



1. Application details

1.1. Permit application details

Permit application No.: 2909/1
 Permit type: Area Permit

1.2. Proponent details

Proponent's name: City of Rockingham

1.3. Property details

Property: ROAD RESERVE (BALDIVIS 6171)
 Local Government Area: City Of Rockingham
 Colloquial name:

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
10.5		Mechanical Removal	Road construction or maintenance

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description	Clearing Description	Vegetation Condition	Comment
Beard Vegetation Association: 998 - Medium woodland of Tuart 1001 - Medium very sparse woodland; jarrah, with low woodland; banksia and casuarina. (Shepherd 2007; SAC Bio datasets 5/2/2009)	The proposal is to clear 10.5 hectares of native vegetation over a total of distance of approximately 2.5 km for the upgrade and extension of Karnup Road between Baldivis Road in the east and Eighty Road in the west.	Very Good: Vegetation structure altered; obvious signs of disturbance (Keighery 1994)	The vegetation clearing description is based on a site inspection by DEC officers on 23 January 2009 and a flora and fauna assessment conducted by Cardno (2008).
Heddle: Karrakatta Complex Central and South: Predominantly open forest of E. gomphocephala - E. marginata - E. calophylla and woodland of E. marginata - Banksia species (Heddle et al 1980).	The area under application is located within an undulating landscape, with the vegetation ranging from degraded condition to excellent condition, with an overall average of very good condition. The vegetation in very good condition is located in the central portion under application and comprises Eucalyptus gomphocephala, Banksia attenuata, B. menziesii and Allocasuarina over an understorey comprising Hibbertia hypericoides, Acacia pulchella, Mesomelaena pseudostygia, Desmodcladus flexuosus and Conostylis species.	Excellent: Vegetation structure intact; disturbance affecting individual species, weeds non-aggressive (Keighery 1994)	
	Although the majority of the central vegetation is in very good condition, a small portion (~0.5 ha) of the vegetation in this locality is in excellent condition comprising Banksia woodland with		

Allocasuarina fraseriana and Xylomelum occidentale over Hibbertia hypericoides, Acacia pulchella, Desmodium flexuosus and Conostylis species.

The vegetation in the eastern and western portions of the area under application is in good condition and comprises Eucalyptus marginata and Banksia attenuata over Adenanthos cygnorum, Acacia pulchella, Hibbertia hypericoides, Macrozamia riedlei, Conostylis species and Burchardia congesta.

Good: Structure significantly altered by multiple disturbance; retains basic structure/ability to regenerate (Keighery 1994)

The vegetation in the eastern and western extremities is in degraded condition and comprises Kunzea glabrescens and Allocasuarina fraseriana over Acacia pulchella and non-native grasses.

Degraded: Structure severely disturbed; regeneration to good condition requires intensive management (Keighery 1994)

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 vegetation under application consists of 10.5 hectares of vegetation in degraded to good (~35%) and very good to excellent (~65%) condition, with an overall condition rating of very good (DEC, 2009). The vegetation in very good to excellent condition is likely to provide suitable habitat for a range of ground dwelling fauna species such as the Quenda, Kangaroo, snake and lizard species and foraging bird species. In particular, the Carnaby's Black Cockatoo and possum scats/scratchings were observed within the applied area during the site inspection (DEC, 2009).

A spring flora and fauna survey was conducted by Cardno (2008) on Karnup Road Reserve. During this flora survey, Cardno identified a total of 100 flora taxa (including 80 native species and 20 introduced species) and described the vegetation within the applied area as ranging from degraded to excellent condition (Cardno, 2008).

During the fauna survey of Karnup Road Reserve, Cardno (2008) identified a total of 23 bird species, one mammal and two reptile species within the applied area, including the EPBC Act (Migratory) listed Rainbow Bee-eater (Merops ornatus), the Carnaby's Black-Cockatoo (Calyptorhynchus latirostris) (EPBC Act, Endangered), Baudin's Black-Cockatoo (Calyptorhynchus baudinii) (EPBC Act, Vulnerable) and four bird species listed as Regionally Significant birds on the Swan Coastal Plain (Government of Western Australia, 2000).

Given the diversity of the vegetation under application and that it is likely to be utilised by a number of fauna species, including large range of avifauna and species of conservation significance, it is considered likely that the applied area may be considered to be an area of high biological diversity.

Methodology

References:

- Cardno (2008)
- DEC (2009)
- Government of Western Australia (2000)

GIS Datasets:

- SAC BIO Datasets 6/02/2009

(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 is at variance to this Principle

There are two fauna species of conservation significance which have been recorded within the local area (5km radius) being the Eastern Curlew (Numenius minutus, P4) and the Quenda (Isodon obesulus fusciventer, P5).

The Eastern Curlew inhabits coastal and estuarine localities (Simpson & Day, 2004) and has been recorded at Lake Cooloongup, which is located approximately 3.8 km north-west of the area under application. Given that the applied area comprises upland vegetation and that no wetlands were identified onsite (Cardno, 2008), it is not considered likely that the area under application would provide suitable habitat for the identified bird species.

The vegetation under application comprises Eucalyptus species, Banksia species, Allocasuarina fraseriana, Xylomelum occidentale, Xanthorrhoea preissii, Acacia pulchella over an understorey comprising Macrozamia riedlei, Adenanthos cygnorum, Hibbertia hypericoides, Conostylis spp, Desmodium flexuosa and grasses, and it is likely to provide suitable habitat for a range of ground dwelling fauna species such as the Quenda, snakes, lizards and kangaroos. In addition, possum scats/scratchings were observed during the DEC site inspection, with the trees under application likely to provide suitable habitat for this identified species (DEC 2009).

The area under application is located within the distribution range of the Carnaby's Black-Cockatoo (Calyptorhynchus latirostris) (EPBC Act Endangered), which nest in large hollows of Eucalyptus trees and forage on the seeds and nectar from the flowers of Banksia spp, Eucalyptus spp and Hakea species (Burbidge, 2004). The vegetation within the applied area comprises mature trees containing both large and smaller hollows considered to provide nesting opportunities for a number of species ranging from small insectivorous birds species through to the larger parrot species, including the Carnaby's Black-Cockatoo which was observed on site (Cardno, 2008).

During the fauna survey of Karnup Road Reserve, Cardno (2008) identified a total of 23 bird species, one mammal and two reptile species within the applied area, including the EPBC Act (Migratory) listed Rainbow Bee-eater (Merops ornatus), the Carnaby's Black-Cockatoo (Calyptorhynchus latirostris) (EPBC Act, Endangered), Baudin's Black-Cockatoo (Calyptorhynchus baudinii) (EPBC Act, Vulnerable) and four bird species listed as Regionally Significant birds on the Swan Coastal Plain (Government of Western Australia, 2000).

The Rainbow Bee-eater is protected under the Environmental Protection Biodiversity Conservation Act 1999. This migratory bird species nests in burrows excavated in sandy ground during the spring and summer months. Given that this species was observed on site during the fauna survey and the area under application comprises sandy soils and vegetated areas suitable for nesting, it is considered likely that the area under application may provide significant local habitat for this protected species. Any clearing of vegetation during the months of September to February is likely to destroy any burrows that may be present on site.

Given the presence of suitable habitat and hollows for a number of local native fauna species, including those of conservation and regional significance, it is considered that the vegetation under application is likely to provide significant habitat for indigenous fauna.

A fauna management condition will be placed on the permit to ensure species of conservation significance are located, avoided or relocated.

Methodology

References:

- Burbidge (2004)
- Cardno (2008)
- DEC (2009)

GIS Databases:

- SAC Bio Datasets 6/02/2009

(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 occurrences of rare flora within a 5km radius of the area under application. The closest rare flora, Synaphea sp. Fairbridge Farm is located approximately 10.7 km from the area under application and is found within a different vegetation complex and soil type to the area under application.

A flora survey conducted in September 2008 did not identify any rare flora or priority species within the area under application (Cardno, 2008).

Given that no rare flora or priority flora were identified during the appropriately timed flora survey of the applied area, it is not considered likely that the vegetation under application includes, or is necessary for the continued existence of, rare flora.

Methodology

References:

- Cardno (2008)
- DEC (2009)

GIS Databases:

- Hedde Vegetation Complexes

- Soils, Statewide - DA 11/99
- SAC Bio Datasets 5/02/2009

(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 not likely to be at variance to this Principle

There are 17 known occurrences of Threatened Ecological Communities (TEC), identified as Floristic Community Type 19 (FCT 19) - Sedgeland in Holocene dune swales of the southern Swan Coastal Plain (Gibson et al. 1994) within a 5 km radius of the vegetation under application, the closest being located approximately 2.7km to the west. These TEC's are found within a different vegetation complex and soil type to that found in the area under application and are associated with seasonal wetlands.

During the flora survey, Cardno (2008) identified the vegetation under application as comprising FCT 21a - Central Banksia attenuata - Eucalyptus marginata woodlands and FCT 28 - Spearwood Banksia attenuata or B. attenuata - Eucalyptus woodlands, neither of which are identified as a TEC or Priority Ecological Community (PEC).

Given the distance to the closest TEC and that a flora survey conducted of the applied area did not identify the vegetation under application as a TEC (Cardno, 2008) , it is not considered likely that the vegetation under application comprises, or is necessary for the maintenance of a TEC.

Methodology

References:

- Cardno (2009)
- DEC (2009)

GIS Databases:

- Heddle Vegetation Complexes
- Soils, Statewide - DA 11/99
- SAC BIO Datasets - accessed 5/02/2009

(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

Heddle et al. (1980) defines the vegetation under application as Karrakatta Complex Central and South of which there is 29.5% of pre-European extent remaining (EPA 2006). The vegetation under application is also described as Beard vegetation association 998 and 1001 of which there is 41.6% and 25.3% respectively of pre-European extent remaining (Shepherd 2006).

The area under application is located within the City of Rockingham, within which there is 31.4% of pre-European extent remaining.

The State Government is committed to the National Objectives and Targets for Biodiversity Conservation which includes a target that prevents the clearance of ecological communities with an extent below 30% of that present of Pre-European settlement (Commonwealth of Australia 2001). However, the EPA (2006) recognises the Perth Metropolitan Region as a 'constrained area,' providing for the reduction of vegetation complexes to a minimum of 10% of the Pre-European extent.

Given the current representation levels of the vegetation under application and the fact that there are large conservation reserves located within the local area which are comprised of the same vegetation types, it is not considered likely that the vegetation under application is significant as a remnant.

	Pre-European (ha)	Current extent (ha)	Remaining (%)	In secure tenure (%)
IBRA Bioregion*				
Swan Coastal Plain^	1,501,456	571,758	38.1	
City of Rockingham*	26,503	7,695	31.4	
Heddle Vegetation complex**				
Karrakatta Complex - Central and South	49,912	14,695	29.5	2.5
Beard Vegetation complex*				
998	51,015	21,225	41.6	29.2
1001	57,410	14,545	25.3	4.1

- * (Shepherd, 2007)
- ** (EPA, 2006)
- ^ Area within Intensive Land Use Zone

Methodology

- Commonwealth of Australia (2001)
- EPA (2006)
- Shepherd (2007)

GIS Databases:

- Heddle Vegetation Complexes
- Interim Biogeographic Regionalisation of Australia
- Swan Coastal Plain South 20cm Orthomosaic - Landgate 2006
- SAC Bio datasets - accessed on 5/02/2009

(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 not likely to be at variance to this Principle**

There are no wetlands or watercourses mapped within the vegetation under application. However, there are numerous wetlands located within a 5km radius of the area under application, the closest a Conservation Category Wetland is located approximately 500m south of the applied area. In addition, the nearest EPP Lake is located approximately 720m southwest of the area under application.

The nearest watercourses are the Peel Main Drain which is located approximately 1.1km east of the area under application and the Serpentine River which is located approximately 1.2km southeast of the applied area.

Given the distance to these wetlands and watercourses and given that the description and appearance of the vegetation under application is associated with an upland community (DEC 2008), the vegetation under application is not considered likely to include vegetation growing in, or in association with, an environment associated with a watercourse or wetland.

Methodology References:

- Cardno (2008)
- DEC (2009)

GIS Databases:

- EPP, Lakes
- Geomorphic Wetlands (Classification), Swan Coastal Plain
- Hydrography, linear (hierarchy)
- RAMSAR, Wetlands

(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 soils within the area under application are described as well-drained Spearwood sands which generally have a low risk of land degradation from water erosion and waterlogging (Department of Agriculture, 2005) and a nil to low risk of salinity.

Although generally there is a low salinity risk associated with the identified sandy soils, salinity risk mapping has identified a small pocket of high salinity in the western portion of the applied area. However, given the limited size (0.09ha) of the area identified as being at risk, it is not considered likely that the proposed clearing would result in any significant increase in salinity.

The main land degradation risk associated with the removal of vegetation on the identified soil type is considered to be nutrient export and wind erosion (Department of Agriculture, 2005), however, given that the proposed land use is for the extension of Karnup Road, nutrient levels should not be artificially elevated therefore minimising the risk of eutrophication. Furthermore, the thin, linear nature of the proposed clearing and the sealing of exposed surfaces would minimise the risk of wind erosion.

Given the above, it is therefore not considered likely that the proposed clearing would result in appreciable land degradation.

Methodology References:

- DEC (2009)
- Department of Agriculture (2005)
- Northcote et al (1960-68)

GIS Databases:

- Salinity Risk LM 25m - DOLA 00

- 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 is not likely to be at variance to this Principle

There are numerous areas reserved for conservation purposes within a 5km radius of the area under application, the closest being Bush Forever site 376 (Baldivis Road Bushland) which is located approximately 22 metres south of the applied area and Bush Forever site 75 (Churcher Swamp) which is situated approximately 915 metres to the south.

In addition, Biodiversity linkage No. 81 is located immediately south of the area under application and has been identified as a 'Regional Ecological Linkage' within the local area, linking Bush Forever site 376 in the east with Bush Forever site 75 in the southwest (Strategy Plan for Perth Greenways: Final Report, 1998).

Although the eastern corner of the applied area is located within the identified linkage, given the small, linear size of the affected area (~1.8 ha), it is not considered likely that the proposed clearing will reduce the ability of this remnant to act as a stepping stone for local fauna species or to fragment the identified corridor linkage from local conservation reserves.

Given the above and the distance to the nearest conservation area, it is not considered likely that the proposed clearing is likely to have an impact on the environmental values of any adjacent or nearby conservation area.

Methodology

References:

- Cardno (2008)
- DEC (2009)

GIS Databases:

- Bushforever
- CALM Managed Lands and Waters
- CALM Regional Parks
- Register of National Estate
- System 6 Conservation Reserves

(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

The closest watercourses are a Conservation Category Wetland which is located approximately 500m south of the area under application and the Peel Main Drain which is located approximately 1.1km east of the applied area. The eastern portion of the under application is within the Peel Harvey Catchment Area, but is not located within a Public Drinking Water Source Area.

Given the high infiltration rates of the sandy soils identified within the area under application, and the distance to the nearest wetland and watercourse, it is not considered likely that the proposed clearing would cause water erosion resulting in a deterioration in surface water quality.

The area under application has a nil to low risk of acid sulphate soils and is generally associated with a low risk of salinity. However, salinity risk mapping has identified a small portion (0.09ha) within the applied area as having a high salinity risk due to its position lower in the landscape. Given that groundwater salinity in the local area is between 1000-3000 mg/L (moderate salinity level) and given the limited size (0.09ha) of the area identified as being at risk, it is not considered likely that the proposed clearing would cause a deterioration in the quality of the underground water.

Given the above, it is therefore not considered likely that the proposed clearing would cause deterioration in the quality of surface or underground water.

Methodology

GIS Databases:

- EPP, Areas
- EPP, Lakes
- Geomorphic Wetlands (Classification), Swan Coastal Plain
- Groundwater Salinity, Statewide
- Hydrography, linear (hierarchy)
- Public Drinking Water Source Areas (PDWSAs)
- RAMSAR, Wetlands
- Salinity Risk LM 25m - DOLA 00_1

(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 area under application is located approximately 500 metres north of a Conservation Category Wetland and approximately 1.1km west of the Peel Main Drain, at an elevation of 10-30 metres.

Given the distance to the nearest wetland and watercourse and the high infiltration of the soils on site, it is not considered likely that the proposed removal of vegetation would impact on peak flood height or duration.

Methodology GIS Databases:
Geomorphic wetlands (Mgt Categories)- Swan Coastal Plain- DEC
Hydrography, linear (hierarchy)
Soils, Statewide
Topographic Contours, Statewide - DOLA 12/09/02

Planning instrument, Native Title, Previous EPA decision or other matter.

Comments

The proposal is to clear 10.5 ha of native vegetation for the extension of Karnup Road between Baldivis Road in the east and Eighty Road in the west.

Located in the eastern portion of the area under application is an Aboriginal site of significance (id. 4347) which has been listed on the Permanent Register. Given the proximity of this Aboriginal site, it is considered that consultation should be considered for the area under application.

A submission (2009a) for the proposed clearing of the area under application was received. The submission considered biodiversity issues including that the vegetation under application may have a high level of biodiversity of flora and fauna (potentially including the Carnaby's Black-Cockatoo (EPBC Act Endangered) and the Rainbow Bee-Eater (EPBC Act Migratory) and recommend referring this proposal to the Commonwealth Department of Environment, Water, Heritage and the Arts (DEWHA) for advice. Further recommendation that any road construction, access, drainage and maintenance did not result in the clearing or disturbance of native vegetation within Bush Forever site 376. The issues raised have been addressed under the relevant principles.

A submission (2009b) for the proposed clearing identified that there would be an impact upon fauna movement in a north-south direction and recommend weed control be undertaken in partnership with adjoining property owners.

Methodology References:
- Submission (2009a)
- Submission (2009b)
GIS Databases:
- Aboriginal Sites of Significance

4. Assessor's comments

Comment

The assessable criteria have been addressed and the proposed clearing is at variance to Principles (b) and may be at variance to Principles (a).

5. References

Burbidge, A. (2004) Threatened Animals of Western Australia, Department of Conservation and Land Management, Perth, Western Australia.

Cardno (WA) Pty Ltd (2008) Flora and Fauna Assessment Report for the Karnup Road Extension, unpublished report prepared for the City of Rockingham.

Commonwealth of Australia (2001) National Targets and Objectives for Biodiversity Conservation 2001-2005, AGPS, Canberra.

DEC (2009) Site Inspection Report for Clearing Permit Application CPS2909/1, Karnup Road Reserve, Baldivis. Site inspection undertaken 23/01/2009. Department of Environment and Conservation, Western Australia (TRIM Ref. DOC75495).

Department of Agriculture (2005) AgMaps Land Manager CD-rom for the Shires of Serpentine-Jarrahdale, Kwinana, Rockingham, Mandurah, Murray, Boddington, Waroona and Harvey. Department of Agriculture, Western Australia. ISSN: 1448-235X.

EPA (2006) Guidance for the Assessment of Environmental Factors - Level of Assessment for Proposals Affecting Natural Areas Within the System 6 Region and Swan Coastal Plain Portion of the System 1 Region. Guidance Statement No 10. Environmental Protection Authority, Western Australia.

Gibson N., Keighery B., Keighery G., Burbidge A. and Lyons M. (1994). A Floristic Survey of the Southern Swan Coastal Plain. Western Australian Department of Conservation and Land Management and the Western Australian Conservation Council.

Government of Western Australia (2000) Bush Forever Volumes 1 and 2. Western Australian Planning Commission, Perth WA.

Hedde, E. M., Loneragan, O. W., and Havel, J. J. (1980) Vegetation Complexes of the Darling System, Western Australia. In Department of Conservation and Environment, Atlas of Natural Resources, Darling System, Western Australia.

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. with Beckmann G 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.

Shah, B. (2006) Conservation of Carnaby's Black-Cockatoo on the Swan Coastal Plain, Western Australia. December 2006. Carnaby's Black-Cockatoo Recovery Project. Birds Australia, Western Australia.

Shepherd, D.P. (2007). Adapted from: Shepherd, D.P., Beeston, G.R., and Hopkins, A.J.M. (2001), Native Vegetation in Western Australia. Technical Report 249. Department of Agriculture Western Australia, South Perth. Includes subsequent updates for 2006 from Vegetation Extent dataset ANZWA1050000124.

Simpson, K. and Day, N. (2004) Field Guide to the Birds of Australia, 7th edition, Penguin Group (Australia), Australia.

Submission (2009a) Direct Interest Submissions received for Karnup Road Reserve, Baldivis. TRIM REF DOC75038.

Submission (2009b) Direct Interest Submission received for Karnup Road Reserve, Baldivis. TRIM REF DOC74465.

6. Glossary

Term	Meaning
BCS	Biodiversity Coordination Section of DEC
CALM	Department of Conservation and Land Management (now BCS)
DAFWA	Department of Agriculture and Food
DEC	Department of Environment and Conservation
DEP	Department of Environmental Protection (now DEC)
DoE	Department of Environment
DoIR	Department of Industry and Resources
DRF	Declared Rare Flora
EPP	Environmental Protection Policy
GIS	Geographical Information System
ha	Hectare (10,000 square metres)
TEC	Threatened Ecological Community
WRC	Water and Rivers Commission (now DEC)