



Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 8104/1
Permit type: Purpose Permit

1.2. Proponent details

Proponent's name: Urban Resources Pty Ltd

1.3. Property details

Property: Miscellaneous Licence 70/192
Local Government Area: City of Swan
Colloquial name:

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
2.9		Mechanical Removal	A Road

1.5. Decision on application

Decision on Permit Application: Grant
Decision Date: 10 January 2019

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description The vegetation of the application area is broadly mapped as the following Beard vegetation association: 949: Low woodland; banksia (GIS Database).

A flora and vegetation survey was conducted over the application area by a botanist from Strategen during April 2018. Four vegetation types were recorded within the application area, along with cleared areas (Strategen, 2018):

VT1 - Low open woodland of *Banksia attenuata*, *Banksia menziesii* and *Nuytsia floribunda* over shrubland of *Adenanthos cygnorum*, *Xanthorrhoea preissii* and *Acacia pulchella* over herbland of *Dasypogon bromeliifolius*, *Patersonia occidentalis* and *Bossiaea eriocarpa*.

VT2 - Thicket of *Kunzea ericifolia* over low shrubland of *Hypocalymma angustifolium* and *Regelia ciliata* over herbland of *Desmocladius flexuosus*.

VT3 - Low open woodland of *Banksia ilicifolia* and *Nuytsia floribunda* over low shrubland of *Melaleuca preissiana* and *Hypocalymma angustifolium* over herbland of *Dasypogon bromeliifolius*.

VT4 - Open low woodland of *Nuytsia floribunda* and **Pinus pinaster* over low sparse shrubland of *Xanthorrhoea preissii* and *Macrozamia riedlei* over mixed open herbland/ grassland of *Lechenaultia floribunda*, **Eragrostis curvula* and **Ehrharta calycina*.

CL - Cleared areas.

*denotes introduced species

Clearing Description Urban Resources Pty Ltd (Urban Resources) proposes to clear up to 2.9 hectares of native vegetation within a boundary of approximately 3.16 hectares, for the purpose of a road. The project is located approximately 8 kilometres north-east of Wanneroo, within the City of Swan.

Vegetation Condition Very Good: Vegetation structure altered; obvious signs of disturbance (Keighery, 1994);
To:
Completely Degraded: No longer intact; completely/almost completely without native species (Keighery, 1994).

Comment The vegetation condition was derived from a vegetation survey conducted by Strategen (2018c).
The proposed clearing is to widen the existing Seismic Road to enable access to the Boundary Road sand mine.

3. Assessment of application against Clearing Principles

(a) Native vegetation should not be cleared if it comprises a high level of biological diversity.

Comments **Proposal may be at variance to this Principle**
The clearing permit application area is located within the Perth subregion of the Interim Biogeographic Regionalisation for Australia (IBRA) Swan Coastal Plain Bioregion (GIS Database). The Swan Coastal Plain is

dominated by *Banksia* or Tuart woodlands on sandy soils, *Casuarina obesa* on outwash plains and swampy areas with paperbarks (CALM, 2002). The Perth subregion comprises of Marri on colluvial and aeolian sands, heath and/or Tuart woodlands on limestone, and *Banksia* and Jarrah-*Banksia* woodlands on Quaternary marine dunes (CALM, 2002).

A flora and vegetation survey of the application area recorded four vegetation types within the application area along with cleared areas. Approximately 53% of the application area is mapped as cleared areas with only 1.5 hectares of native vegetation mapped within the application area and proposed to be cleared (Strategen, 2018c).

No Threatened or Priority Flora were recorded during the survey or have previously been recorded within the application area (Strategen, 2018c; GIS Database).

There is one Threatened Ecological Community (TEC) located within and in close proximity to the application area, 'Banksia woodlands of the Swan Coastal Plain' (Strategen, 2018c; GIS Database). The floristic composition of some areas of vegetation within the affected area is also likely to align, subject to suitable surveys and detailed analysis to confirm, with the composition of floristic community types FCT22, FCT21c and/or FCT23b, which are listed by the Department of Biodiversity, Conservation and Attractions (DBCA) as Priority Ecological Communities (PECs) (DBCA, 2018a; Strategen, 2018c). The proposed clearing will impact 0.84 hectares of Banksia Woodlands TEC/PECs (Strategen, 2018a).

The vegetation of the 'Banksia woodlands of the Swan Coastal Plain' also provides foraging habitat for the Threatened Carnaby's Cockatoo (*Calyptorhynchus latirostris*) (Strategen, 2018c).

Eight introduced flora species were recorded during the flora survey including some pine trees (*Pinus pinaster*) (Strategen, 2018c). The pine trees are likely due to the southern portion of the application area being adjacent to a pine plantation (GIS Database). None of the introduced species are listed as Declared Plant species pursuant to section 22 of the *Biosecurity and Agriculture Management Act 2007*. Weed species have the potential to outcompete native species and result in a reduction in biodiversity of the area. Potential impacts from weeds may be minimised by the implementation of a weed management condition.

The application area is located within a Dieback (*Phytophthora cinnamomi*) risk zone and land managers Department of Biodiversity, Conservation and Attractions expressed concerns that dieback be adequately managed (DBCA, 2018a; DBCA, 2018b). Dieback is a major threat to plant biodiversity in the south west of Western Australia because the plant pathogen *P. cinnamomi* kills susceptible plants by attacking their root systems. It is important to limit the spread of dieback and this can be achieved through strict hygiene measures (DBCA, 2018b). Potential impacts from dieback may be minimised by the implementation of a dieback management condition.

The presence of the Banksia Woodlands raises the diversity of the application area both floristically and from a fauna perspective, with its value as foraging habitat for Carnaby's Cockatoo. Aerial imagery shows there is an existing road through the application area (GIS Database), which diminishes its value.

Based on the above, the proposed clearing may be at variance to this Principle.

Methodology

CALM (2002)
DBCA (2018a)
DBCA (2018b)
Strategen (2018a)
Strategen (2018c)

GIS Database:

- IBRA Australia
- Imagery
- Threatened and Priority Flora
- Threatened and Priority Ecological Communities Boundaries
- Threatened and Priority Ecological Communities Buffers

(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 indigenous to Western Australia.

Comments

Proposal may be at variance to this Principle

While most of the application area was cleared land, the following two fauna habitats have been recorded within the application area (Strategen, 2018c):

- Banksia woodland – *Banksia attenuata* and *Banksia menziesii* over *Kunzea glabrescens*, *Nuytsia floribunda* and *Acacia*, over *Xanthorrhoea preissii*. This habitat has vegetation in multiple strata (canopy, midstorey and understorey) and some woody debris and leaf litter that provides habitat, particularly for small reptiles, birds and mammals; and
- Kunzea woodland – Riparian vegetation at the edge of a wetland area. This fauna habitat is very

limited in the application area and although it lacks structure, it potentially provides habitat for some aquatic species including frogs. The vegetation type was observed to be extensive outside of the application area.

A total of 29 fauna species from 23 families were recorded, either directly or indirectly, during the Strategen (2018c) fauna survey. These consisted of one reptile, eight bird and two mammal species.

A desktop assessment by Strategen (2018c) of conservation significant fauna species identified several species to potentially occur within the application area:

- Carnaby's Cockatoo (*Calyptorhynchus latirostris*)
- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksia naso*)
- Rainbow Bee-eater (*Merops ornatus*)
- Southern Brown Bandicoot (*Isodon obesulus*)

The Forest Red-tailed Black Cockatoo was considered unlikely to occur in the application area because it does not contain suitable foraging vegetation (Strategen, 2018c).

The Rainbow Bee-eater is considered as possibly occurring with the application area (Strategen, 2018c). This species is common and widespread in Western Australia (Strategen, 2018c) while it may utilise the application area, it is not likely to be significant habitat for the species.

The Southern Brown Bandicoot was recorded during the Strategen (2018c) survey through numerous diggings that were observed. The species is distributed from the Swan Coastal Plain to Guilderton. Its habitat is Jarrah and Karri forests, and coastal vegetation complexes. On the Swan Coastal Plain it often utilises wetlands with dense vegetation. A small part of the application area has relatively dense vegetation and it provides suitable habitat for the Southern Brown Bandicoot (Strategen, 2018c). Strategen (2018c) observed this suitable habitat to be extensive outside the application area.

Carnaby's Cockatoo is considered likely to occur and the application area provides suitable foraging habitat (Strategen, 2018c). Approximately 1.08 hectares of the application area is Banksia woodland, including known food plants *Banksia attenuata* and *Banksia menziesii*. Vegetation types VT1 and VT3 are considered to be high quality foraging habitat (Strategen, 2018c). The survey recorded no breeding trees, based on a diameter at breast height (DBH) >500 millimetres, and the application area is unlikely to provide breeding habitat for Carnaby's Cockatoo (Strategen, 2018c).

Urban Resources has reduced the total amount of clearing from 3.16 hectares to 2.90 hectares to reduce the impact on the Banksia woodlands. This has reduced the amount of Carnaby's Cockatoo foraging habitat proposed to be cleared to 0.84 hectares, of which 0.13 hectares is degraded with the remaining in good to very good condition (Strategen, 2018a). The proposed impact to foraging habitat is considered small due to the small area and it being directly adjacent to an existing road.

Based on the above, the proposed clearing may be at variance to this Principle.

Methodology Strategen (2018a)
Strategen (2018c)

(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.

Comments Proposal is not likely to be at variance to this Principle

There are no known records of Threatened flora within the application area (GIS Database). A flora and vegetation survey of the application area and surrounds was undertaken by a botanist from Strategen on 11 April 2018. The flora survey did not record any species of Threatened flora (Strategen, 2018c). However, the flora survey was undertaken in April, which is outside the recommended survey period for the region (EPA, 2016; Strategen, 2018c). The desktop assessment identified one Threatened Flora species as possibly occurring within the application area, *Lepidosperma rostratum*. The field survey recorded *Lepidosperma* sp. with the specimen unable to be identified to species level. The unidentified *Lepidosperma* sp. was recorded outside the application area and based on morphological differences and habitat preferences, it is unlikely to be *Lepidosperma rostratum* (Strategen, 2018b).

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

Methodology EPA (2016)
Strategen (2018b)
Strategen (2018c)
GIS Database:
- Threatened and Priority Flora

(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.

Comments Proposal is at variance to this Principle

There is one known Threatened Ecological Community (TECs) located within and in close proximity to the application area, 'Banksia woodlands of the Swan Coastal Plain' (GIS Database). This TEC is listed as Endangered under the (Federal) *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

A flora and vegetation survey of the application area by a botanist from Strategen (2018c) identified two Banksia woodland vegetation types, VT1 and VT3:

VT1 - Low open woodland of *Banksia attenuata*, *Banksia menziesii* and *Nuytsia floribunda* over shrubland of *Adenanthos cygnorum*, *Xanthorrhoea preissii* and *Acacia pulchella* over herbland of *Dasypogon bromeliifolius*, *Patersonia occidentalis* and *Bossiaea eriocarpa*.

VT3 - Low open woodland of *Banksia ilicifolia* and *Nuytsia floribunda* over low shrubland of *Melaleuca preissiana* and *Hypocalymma angustifolium* over herbland of *Dasypogon bromeliifolius*.

An assessment against the key diagnostic criteria for the TEC determined the vegetation in VT1 and VT3 likely constitute the 'Banksia woodlands of the Swan Coastal Plain' TEC (Strategen, 2018c). The results were not conclusive due to the survey timing and the low species richness of the quadrats (Strategen, 2018c). There is 1.08 hectares of vegetation likely to be the TEC within the application area and it is in very good to good condition (Strategen, 2018c).

Urban Resources has reduced the total amount of clearing from 3.16 hectares to 2.90 hectares to reduce the impact on the Banksia woodlands. This has reduced the amount of TEC proposed to be cleared to 0.84 hectares, of which 0.13 hectares is degraded with the remaining in good to very good condition (Strategen, 2018a).

The proposed clearing will impact 0.84 hectares of 'Banksia woodlands of the Swan Coastal Plain' TEC. The impact is considered small due to the small area and it being directly adjacent to an existing road. The clearing is not expected to significantly impact the Banksia woodland or the function of the surrounding Banksia woodland vegetation (Strategen, 2018a).

Based on the above, the proposed clearing is at variance to this Principle.

Methodology Strategen (2018c)
GIS Database:

- Threatened and Priority Ecological Communities Boundaries
- Threatened and Priority Ecological Communities Buffers

(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.

Comments Proposal is not likely to be at variance to this Principle

The application area falls within the Swan Coastal Plain Bioregion of the Interim Biogeographic Regionalisation for Australia (IBRA) (GIS Database). Approximately 39% of the pre-European vegetation still exists in the Swan Coastal Plain IBRA Bioregion (Government of Western Australia, 2018). The application area is broadly mapped as Beard vegetation association 949: Low woodland; banksia (GIS Database). Between 56-57% of the pre-European extent of this vegetation association remains uncleared at the state, bioregional and sub-regional levels (Government of Western Australia, 2018). This vegetation association has a conservation status of Least concern (Department of Natural Resources and Environment, 2002).

	Pre-European area (ha)*	Current extent (ha)*	Remaining %*	Conservation Status**	Pre-European % in DBCA Managed Lands (and post clearing %)
IBRA Bioregion - Swan Coastal Plain	1,501,222	578,997	~38.57	Depleted	270,073 (222,767)
IBRA Subregion - Perth	1,117,757	465,509	~41.65	Depleted	229,365 (183,018)
Local Government - City of Swan	104,252	44,620	~42.80	Depleted	19,404 (12,924)
Beard vegetation associations - State					
949	218,193	122,966	~56.36	Least concern	91,811 (68,743)
Beard vegetation associations - Bioregion					
949	209,983	120,150	~57.22	Least concern	90,869 (67,824)
Beard vegetation associations - subregion					
949	184,476	104,016	~56.38	Least concern	84,190 (61,407)

* Government of Western Australia (2018)

** Department of Natural Resources and Environment (2002)

The proposed clearing is to widen an existing road with the clearing expected to cause minimal additional disturbance in comparison to the existing road. Therefore, the application area does not represent a significant remnant of native vegetation in an area that has been extensively cleared.

Based on the above, the proposed clearing is not likely to at variance to this Principle.

Methodology Department of Natural Resources and Environment (2002)
Government of Western Australia (2018)

GIS Database:
- IBRA Australia
- Pre-European Vegetation

(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.

Comments Proposal is at variance to this Principle

A small section, approximately 0.05 hectares, of the application area intersects the outer edge of a wetland (GIS Database). The wetland is conservation significant dampland and classified as a Geomorphic Wetland of the Swan Coastal Plain (GIS Database).

A flora and vegetation survey of the application area by a botanist from Strategen (2018c) mapped 0.24 hectares of vegetation growing in association with the conservation significant wetland. There is an existing road that already intersects this outer edge of the wetland (GIS Database) and the proposed clearing is to widen this existing track. Therefore, the impacts on the conservation significant wetland are expected to be minimal.

A Mining Proposal has been approved under the *Mining Act 1978* for the road associated with the proposed clearing. The Mining Proposal contains strict conditions on drainage and hygiene to prevent any adverse impacts on surrounding wetland vegetation (Urban Resources, 2018).

Based on the above, the proposed clearing is at variance to this Principle.

Methodology Strategen (2018c)
Urban Resources (2018)

GIS Database:
- Geomorphic Wetlands (Classification) – Swan Coastal Plain
- Hydrography, Linear

- Imagery

(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.

Comments Proposal is not likely to be at variance to this Principle

The application area lies within the Cb39 soil type which is described as undulating to gently undulating plains with prominent shallow drainage depressions (Northcote et al., 1968; GIS Database). The dominant soils are deep mottled bleached sands. Also occurring are other types of deep sands and in shallow drainage areas there are sandy or loamy bleached grey earths and loamy mottled duplex soils (Northcote et al., 1968).

Following clearing, the access road will be constructed of compacted base course and recycled asphalt to reduce dust (Urban Resources, 2018).

Approximately 11% of the application area is broadly mapped as having a high to moderate risk of acid sulphate soils (ASS), with the rest having a moderate to low risk (GIS Database). As the proposed clearing is unlikely to significantly disturb the existing soil profile or disturb the ground below the water table, it is unlikely that any ASS will be disturbed.

The proposed clearing of up to 2.9 hectares of native vegetation, for the purpose of a road is unlikely to cause appreciable land degradation.

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

Methodology Northcote et al. (1968)
Urban Resources (2018)

GIS Database:
- Acid Sulphate Soil Risk Map, Swan Coastal Plain
- Soils, Statewide

(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.

Comments Proposal may be at variance to this Principle

The application area is within State Forest 65 (Gnangara – Moore River State Forest) (GIS Database). Most of the application area is within proposed Yongka (Melaleuca Park) Nature Reserve, with the State Forest proposed to be converted into a reserve (GIS Database).

Approximately 2.87 hectares of the application area is within Bush Forever Site 399 (GIS Database). Bush Forever is managed by the Department of Planning, Lands and Heritage. Site 399 'Melaleuca Park and Adjacent Bushland, Bullsbrook/Lexia' covers an area of 4150.9 hectares and includes State Forest 65, EPA Red Book Area M9 and Register of National Estate site Melaleuca Park (Government of Western Australia, 2000; GIS Database).

Advice was received from Biodiversity, Conservation and Attractions (DBCA) described the values of the conservation area that the proposed clearing will impact as the 'Banksia woodlands of the Swan Coastal Plain' TEC; floristic community types FCT22, FCT21c and/or FCT23b, which are listed by DBCA as PECs; and foraging habitat for Carnaby's Cockatoo (DBCA, 2018). DBCA (2018) noted that Urban Resources had chosen this access route in consultation with DBCA to minimise the impact to values such as wetlands and to prevent creating a new access track, instead utilising an existing road. DBCA (2018) recommended that Urban Resources take all practical measures to minimise and mitigate direct and indirect impacts to native vegetation and the values of State forest from the construction and operation of the access road.

Following the DBCA advice, Urban Resources reduced the width of the road easement to further minimise the amount of clearing. The amount of proposed clearing was reduced from 3.16 hectares to 2.90 hectares. Part of this is completely degraded due to the existing road, reducing the amount to 1.26 hectares (Strategen, 2018a). The amount of Banksia Woodlands proposed to be cleared was reduced to 0.84 hectares (Strategen, 2018a); with Banksia Woodlands being one of the main values of the proposed Nature Reserve, Bush Forever, Red Book Area and Register of National Estate sites.

A Mining Proposal has been approved under the *Mining Act 1978* for the road associated with the proposed clearing. The Mining Proposal contains strict conditions to minimise and mitigate the direct and indirect impacts of the construction and operation of the access road (Urban Resources, 2018).

The proposed clearing will impact on the values of a conservation area. Given the amount of clearing of Banksia Woodlands is small (0.84 hectares), there are sufficient management measures to prevent impacts to surrounding native vegetation, and the clearing is utilising an existing track; the impact on the conservation area is considered acceptable.

Based on the above, the proposed clearing may be at variance to this Principle.

Methodology DBCA (2018a)
Government of Western Australia (2000)

GIS Database:
- Bushforever - 2000
- DPaW Tenure
- EPA Red Book 1976-91
- Register of National Estate

(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.

Comments Proposal is not likely to be at variance to this Principle

According to available databases, a small section of the application area, approximately 0.05 hectares, intersects the outer edge of a wetland (GIS Database). The wetland is conservation significant dampland and classified as a Geomorphic Wetland of the Swan Coastal Plain (GIS Database). An onground survey by Strategen (2018c) recorded that the proposed clearing will not intersect any surface water features although it will clear approximately 0.24 hectares of riparian vegetation.

There is already an existing road and the proposed clearing is to widen it. The proposed clearing is unlikely to result in significant changes to surface water flows to those already modified due to the existing road.

The application area is within the Gnangara Underground Water Pollution Control Area, which is a Priority 1 Public Drinking Water Source Area (GIS Database). A section of the application is within a Wellhead Protection Zone (GIS Database). Advice was provided by Department of Water and Environmental Regulation (DWER) and Water Corporation for the Mining Proposal for the road. There were no comments specifically about the clearing of native vegetation (DWER, 2018; Water Corporation, 2018). All of DWER and Water Corporation's comments about the construction and operation of the road were incorporated into the Mining Proposal and must be complied with under the *Mining Act 1978*.

The small amount of proposed clearing is unlikely to cause deterioration in the quality of underground water.

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

Methodology DWER (2018)
Strategen (2018c)
Water Corporation (2018)

GIS Database:
- Geomorphic Wetlands (Classification) – Swan Coastal Plain
- Hydrography, Linear
- PDWA Protection Zones
- Public Drinking Water Source Areas

(j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.

Comments Proposal is not likely to be at variance to this Principle

The climate of the region is warm Mediterranean (CALM, 2002) and the average annual rainfall at the closest weather station at Wanneroo is 797 millimetres (BOM, 2018).

A small part of the application area, approximately 0.05 hectares, is within a dampland (GIS). Temporary localised flooding may occur briefly following heavy rainfall events. However, the proposed clearing is unlikely to increase the incidence or intensity of natural flooding events.

Based on the above, the proposed clearing is not likely to be at variance to this Principle.

Methodology BOM (2018)

GIS Database:
- Geomorphic Wetlands – Swan Coastal Plain
- Hydrography, Linear

Planning Instrument, Native Title, previous EPA decision or other matter.

Comments

The clearing permit application was advertised on 2 July 2018 by the Department of Mines, Industry Regulation and Safety (DMIRS), inviting submissions from the public. Two submissions were received in relation to this application. The first submission was in regards to Aboriginal Heritage issues and a written response was provided on the matters raised. The second submission commented on traffic and asked for residents to have an opportunity to comment. The public submissions period provided this opportunity for residents to comment.

The permit area is within the South West Native Title Settlement area (DPLH, 2018). This settlement resolves Native Title rights and interests over an area of approximately 200,000 square kilometres within the south west of Western Australia. The mining tenure has been granted in accordance with the future act regime of the *Native Title Act 1993* and the nature of the act (i.e. the proposed clearing activity) has been provided for in that process, therefore the granting of a clearing permit is not a future act under the *Native Title Act 1993*.

There are no registered Aboriginal Sites of Significance within the application area (DPLH, 2018). It is the proponent's responsibility to comply with the *Aboriginal Heritage Act 1972* and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

It is the proponent's responsibility to liaise with the Department of Water and Environmental Regulation and the Department of Biodiversity Conservation and Attractions, to determine whether a Works Approval, Water Licence, Bed and Banks Permit, or any other licences or approvals are required for the proposed works.

The application area is located within the draft Perth and Peel Green Growth Plan for 3.5 million (Green Growth Plan). The Green Growth Plan is draft and is currently suspended, therefore, has no statutory basis at this time and is therefore not a consideration in this application.

Methodology DPLH (2018)

4. References

- BoM (2018) Bureau of Meteorology Website – Climate Data Online, Wanneroo. Bureau of Meteorology.
<http://www.bom.gov.au/climate/data/> (Accessed 23 November 2018).
- CALM (2002) A Biodiversity Audit of Western Australia's 53 Biogeographic Subregions in 2002. Department of Conservation and Land Management, Western Australia.
- DBCA (2018a) Biodiversity advice for land clearing application. Advice to Assessing Officer, Department of Mines, Industry Regulation and Safety, received 18 December 2018. Environmental Management Branch, Department of Biodiversity, Conservation and Attractions.
- DBCA (2018b) Phytophthora dieback. Department of Biodiversity, Conservation and Attractions.
<https://www.dpaw.wa.gov.au/management/pests-diseases/phytophthora-dieback> (Accessed 30 August 2018).
- DPLH (2018) Aboriginal Heritage Enquiry System. Department of Planning, Lands and Heritage.
<http://maps.daa.wa.gov.au/AHIS/> (Accessed 23 November 2018).
- Department of Natural Resources and Environment (2002) Biodiversity Action Planning. Action planning for native biodiversity at multiple scales; catchment bioregional, landscape, local. Department of Natural Resources and Environment, Victoria.
- DWER (2018) Advice for Mining Proposal. Advice to Assessing Officer, Department of Mines, Industry Regulation and Safety, received 20 June 2018. Land Use Planning Swan Avon Region, Department of Water and Environmental Regulation.
- EPA (2016) Technical Guidance Flora and Vegetation Surveys for Environmental Impact Assessment. Environmental Protection Authority.
- Government of Western Australia (2000) Bush Forever Volume 2. Western Australian Planning Commission, Perth WA.
- Government of Western Australia (2018) 2017 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). Current as of December 2017. WA Department of Biodiversity, Conservation and Attractions.
<https://catalogue.data.wa.gov.au/dataset/dbca-statewide-vegetation-statistics>
- Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.
- Northcote, K. H., Beckmann G, Bettenay E., Churchward H. M., van Dijk D. C., Dimmock G. M., Hubble G. D., Isbell R. F., McArthur W. M., Murtha G. G., Nicolls K. D., Paton T. R., Thompson C. H., Webb A. A. and Wright M. J. (1960-68) 'Atlas of Australian Soils, Sheets 1 to 10, with explanatory data'. CSIRO and Melbourne University Press: Melbourne.
- Strategen (2018a) Additional information received in relation to Clearing Permit Application CPS 8104/1, dated 18 December 2018.
- Strategen (2018b) Additional information received in relation to Clearing Permit Application CPS 8104/1, dated 21 December 2018.
- Strategen (2018c) Seismic Road, Wanneroo Flora, Vegetation and Fauna Assessment Report. Report Prepared by Strategen Environmental for Urban Resources, June 2018.
- Urban Resources (2018) Mining Proposal and Closure Plan Tenement L70/19. Haul Road (Widening of Seismic Ave) for Boundary Road Sand Mine (M70/1329) Rev 1. August 2018.
- Water Corporation (2018) Advice for Mining Proposal. Advice to Assessing Officer, Department of Mines, Industry Regulation and Safety, received 30 August 2018. Water Quality Branch.

5. Glossary

Acronyms:

BoM	Bureau of Meteorology, Australian Government
DAA	Department of Aboriginal Affairs, Western Australia (now DPLH)
DAFWA	Department of Agriculture and Food, Western Australia (now DPIRD)
DBCA	Department of Biodiversity Conservation and Attractions, Western Australia
DEC	Department of Environment and Conservation, Western Australia (now DBCA and DWER)
DEE	Department of the Environment and Energy, Australian Government
DER	Department of Environment Regulation, Western Australia (now DWER)
DMIRS	Department of Mines, Industry Regulation and Safety, Western Australia
DMP	Department of Mines and Petroleum, Western Australia (now DMIRS)
DPIRD	Department of Primary Industries and Regional Development, Western Australia
DPLH	Department of Planning, Lands and Heritage, Western Australia
DRF	Declared Rare Flora
DoE	Department of the Environment, Australian Government (now DEE)
DoW	Department of Water, Western Australia (now DWER)
DPaW	Department of Parks and Wildlife, Western Australia (now DBCA)
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities (now DEE)
DWER	Department of Water and Environmental Regulation, Western Australia
EPA	Environmental Protection Authority, Western Australia
EP Act	<i>Environmental Protection Act 1986</i> , Western Australia
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Federal Act)
GIS	Geographical Information System
ha	Hectare (10,000 square metres)
IBRA	Interim Biogeographic Regionalisation for Australia
IUCN	International Union for the Conservation of Nature and Natural Resources – commonly known as the World Conservation Union
PEC	Priority Ecological Community, Western Australia
RIWI Act	<i>Rights in Water and Irrigation Act 1914</i> , Western Australia
TEC	Threatened Ecological Community

Definitions:

{DPaW (2017) Conservation Codes for Western Australian Flora and Fauna. Department of Parks and Wildlife, Western Australia}:-

T	Threatened species: Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i> , listed under Schedules 1 to 4 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora (which may also be referred to as Declared Rare Flora). Threatened fauna is that subset of 'Specially Protected Fauna' declared to be 'likely to become extinct' pursuant to section 14(4) of the <i>Wildlife Conservation Act 1950</i> . Threatened flora is flora that has been declared to be 'likely to become extinct or is rare, or otherwise in need of special protection', pursuant to section 23F(2) of the <i>Wildlife Conservation Act 1950</i> . The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.
CR	Critically endangered species Threatened species considered to be facing an extremely high risk of extinction in the wild. Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i> , in Schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.
EN	Endangered species Threatened species considered to be facing a very high risk of extinction in the wild. Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i> , in Schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.
VU	Vulnerable species Threatened species considered to be facing a high risk of extinction in the wild. Published as Specially Protected under the <i>Wildlife Conservation Act 1950</i> , in Schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice for Threatened Fauna and Wildlife Conservation (Rare Flora) Notice for Threatened Flora.

- EX Presumed extinct species**
Species which have been adequately searched for and there is no reasonable doubt that the last individual has died. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice for Presumed Extinct Fauna and Wildlife Conservation (Rare Flora) Notice for Presumed Extinct Flora.
- IA Migratory birds protected under an international agreement**
Birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and the Bonn Convention, relating to the protection of migratory birds. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice.
- CD Conservation dependent fauna**
Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice.
- OS Other specially protected fauna**
Fauna otherwise in need of special protection to ensure their conservation. Published as Specially Protected under the *Wildlife Conservation Act 1950*, in Schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice.
- P Priority species**
Species which are poorly known; or
Species that are adequately known, are rare but not threatened, and require regular monitoring. Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.
- P1 Priority One - Poorly-known species:**
Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.
- P2 Priority Two - Poorly-known species:**
Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.
- P3 Priority Three - Poorly-known species:**
Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.
- P4 Priority Four - Rare, Near Threatened and other species in need of monitoring:**
(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands.
(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for Vulnerable, but are not listed as Conservation Dependent.
(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.