



CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

PERMIT DETAILS

Area Permit Number: 7138/1

File Number: DER2016/001139

Duration of Permit: From 15 October 2016 to 15 October 2018

PERMIT HOLDER

Coogee Nominees Pty Ltd

LAND ON WHICH CLEARING IS TO BE DONE

Lot 9 on Plan 8225, Southern River

AUTHORISED ACTIVITY

The Permit Holder shall not clear more than 2.5 hectares of native vegetation within the area cross-hatched yellow on attached Plan 7138/1.

CONDITIONS

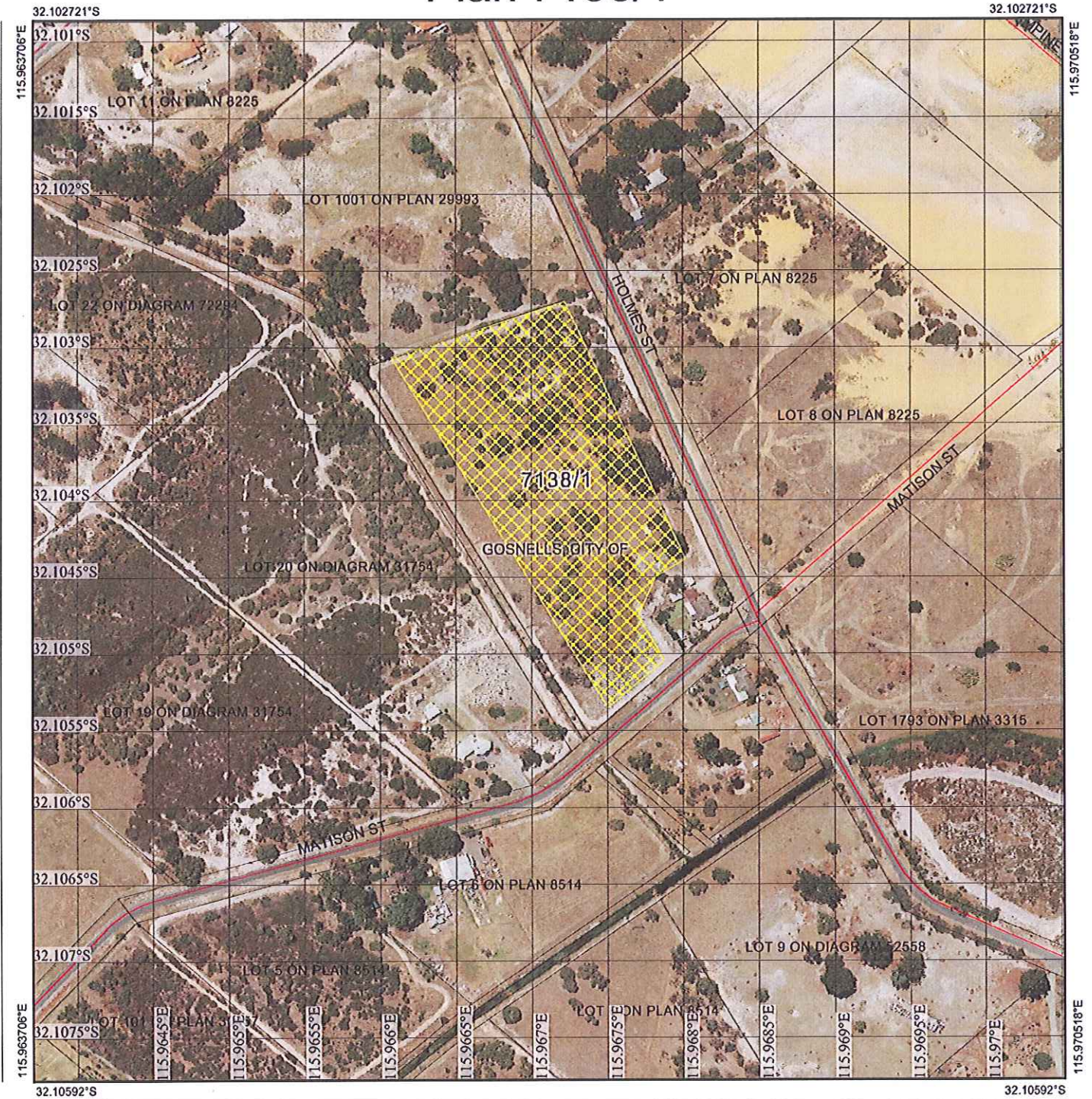
Nil.

Emma Bramwell
A/ MANAGER
CLEARING REGULATION

*Officer delegated under Section 20
of the Environmental Protection Act 1986*

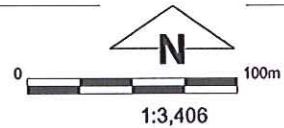
15 September 2016

Plan 7138/1



Legend

-  Roads
-  Imagery
-  Clearing Instruments Activities
-  Local Government Authority
-  Cadastre



1:3,406

(Approximate when reproduced at A4)

GDA 94 (Lat/Long)

Geocentric Datum of Australia 1994

E Branwell Date 15/09/16
E Branwell

Officer with delegated authority under Section 20 of the Environmental Protection Act 1986



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 WESTERN AUSTRALIA
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1. Application details

1.1. Permit application details

Permit application No.: 7138/1
Permit type: Area Permit

1.2. Applicant details

Applicant's name: Coogee Nominees Pty Ltd

1.3. Property details

Property: LOT 9 ON PLAN 8225, SOUTHERN RIVER
Local Government Authority: GOSNELLS, CITY OF
DER Region: Greater Swan
DPaW District: SWAN COASTAL
Localities: SOUTHERN RIVER

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
2.5		Mechanical Removal	Stockpile/bulk earthworks

1.5. Decision on application

Decision on Permit Application: Granted
Decision Date: 15 September 2016
Reasons for Decision: The clearing permit application is to clear 2.5 hectares of native vegetation within Lot 9 on Plan 8225, Southern River, for the purpose of bulk earthworks for a future subdivision. This application was received on 23 June 2016 and has been assessed against the clearing principles, planning instruments and other matters in accordance with section 51O of the *Environmental Protection Act 1986*.

The Delegated Officer determined that the proposed clearing is at variance to Principle (f), may be at variance to Principle (g) and is not likely to be at variance to the remaining principles. The Delegated Officer determined that the proposed clearing of 2.5 hectares of native vegetation in a degraded to completely degraded (Keighery, 1994) condition is unlikely to have a significant impact on the values of the multiple use category wetland in which the clearing is located.

State policies and other relevant policies have been taken into consideration in the decision to grant a clearing permit.

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
The application area has been mapped as the following vegetation types: Beard vegetation association 1001: Medium very sparse woodland; jarrah, with low woodland; <i>Banksia</i> and <i>Casuarina</i> (Shepherd et al., 2001). Hedde Southern River complex: Open woodland of <i>Corymbia calophylla</i> (marri) - <i>Eucalyptus marginata</i> (jarrah) - <i>Banksia</i> species with fringing woodland of <i>Eucalyptus rudis</i> (flooded gum) - <i>Melaleuca raphiophylla</i> (swamp paperbark) along creek beds (Hedde et al., 1980).	The application is to clear 2.5 hectares of native vegetation within Lot 9 on Plan 8225, Southern River, for the purpose of bulk earthworks for a future subdivision.	Completely Degraded; No longer intact, completely/almost completely without native species (Keighery, 1994). to Degraded; Structure severely disturbed; regeneration to good condition requires intensive management (Keighery, 1994).	The condition and description of the application area was determined via a site inspection conducted by Department of Environment Regulation (DER) officers on 27 July 2016. The majority of the application area consists of <i>Melaleuca</i> sp. over an understorey of exotic grasses (DER, 2016). The vegetation community changes in the north eastern corner of the application area and consists of a mix of <i>Eucalyptus marginata</i> and <i>Melaleuca</i> sp. with pockets of <i>Kunzea</i> sp. and <i>Regelia</i> sp. throughout the mid-storey. The understorey vegetation is dominated by exotic grasses, with clumps of scattered sedges (DER, 2016).

3. Assessment of application against clearing principles

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

Comments

Proposed clearing is not likely to be at variance to this Principle

The application is to clear 2.5 hectares of native vegetation within Lot 9 on Plan 8225, Southern River, for the purpose of bulk earthworks for a future subdivision.

The vegetation within the application area is in a degraded to completely degraded (Keighery, 1994) condition with an understorey dominated by weeds. The majority of the application area consists of *Melaleuca* sp. over an understorey of exotic grasses (DER, 2016).

Twenty rare flora species have been recorded within the local area (10 kilometre radius). The closest mapped rare flora species is an orchid which occurs in areas of mixed woodland of jarrah and banksia from deep grey-white sandy soils. Given the habitat preferences of this species, it is considered that this species is unlikely to occur within the application area.

Twenty rare flora species and fifty five priority flora species have been recorded within the local area (10 kilometre radius). The closest mapped priority flora species is a priority 4 species which has been recorded approximately 70 metres from the application area. This species is an erect shrub which grows in association with winter wet flats in sand/sandy clay (Western Australian Herbarium, 1998-). Given the historical disturbance of the application area and the high concentration of weeds, it is considered that this species is unlikely to occur within the application area.

A level 2 flora and vegetation survey undertaken on an adjacent property identified two priority 3 species. Priority 3 flora species are poorly known, but do not appear to be under imminent threat. Both species have moderate distributions across the Swan Coastal Plain (Western Australian Herbarium, 1998-), and it is considered that the proposed clearing is unlikely to impact the conservation status of either species if they are present within the application area.

Fifteen fauna species listed as rare or likely to become extinct under the *Wildlife Conservation Act 1986* have been recorded within the local area, including forest red-tailed black cockatoo (*Calyptorhynchus banksii* subsp. *naso*), Carnaby's cockatoo (*Calyptorhynchus latirostris*), Baudin's cockatoo (*Calyptorhynchus baudinii*), woylie (*Bettongia penicillata* subsp. *ogilbyi*), chuditch (*Dasyurus geoffroii*), numbat (*Mymecobius fasciatus*) and quokka (*Setonix brachyurus*) (Parks and Wildlife, 2007-).

A flock of five forest red-tailed black cockatoos were observed within a jarrah tree within the north eastern corner of the application area during a site inspection undertaken by Department of Environment Regulation (DER) officers (DER, 2016). The application area is dominated by *Melaleuca* sp. and is therefore not significant foraging habitat for black cockatoos. Given the lack of native understorey and the degraded to completely degraded (Keighery, 1994) condition of the vegetation, it is considered that the application area is unlikely to provide significant habitat for ground dwelling fauna.

The nearest threatened ecological community (TEC) is 'Shrublands and woodlands on Muchea limestone' community, which is located approximately 950 metres south of the application area. Noting the type and condition of the vegetation, it is considered that this species is unlikely to occur within the application area.

The closest priority ecological community (PEC) to the application area is 'Low lying *Banksia attenuata* woodlands or shrublands' (Priority 3) located approximately 3.3 kilometres north east of the application area. A site inspection undertaken by DER officers found that the vegetation within the application area is not consistent with the description of this PEC (DER, 2016). Given the distance to the closest mapped occurrence, it is considered that the proposed clearing is unlikely to impact on this PEC.

On the basis of the above, the application area is unlikely to comprise a high level of biodiversity.

Given the above, the proposed clearing not likely to be at variance to this Principle.

Methodology

References:

DER (2016)
Keighery (1994)
Parks and Wildlife (2007-)
Western Australian Herbarium (1998-)

GIS Database:

SAC Bio datasets – Accessed August 2016

(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 **Proposed clearing is not likely to be at variance to this Principle**
Fifteen fauna species listed as rare or likely to become extinct under the *Wildlife Conservation Act 1986* have been recorded within the local area (10 kilometre radius), including forest red-tailed black cockatoo (*Calyptorhynchus banksii* subsp. *naso*), Carnaby's cockatoo (*Calyptorhynchus latirostris*), Baudin's cockatoo (*Calyptorhynchus baudinii*), woylie (*Bettongia penicillata* subsp. *ogilbyi*), chuditch (*Dasyurus geoffroii*), numbat (*Mymecobius fasciatus*) and quokka (*Setonix brachyurus*) (Parks and Wildlife, 2007-).

A site inspection of the application area conducted by DER officers described the vegetation within the application area as consisting predominately of *Melaleuca* sp. over an understorey of exotic grasses (DER, 2016). The vegetation community changes in the north eastern corner of the application area and consists of a mix of *Eucalyptus marginata* (jarrah) and *Melaleuca* sp. with pockets of *Kunzea* sp. and *Regelia* sp. throughout the mid-storey.

Forest red-tailed black-cockatoo, Baudin's cockatoo and Carnaby's cockatoo (colloquially known as black cockatoos) forage on the seeds, nuts and flowers of a large variety of plants including proteaceous species (*Banksia*, *Hakea*, *Grevillea*), as well as *Allocasuarina* and *Eucalyptus* species, *Corymbia calophylla* and a range of introduced species (Valentine and Stock, 2008).

A flock of five forest red-tailed black-cockatoos were observed within a jarrah tree within the north eastern corner of the application area during a site inspection undertaken by DER officers (DER, 2016). Although five forest red-tailed black-cockatoos were observed, the application is unlikely to provide significant habitat for this species.

The application area is dominated by *Melaleuca* sp. and is therefore not significant foraging habitat for black cockatoos. *Eucalyptus* trees observed within the application area are not of a suitable size to provide nesting habitat for black cockatoos.

Given the lack of native understorey and the degraded to completely degraded (Keighery, 1994) condition of the vegetation within the application area, it is considered that the application area is unlikely to provide significant habitat for ground dwelling fauna.

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

Methodology **References:**
DER (2016)
Keighery (1994)
Parks and Wildlife (2007-)
Valentine and Stock (2008)

GIS Database:
SAC Bio datasets – Accessed August 2016

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

Comments **Proposed clearing is not likely to be at variance to this Principle**
Twenty rare flora species have been recorded within the local area (10 kilometre radius).

The closest mapped rare flora species is an orchid which occurs in areas of mixed woodland of jarrah (*Eucalyptus marginata*), candlestick banksia (*Banksia attenuata*), holly banksia (*B. ilicifolia*) and firewood banksia (*B. menziesii*) with scattered sheoak (*Allocasuarina fraseriana*) and marri (*Corymbia calophylla*) over dense shrubs of blueboy (*Stirlingia latifolia*), swan river myrtle (*Hypocalymma robustum*), yellow buttercups (*Hibbertia hypericoides*), buttercups (*H. subvaginata*), balga (*Xanthorrhoea preissii*), coastal jugflower (*Adenanthos cuneatus*) and *Conostylis* species (DEC, 2009). Throughout its range the species tends to favour areas of dense undergrowth. Soil is usually deep grey-white sand usually associated with the Bassendean sand-dune system (DEC, 2009). Given the habitat preferences of this species it is not likely to occur within the application area.

The vegetation within the application area is in a degraded to completely degraded (Keighery, 1994) condition with an understorey dominated by weeds. On this basis it is considered that the application area is unlikely to include or be necessary for the continued existence of rare flora.

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

Methodology **References:**
DEC (2009)
Keighery (1994)

GIS Database:

(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 Proposed clearing is not likely to be at variance to this Principle
 Nine threatened ecological communities (TEC) have been recorded within the local area (10 kilometre radius). The nearest TEC is 'Shrublands and woodlands on Muchea limestone' community, which is located approximately 950 metres south of the application area.

The vegetation within the application area is in a degraded to completely degraded (Keighery, 1994) condition with an understorey dominated by weeds. On this basis it is considered that the application area is unlikely to comprise the whole or a part of or be necessary for the maintenance of a TEC.

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

Methodology References:
 Keighery (1994)

GIS Database:
 SAC Bio datasets – Accessed August 2016

(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 Proposed clearing is not likely to be at variance to this Principle
 The vegetation within the application area is mapped as Beard vegetation association 1001 and Heddle vegetation Southern River complex, which retain approximately 22 and 18 per cent of their pre-European vegetation extents within the Swan Coastal Plain respectively (Government of Western Australia, 2015; Parks and Wildlife, 2015).

The City of Gosnells retains approximately 28 per cent of its pre-European vegetation, and the local area (10 kilometre radius) retains approximately 25 per cent native vegetation cover.

The National Objectives and Targets for Biodiversity Conservation include a target that prevents the clearance of ecological communities with an extent below 30 per cent of that present pre-European settlement (Commonwealth of Australia, 2001). Within constrained areas (areas of urban development in cities and major towns) on the Swan Coastal Plain, the threshold for representation of the pre-clearing extent of a particular native vegetation complex is 10 per cent (EPA, 2008). The application area is within a constrained area.

The vegetation within the application area is in a degraded to completely degraded (Keighery, 1994) condition with an understorey dominated by weeds. On this basis, and noting that the application area is unlikely to comprise a high level of biological diversity or significant habitat for fauna, it is considered that the application area is unlikely to be significant as a remnant in a highly cleared area.

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

	Pre-European (ha)	Current Extent (ha)	Remaining (%)	Extent in Parks and Wildlife Managed Lands (%)
IBRA Bioregion*				
Swan Coastal Plain	1,501,222	580,162	39	37
Local government*				
City of Gosnells	12,715	3,580	28	17
Beard Vegetation Association in Bioregion*				
1001	57,410	12,880	22	14
Heddle Vegetation Complex**				
Southern River Complex	57,970	10,698	18	1.5

Methodology References:
 Commonwealth of Australia (2001)
 EPA (2008)
 *Government of Western Australia (2015)
 Keighery (1994)
 **Parks and Wildlife (2015)

GIS Databases:

Imagery
Remnant 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 Proposed clearing is at variance to this Principle

The application area is located within an area identified in the Geomorphic Wetlands Swan Coastal Plain dataset as a multiple use category dampland (seasonally waterlogged basin).

Multiple use category wetlands are wetlands with few important ecological attributes and functions remaining. Use, development and management should be considered in the context of ecologically sustainable development and best management practice catchment planning through landcare (Water and Rivers Commission, 2001).

The Department of Parks and Wildlife (Parks and Wildlife) advised that the dampland extends outside of Lot 9 and includes an area directly west of the application area that is evaluated as resource enhancement category (Parks and Wildlife, 2016). Parks and Wildlife advised that the clearing within Lot 9 will result in the loss of scattered vegetation within a multiple use category wetland (Parks and Wildlife, 2016). Parks and Wildlife advised that the proposed clearing in itself is unlikely to significantly impact the local wetland values (Parks and Wildlife, 2016).

Balannup drain runs adjacent to the western boundary of Lot 9. The applicant has retained a 25 metre buffer to this drain to ensure that it is not disturbed.

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

The vegetation within the application area is in a degraded to completely degraded (Keighery, 1994) condition with an understorey dominated by weeds. On this basis it is considered that the proposed clearing is unlikely to significantly impact on this wetland.

Methodology References:
Keighery (1994)
Parks and Wildlife (2016)
Water and Rivers Commission (2001)

GIS Databases:
Hydrography, linear
Hydrography, hierachy
Geomorphic Wetlands, Swan Coastal Plain

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

Comments Proposed clearing may be at variance to this Principle

The application area is mapped as soil type Cb38 which is described as sandy dunes with intervening sandy and clayey swamp flats: chief soils are leached sands (Northcote et al., 1960-68).

It is considered that due to the sandy nature of the soil, and in the absence of appropriate vegetation cover, windbreaks or adequate dust suppression on exposed surfaces, the proposed clearing may result in appreciable land degradation in the form of wind erosion.

The topography of the application area is relatively flat, and the annual rainfall is 900 millimetres. On this basis it is considered that the proposed clearing is unlikely to cause appreciable land degradation in the form of water erosion.

Noting that the application area is located within a multiple use wetland, and the presence of some clay in the soil profile, it is considered that the proposed clearing may cause waterlogging during events of heavy rainfall.

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

Methodology References:
Northcote et al. (1960-68)

References:
Annual Rainfall, Statewide
Soils, Statewide
Topography

(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 Proposed clearing is not likely to be at variance to this Principle

Ten Bush Forever sites are located within three kilometres of the application area, with the closest being site 891 which is located approximately 140 metres south. The application area and Bush Forever site 891 are separated by two roads and an area of predominately cleared land, therefore the proposed clearing is not likely to directly impact upon this conservation area.

The vegetation within the application area is in a degraded to completely degraded (Keighery, 1994) condition with an understorey dominated by weeds. On this basis, and noting the presence of adjacent vegetation in a better condition, it is considered that the application area is unlikely to form part of an ecological corridor that facilitates the movement of fauna between conservation areas or that the proposed clearing will impact on the environmental values of nearby conservation areas.

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

Methodology References:
Keighery (1994)

GIS Databases:
Bush Forever Sites
Parks and Wildlife Tenure

(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 Proposed clearing is not likely to be at variance to this Principle

The application area is mapped within a multiple use category wetland. This multiple use category wetland is unlikely to hold surface water for extended periods.

The application area is located approximately 25 metres east of Balannup drain. The 25 metre buffer to Balannup drain is considered to be sufficient to ensure that the proposed clearing will not cause deterioration in the quality of surface water in this drain.

Groundwater salinity mapped within the application area ranges from 500 to 1,000 milligrams per litre (measured as total dissolved solids), which is marginally saline. It is considered that the proposed clearing of 2.5 hectares of vegetation in a degraded to completely degraded (Keighery, 1994) condition is unlikely impact on the quality of groundwater through increased salinity.

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

Methodology References:
Keighery (1994)

GIS Databases:
Hydrography, linear
Hydrography, hierachy
Geomorphic Wetlands, Swan Coastal Plain
Groundwater salinity

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

Comments Proposed clearing is not likely to be at variance to this Principle

The application area is located within an area identified in the Geomorphic Wetlands Swan Coastal Plain dataset as a multiple use category dampland (seasonally waterlogged basin).

The application area is mapped as soil type Cb38 which is described as sandy dunes with intervening sandy and clayey swamp flats: chief soils are leached sands (Northcote et al., 1960-68).

Noting that the application area is located within a multiple use wetland, and the presence of some clay in the soil profile, it is considered that the proposed clearing may cause waterlogging during events of heavy rainfall. It is considered, however, that the proposed clearing of 2.5 hectares is unlikely to impact on the incidence or intensity of flooding on a local or regional scale.

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

Methodology References:
Northcote et al., 1960-68

GIS Databases:

Planning instruments and other relevant matters.

Comments The application is to clear 2.5 hectares of native vegetation within Lot 9 on Plan 8225, Southern River, for the purpose of bulk earthworks for a future subdivision.

The application area is located within a multiple use category dampland (seasonally waterlogged basin). Parks and Wildlife advised that the proposed clearing in itself is unlikely to significantly impact the local wetland values, however, the proposed subdivision has the potential to impact the adjacent resource enhancement category wetland, which supports flora species of conservation significance (Parks and Wildlife, 2016). Parks and Wildlife advised that the potential impacts include hydrological change, altered water quality, degradation of wetland vegetation, introduction of weeds and domestic animals, and littering (Parks and Wildlife, 2016). Parks and Wildlife advised that the subsequent fill and development of Lot 9 will also result in the loss of any hydrological function that the wetland may currently retain (Parks and Wildlife, 2016).

Parks and Wildlife advised that it supports the Environmental Protection Authority's *Guidance Statement 33* which recommends that wetlands that are to be protected should be afforded a minimum 50 metre buffer (Parks and Wildlife, 2016). Parks and Wildlife advised that ideally wetland buffers should be vegetated to mitigate the potential impacts from a change in land use (Parks and Wildlife, 2016). Parks and Wildlife advised that stormwater management associated with the future subdivision should aim to maintain the pre-development hydrological regime of the adjacent wetland areas in accordance with the Department of Water's *Decision process for stormwater management in WA* (Parks and Wildlife, 2016).

On 14 July 2016, the City of Gosnells issued planning approval for the purpose of bulk earthworks within Lot 9 Matison Street Southern River (City of Gosnells, 2016).

The application area is located within the Perth groundwater area proclaimed under the *Rights in Water and Irrigation Act 1914*. This application was referred to the Department of Water (DoW). DoW advised that it has assessed the referral to clear native vegetation and has no comment to provide (DoW, 2016).

The application was advertised in *The West Australian* newspaper on 25 July 2016 by DER inviting public submissions within a 21 day period. No submissions were received in relation to this application.

No Aboriginal Sites of Significance have been recorded within the application area.

Methodology References:
City of Gosnells (2016)
DoW (2016)
Parks and Wildlife (2016)

GIS Databases:
Aboriginal Sites of Significance

4. References

- City of Gosnells (2016) Planning approval – 86 (Lot 9) Matison Street Southern River – Bulk Earthworks (DER Ref: A1157553).
- Commonwealth of Australia (2001) National Objectives and Targets for Biodiversity Conservation 2001-2005, Canberra.
- Department of Environment and Conservation (DEC) (2009) Recovery Plan. Commonwealth Department of the Environment, Water, Heritage and the Arts, Canberra.
- Department of Environment Regulation (DER) (2016) Site Inspection Report for Clearing Permit Application CPS 7138/1. Site inspection undertaken on 27 July 2016. Department of Environment Regulation, Western Australia (DER Ref: A1157550).
- Department of Parks and Wildlife (Parks and Wildlife) (2007-) NatureMap: Mapping Western Australia's Biodiversity. Department of Parks and Wildlife. URL: <http://naturemap.dpaw.wa.gov.au/>. Accessed August 2016
- Department of Parks and Wildlife (Parks and Wildlife) (2015) 2015 South West Forest and Swan Coastal Plain Vegetation Complex Statistics: a report prepared for the Department of Environment Regulation. Current as of March 2015. Department of Parks and Wildlife, Perth, Western Australia.
- Department of Parks and Wildlife (Parks and Wildlife) (2016) Wetland advice for clearing permit application CPS 7138/1 - Coogee Nominees Pty Ltd. Received on 22 August 2016 (DER Ref: A1157545).
- Department of Water (DoW) (2016) Advice for clearing permit application CPS 7138/1. Received on 4 August 2016. Department of Water, Western Australia (DER Ref: A1157572).
- Environmental Protection Authority (EPA) (2008) Environmental Guidance for Planning and Development. Guidance Statement No. 33. Environmental Protection Authority. Western Australia.
- Government of Western Australia (2015). 2015 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). Current as of June 2015. WA Department of Parks and Wildlife, Perth.
- 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.

Shepherd, D.P., Beeston, G.R. and Hopkins, A.J.M. (2001) Native Vegetation in Western Australia, Extent, Type and Status. Resource Management Technical Report 249. Department of Agriculture, Western Australia.

Valentine, L.E. and Stock, W. (2008) Food Resources of Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) in the Gnamptara Sustainability Strategy Study Area. Edith Cowan University and Department of Environment and Conservation. December 2008.

Water and Rivers Commission (2001) Position Statement: Wetlands, Water and Rivers Commission, Perth.

Western Australian Herbarium (1998-) FloraBase - The Western Australian Flora. Department of Parks and Wildlife. <http://florabase.dpaw.wa.gov.au/>. Accessed August 2016.