.
Rehabilitation credit		
N/A	N/A	
Offset		
Description	Rehabilitation and revegetation	Revegetation and rehabilitation of the extraction site and amenity bund with black cockatoo foraging habitat.
proposed offset (area in hectares)	6.74	6.74 hectares is proposed to be revegetated with suitable black cockatoo habitat. This counterbalances 45% of the SRI.
Current quality of offset site	0	Condition of revegetation site in a completely degraded (Keighery, 1994) condition with minimal value for black cockatoos
Future quality WITHOUT offset	0	Condition of revegetation site in a completely degraded (Keighery, 1994) condition with minimal value for black cockatoos. Condition not likely to change without intervention.
Future quality WITH offset	4	It is expected for vegetation to improve to good condition (Keighery, 1994) and provide low to moderate quality foraging habitat in 12 years.
Time until ecological benefit (years)	12	10 years minimum to achieve foraging resource, plus 2 years for revegetation to commence
Confidence in offset result (%)	0.7	70% confidence that with an adequate revegetation plan the proposed revegetation will adequately achieve black cockatoo foraging habitat.
Duration of offset implementation (maximum 20 years)	20	Maximum value to be used. It is expected that the site will not be impacted in the future.
Time until offset site secured (years)	2	Two years for revegetation to commence.
Risk of future loss WITHOUT offset (%)	15%	There is a moderate risk of loss. The site is within an extractive industry and employment zone adjacent to extraction activities.
Risk of future loss WITH offset (%)	15%	Risk of loss remains as there is no change in tenure. However following extractive activities and rehabilitation of the site, it is considered that there will be a low likelihood that the site will be impacted for another activity in the future.

Calculation	Score (Area)	Rationale
Offset ratio (Conservation area only)	N/A	
Landscape level values of offset?	N/A	

Scores used in offset calculator for land acquisition offset

Calculation	Score (Area)	Rationale
Conservation significance		
Description	Black cockatoo habitat	Application area contains significant foraging habitat for Carnaby's cockatoo (*Calyptorhynchus latirostris*), forest red-tailed black cockatoo (*Calyptorhynchus banksia* subsp. *naso*) and Baudin's cockatoo (*Calyptorhynchus baudinii*).
Type of environmental value	Species (fauna)	Supporting foraging habitat for all three species of black cockatoo, including supporting breeding
Conservation significance of environmental value	Rare/threatened species - endangered	Carnaby's cockatoo is listed as endangered under the BC Act and EPBC Act, so have used the highest conservation ranking.
Landscape level value impacted	Yes/No	Yes
Significant impact		
Description	Black cockatoo foraging habitat	Low to moderate quality foraging habitat was identified within the application area.
Significant impact (hectares)	5.21	5.21 hectares of suitable foraging habitat for black cockatoos
Quality (scale)	6.00	Habitat assessment determined moderate to low value foraging habitat for black cockatoo species within application area. Foraging habitat is located in close proximity to known breeding and roosting habitat.
Rehabilitation credit		
N/A	N/A	
Offset		
Description	Monetary contribution	Land acquisition is the proposed offset for this application.
proposed offset (area in hectares)	25	The area required to be placed into conservation to offset the loss of 5.21 hectares of vegetation that is suitable black cockatoo habitat. This counterbalances the remaining 55% of the SRI.
Current quality of offset site	7	As the site has not yet been identified, it is envisaged that DWER will purchase a site where the native vegetation is in 'very good to excellent' condition (Keighery, 1994)
Future quality WITHOUT offset	7	As the site has not yet been identified, the site's quality is considered unlikely to improve or decline beyond its current quality over the next 20 years.
Future quality WITH offset	7	No on-ground management is proposed as part of the offset, and thus the site's quality is considered unlikely to improve beyond its current quality over the next 20 years.
Time until ecological benefit (years)	2	It is expected that the identification and purchasing of land will be complete within two years.
Confidence in offset result (%)	0.9	There is a high level of confidence that the land will be purchased and that the habitat quality will not deteriorate with the offset's implementation.
Duration of offset implementation (maximum 20 years)	20	The offset site will be protected in perpetuity – the mechanism for this is yet to be determined, however transfer to conservation tenure is preferred.

Calculation	Score (Area)	Rationale
Time until offset site secured (years)	2	The administrative process of executing the purchase can be achieved within 2 years.
Risk of future loss WITHOUT offset (%)	15%	There is a moderate risk of loss. It is expected that DWER will be purchasing a property that is zoned 'rural'.
Risk of future loss WITH offset (%)	5%	Having the site managed for conservation by DBCA or placing a conservation covenant on the property would reduce the potential impact of development and restrict the type of activities that can occur.
Offset ratio (Conservation area only)	N/A	
Landscape level values of offset?	N/A	

Appendix G: Biological survey information excerpts (Astron Environmental 2013, Bamford 2017, AECOM 2017, InSIGHT 2022)

Figure 2: Map showing location of ten habitat tress with DBH > 500 mm within application area (InSIGHT, 2022)

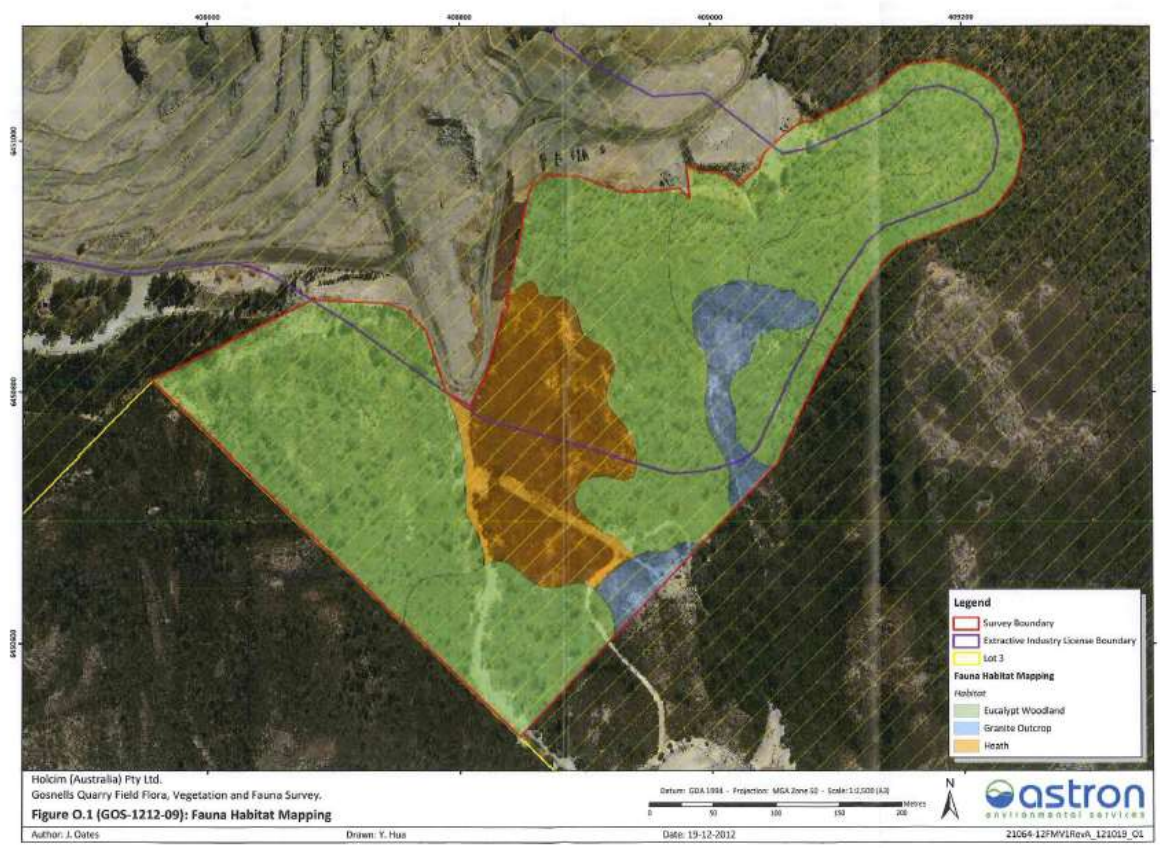

Figure 3: Vegetation types within the application area and surrounds (Astron Environmental,2013)

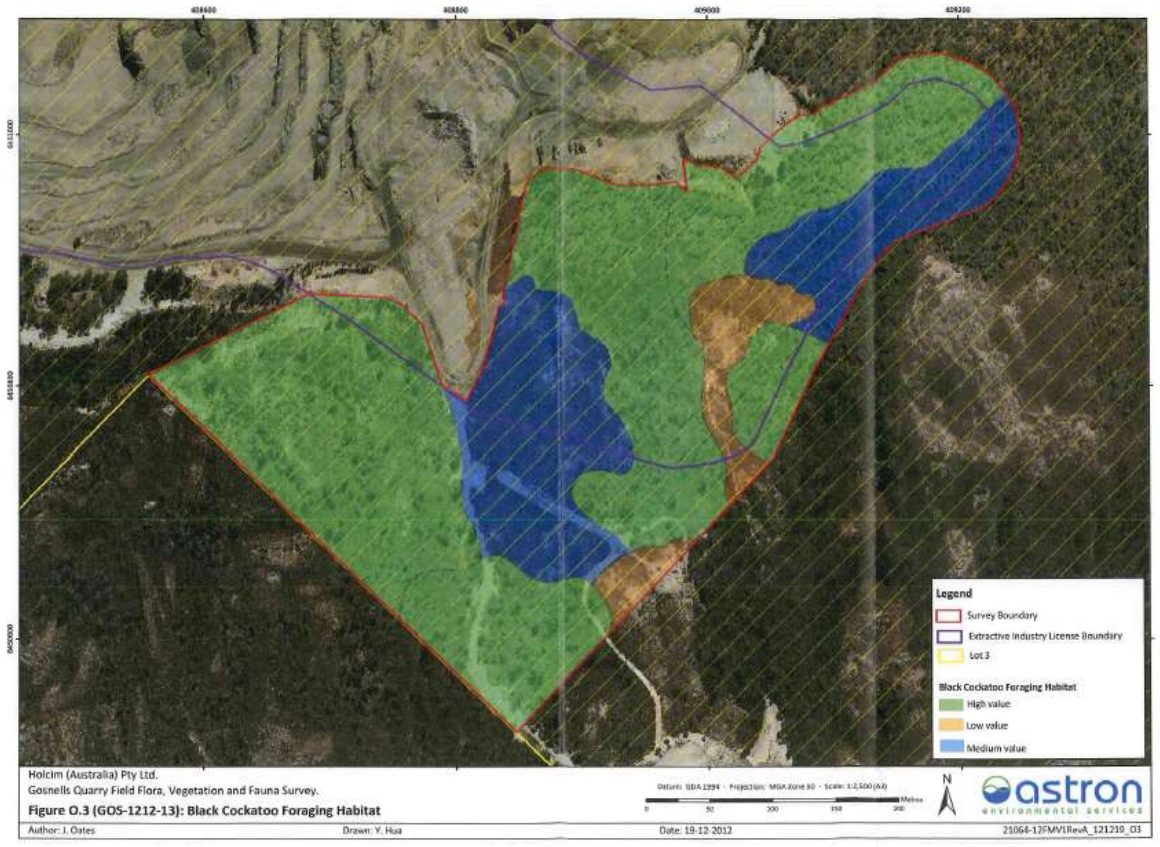

Figure 3: Black cockatoo forgaing habitat value within application area (Astron Environmental,2013)

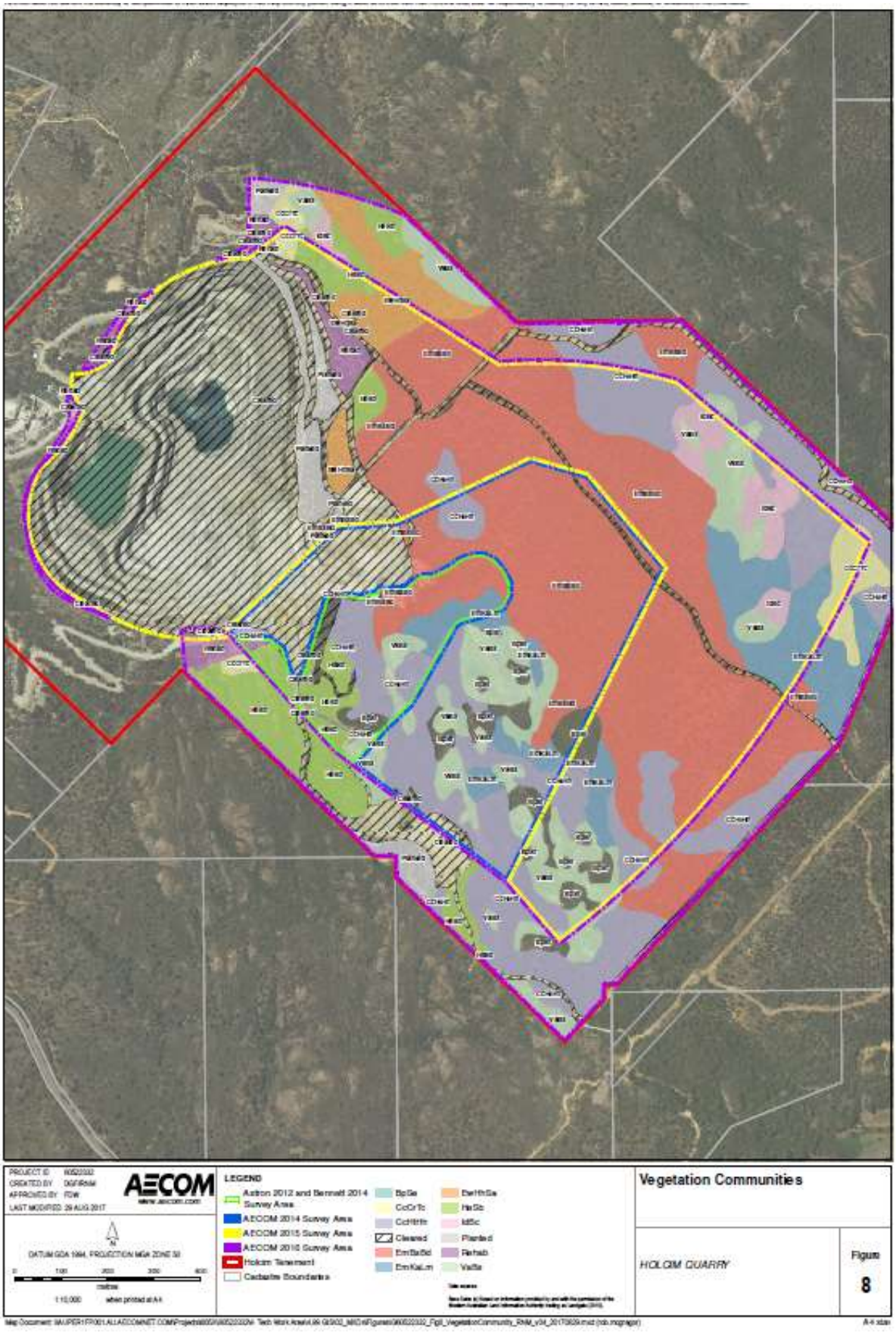

Figure 4: Mapped vegetation types within the Gosnell's quarry area (AECOM, 2017)

Table 5: Detailed vegetation descriptions of the vegetation types within the application area (AECOM, 2017).

Code	Description	Comments	Photograph
Thicket			
CcCrTc	*Corymbia calophylla* mid isolated trees over *Calothamnus rupestris, Xanthorrhoea preissii* and *Hakea undulata* tall closed shrubland over *Hibbertia hypericoides, Banksia dallanneyi* var. *dallanneyi, Gompholobium tomentosum, Synaphea acutiloba* and *Hakea amplexicaulis* low sparse shrubland with *Tetraria capillaris* and *Tetraria octandra* low sparse sedgeland with *Stylidium piliferum, Stylidium bulbiferum, Trichocline spathulata, Dampiera alata* and *Patersonia occidentalis* low sparse forbland. Supports population of *Acacia horridula* (P3), discussed in Section 6.3.1.	Species richness: 46 native species. Survey effort: HO8r, HO15, HO19. Area: 3.29 ha	
VaBs	*Acacia oncinophylla* subsp. *patulifolia* and *Melaleuca holosericea* tall sparse shrubs over *Verticordia acerosa* var. *acerosa, Verticordia insignis* subsp. *insignis, Verticordia plumosa* var. *plumosa* and *Hakea erinacea* mid shrubland over *Borya sphaerocephala, Stylidium bulbiferum, Drosera gigantea, Glischrocaryon aureum* and *Pterochaeta paniculata* low open forbland. Supports populations of *Acacia oncinophylla* subsp. *patulifolia* (P4), *Beaufortia purpurea* (P3) and *Lasiopetalum glutinosum* subsp. *glutinosum* (P3). These are further discussed in Section 6.3.1.	Species richness: 75 native species, eight weed species. Survey effort: CK4, CK5, CK10, HO13r, HO27. Area: 15.18 ha	

Code	Description	Comments	Photograph
BpSr	*Beaufortia purpurea, Hakea uncinata, Verticordia acerosa* var. *acerosa, Petrophile squamata* subsp. *squamata* and *Allocasuarina humilis* mid shrubland over *Beaufortia macrostemon, Banksia armata* var. *armata, Astroloma glaucescens, Babingtonia pelloeae* and *Hibbertia hypericoides* low open shrubland over *Stylidium repens, Thysanotus manglesianus, Goodenia coerulea* and *Stylidium bulbiferum* low sparse forbland. Supports populations of *Beaufortia purpurea* (P3) and *Lasiopetalum glutinosum* subsp. *glutinosum* (P3). These are further discussed in Section 6.3.1.	Species richness: 52 native species. Survey effort: CK3, HO28, HO29. Area: 4.43 ha	
HeSb	*Eucalyptus wandoo* low isolated trees over *Hakea erinacea, Verticordia acerosa* var. *acerosa, Leucopogon sprengelioides, Melaleuca radula* and *Xanthorrhoea drummondii* mid shrubland over *Hibbertia hypericoides, Melaleuca parviceps, Babingtonia camphorosmae, Beaufortia purpurea* and *Hakea incrassata* low shrubland over *Stylidium bulbiferum, Stylidium calcaratum, Cassytha racemosa* forma *racemosa, Stylidium eriopodum* and *Drosera glanduligera* low sparse forbland. Predominantly heathland with some mallee form *Eucalyptus wandoo* and *Corymbia calophylla* as an ecotone to adjacent forest. Variable in density of *Hakea erinacea*. Supports populations of *Asteridea gracilis* (P3), *Beaufortia purpurea* (P3) and *Lasiopetalum glutinosum* subsp. *glutinosum* (P3). These are further discussed in Section 6.3.1.	Species richness: 122 native species, four weed species. Survey effort: HO1, HO17, HO26, HO30, HO31. Area: 10.11 ha	

Appendix H: Sources of information

H.1. GIS databases

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

- Aboriginal Heritage Places (DPLH-001)
- Cadastre (LGATE-218)
- 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
- 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

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

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