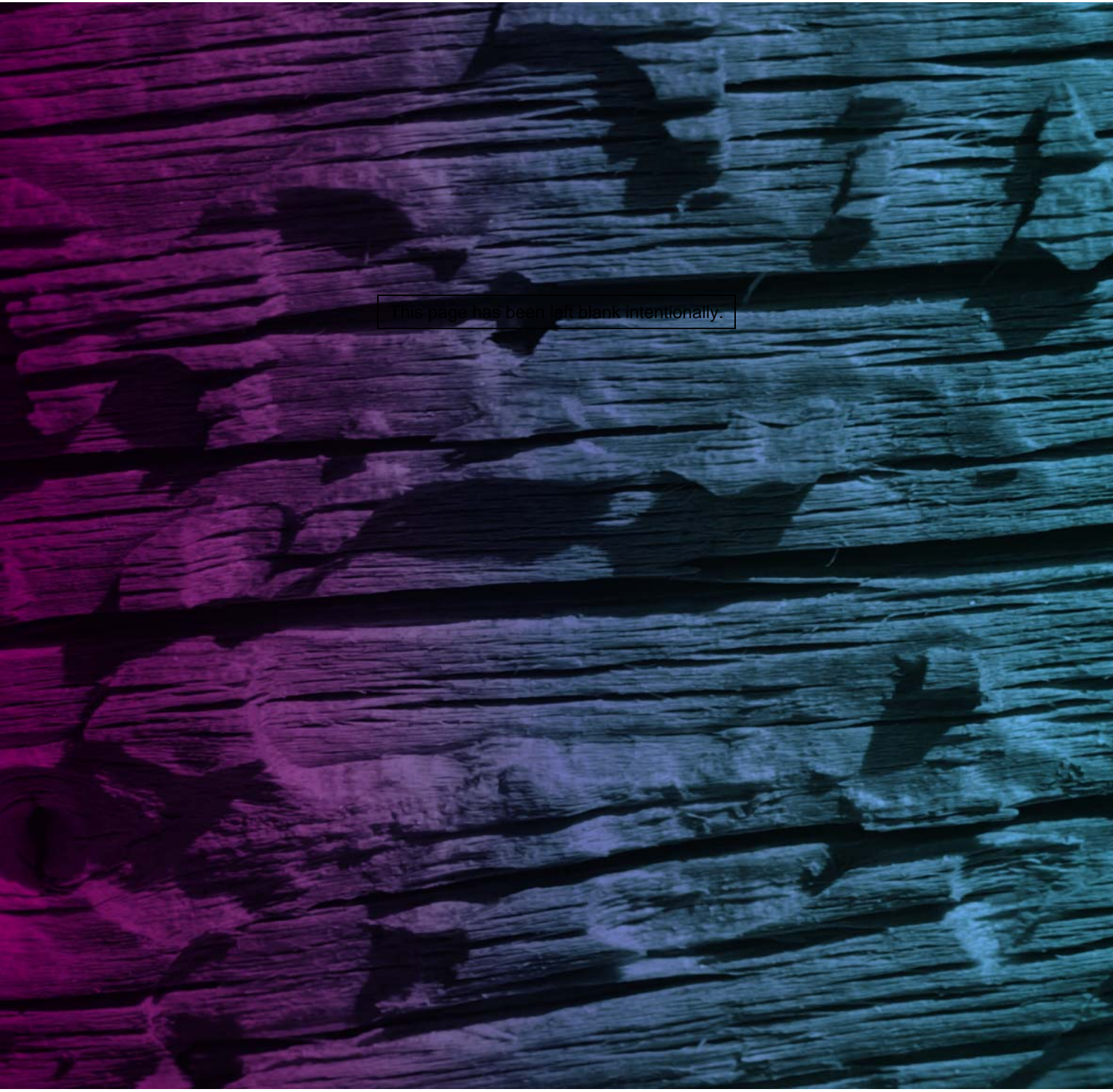


Preliminary Environmental Impact Assessment

Kwinana Freeway Amenity Wall - Glen Iris Drive to Berrigan Drive

A close-up photograph of weathered, horizontal wooden planks, likely part of a fence or wall, showing significant texture and grain. The image is overlaid with a semi-transparent blue gradient.

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Preliminary Environmental Impact Assessment

Kwinana Freeway Amenity Wall - Glen Iris Drive to Berrigan Drive

Prepared for

Main Roads Western Australia

Prepared by

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11 April 2011

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Quality Information

Document Preliminary Environmental Impact Assessment


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Executive Summary

Main Roads Western Australia proposes to construct an amenity wall along the eastern side of Kwinana Freeway between the railway bridge near Glen Iris Drive and Berrigan Drive. This Preliminary Environmental Impact Assessment describes the existing environment of the project area and surrounds and investigates the consequent potential impacts of the project in relation to its construction and physical presence.

Existing environment information was derived from desktop investigations, a review of the Kwinana Freeway Third Lane Southern Extension Flora, Vegetation and Fauna Survey and a Site Investigation undertaken on 23 February 2011.

The project area's key existing environment factors consist of the following:

- The project area is within 10 km of the Forrestdale Lake and Thomsons Lake Ramsar site, within approximately one kilometre of Ken Hurst Park and adjacent areas, and an Indicative Place within the Register of the National Estate (RNE Place ID: 100375 Place File No.: 5/12/007/0022).
- There are two regional parks also classified as Bush Forever sites located near the project area; Beeliar Regional Park to the west of the project area and Jandakot Regional Park to the east of the project area. Two environmentally sensitive areas are also located west of the project area.
- The project area is comprised of five vegetation community types that include intact native vegetation, revegetated and planted areas and degraded communities that are derivatives of intact communities. The condition of the community types found within the project area ranges from 'Good' to 'Degraded' with the majority of the project area in 'Good' condition.
- No occurrences of threatened and priority ecological communities are recorded within the project area.
- No naturally occurring species of priority flora or Declared Rare Flora (DRF), listed by the Department of Environment and Conservation (DEC) under the *Wildlife Conservation Act 1950*, or threatened species under the *Environment Protection and Biodiversity Conservation Act 1999*, were recorded for the project area.
- No recorded Declared Plant species within the project area.
- One Red-tailed Black Cockatoo was observed flying overhead during the field survey for Kwinana Freeway Southern Extension. The project area is also considered to provide some suitable foraging habitat for Red-tailed Black Cockatoos and Carnaby's Black Cockatoos.
- The project area contains small populations of *Lomandra hermaphrodita* however the population patches are of insufficient size to represent suitable habitat for the Graceful Sun Moth.
- The project area contains vegetation communities suitable for *Lerista lineata* (Lined Skink) habitat which can potentially occur within the project area.
- Quenda are likely to use some areas of the project area for foraging, however the project area does not contain habitat for this species.
- The northern part of the project area is within a Priority 3 Public Drinking Water Source Area pursuant to the Jandakot Underground Water Pollution Control Area.
- Depth to groundwater of the project area ranges between about 8 to 22.5 metres below ground level (mbgl) south to north of the project area respectively. Groundwater flow is generally to the west, with salinity ranging from 500 to 1000 mg/l Total Dissolved Solids within the project area.
- The project area is located within a moderate to low risk area of encountering acid sulfate soils within 3 metres of natural ground level.
- DEC Contaminated Sites Database revealed no contaminated sites within the project area.
- No registered Aboriginal or Non-Indigenous heritage places were identified within the project area.
- Land use to the east of the project area is predominately privately owned and comprises residential areas and a retirement community.

- The Site Investigation identified that the existing amenity wall does not eliminate all visual aspects of the Kwinana Freeway such that tall trucks, trains and overhead power lines can be seen over the current height of the wall.

The key impacts include clearing of 1.30 hectares (ha) of native vegetation, clearing of 0.13 ha of potential foraging habitat for Black Cockatoo species, loss of potential Lined Skink habitat and Quenda foraging areas, potential impacts on water resources from accidental spillage and generation of dust, noise and vibration which may impact residents within proximity to the project area. The clearing of 0.13 ha of potential foraging habitat for protected Black Cockatoo species does not pose a significant impact even when considered cumulatively with the Kwinana Freeway Third Lane total clearing area for potential foraging habitat. The total clearing area of foraging habitat inclusive of Kwinana Freeway Third Lane and the proposed amenity wall equates to 0.94 ha which is below the one hectare clearing threshold for foraging habitat currently used to determine the significance of impacts with respect to Black Cockatoo species.

Environmental impacts of this project are not deemed to be significant and are not expected to require referral to the Commonwealth Department of Sustainability, Environment, Water, Population and Communities and/or the Environmental Protection Authority. However due to potential increases in dust, noise and vibration levels it is recommended that a Construction Environmental Management Plan is prepared to reduce impacts on nearby residents.

1.0 Introduction

This section briefly describes the proposed project, placing it within the broader context of planned transport infrastructure for the surrounding area, as well as outlining the overall scope of this Preliminary Environmental Impact Assessment (PEIA).

1.1 Project description

Main Roads Western Australia (MRWA) proposes to construct an amenity wall along the eastern side of Kwinana Freeway between the railway bridge near Glen Iris Drive (south of Roe Highway) and Berrigan Drive (herein termed the proposed project). The objective of the proposed project is to improve the existing amenity of residential areas adjacent to Kwinana Freeway. A map showing the location of the proposed project area is shown in **Figure 1**.

1.2 Background

MRWA appointed AECOM Australia Pty Ltd (AECOM) to undertake a PEIA for the proposed project. AECOM is currently completing an Environmental Impact Assessment (EIA) and Environmental Management Plan (EMP) for the proposed widening of Kwinana Freeway between Roe Highway and Beeliar Drive (herein termed Kwinana Freeway Southern Extension). The impact assessment is supported by a Level 2 spring flora and vegetation survey and a Level 1 fauna survey (AECOM 2010).

1.3 Scope of report

The PEIA has been prepared in accordance with the following MRWA guidelines:

- Environmental Assessment and Approval (6707/0001)
- Supplementary Guidance - EIA (6707/003)
- Environmental Guideline (6707/012)

This PEIA includes the MRWA Vegetation Clearing Impact Assessment Report which assesses the proposed project against Schedule 5 of the *Environmental Protection Act 1986* (EP Act) Ten Clearing Principles (**Appendix A**) and provides recommendations for the proposed project as result of this PEIA (**Appendix B**). The preparation of this PEIA included the following activities:

- identification and review of existing relevant environmental reports
- preparation of an initial assessment to determine the key environmental aspects of the proposed project
- assessment of the proposed project against Schedule 5 EP Act Ten Clearing Principles
- assessment of all environmental aspects likely to require referral of the proposed project and advise whether the proposed project should be referred to the Environmental Protection Authority (EPA)
- assessment of all matters of National Environmental Significance (NES) likely to require referral of the proposed project and advise whether the proposed project should be referred to the Commonwealth Department of Sustainability, Environment, Water, Populations and Communities (DSEWPac)
- consultation with relevant government agencies as required
- determination of the need for (but do not apply for) clearances required under other legislative provisions, and
- provision of a concise report on the findings.



Kwinana Freeway Amenity Wall

Project Site

Figure 1

— Amenity Wall

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0 200 400 600

Metres

1:20,000 (A4)

Datum: GDA94 Projection: MGA z50

2.0 Methodology

This section outlines the methods and information sources used to complete the PEIA. The recent assessment of flora, vegetation and fauna for Kwinana Freeway between Roe Highway and Beeliar Drive is directly relevant to this PEIA and has been utilised to provide increased confidence in the conclusions and recommendations arising from this assessment.

2.1 Preliminary desktop assessment

A preliminary assessment of the proposed project area and the potential impacts of the proposed activities was conducted by reviewing government agency databases as well as existing reports prepared for the Kwinana Freeway Southern Extension project that included assessments of the proposed project area relevant to this PEIA. Current information on climate, air quality, geology, landform, soils, groundwater, matters of national environmental significance and cultural heritage was obtained from the sources listed in **Table 1**.

Table 1 Information sources

Source	Information Platform
DSEWPaC.	Protected Matters Search Tool. Australian Heritage Places Inventory (AHPI).
Department of Environment and Conservation (DEC).	Contaminated Sites Database.
Department of Agriculture and Food Western Australia (DAFWA)	Declared Plants Database
Department of Water (DoW).	Perth Groundwater Atlas. Geographic Data Atlas. Hydrogeological Atlas.
Department of Planning.	Local Planning Schemes.
Department of Indigenous Affairs (DIA).	Aboriginal Heritage Inquiry System (AHIS).
National Native Title Tribunal (NNTT).	Native Title Vision.
Heritage Council of Western Australia (HCWA).	Places Database.
Bureau of Meteorology (BoM).	Climate Statistics.
Geoscience of Australia.	1:250 000 Geology Maps of Australia.
Landgate.	Shared Land Information Platform (SLIP).
Environment Protection Authority (EPA).	State of the Environment Report Western Australia.
Western Australian Planning Commission (WAPC).	Acid Sulfate Soil (ASS) Mapping.

The desktop investigation reviewed the Kwinana Freeway Third Lane Southern Extension Flora, Vegetation and Fauna Survey (AECOM 2010) and the Short-range Endemic and Targeted Invertebrate Baseline Survey for the Roe Highway Extension Project (Phoenix 2010). AECOM (2010) describes the vegetation types, condition, the existence or potential for dieback and makes observations regarding fauna and significant fauna habitat. Phoenix (2010) documents interim results of a short-range endemic invertebrate fauna survey and a targeted invertebrate assessment survey incorporating surveys for *Synemon gratiosa* (Graceful Sun Moth) and other conservation significant invertebrate species.

2.2 Site investigation

A site investigation was undertaken on 23 February 2011 by AECOM environmental consultants. Observations of the site investigation are noted throughout this PEIA.

2.3 Referral

Advice on the need to refer the proposed project to DSEWPaC is based on whether the proposed project would have a significant impact on one or more matters of NES.

Advice on the need to refer the proposed project to the Western Australian EPA is based on MRWA Guideline 6707/0001 - Environmental Assessment and Approval.

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3.0 Environmental Factors

This section describes the biophysical environment of the proposed project area including climate, air quality, geology, landforms and soils, flora and vegetation, fauna, reserves and conservation areas (including Ramsar wetlands), groundwater and hydrogeology, surface hydrology and contamination.

3.1 Matters of national environmental significance

A DSEWPaC Protected Matters Search was undertaken for the proposed project area plus a one kilometre (km) buffer. The report identified that there is potential for listed threatened and migratory species to occur within the proposed project area (six threatened fauna species, five threatened flora species, seven migratory species, five listed marine species, four invasive fauna species and 12 invasive flora species) and that the proposed project area is within 10 km of the Forrestdale Lake and Thomsons Lake Ramsar site. The Convention on Wetlands held in Iran in 1971, called the "Ramsar Convention", is an intergovernmental treaty that embodies the commitments of its member countries to maintain the ecological character of their Wetlands of International Importance and to plan for the "wise use", or sustainable use, of all of the wetlands in their territories.

The Protected Matters Search report also identified the proposed project area to be within approximately one kilometre of Ken Hurst Park and Adjacent Areas, an Indicative Place within the Register of the National Estate (RNE) (Place ID: 100375 Place File No.: 5/12/007/0022). These matters of NES are protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). A copy of the protected matters search report can be found in **Appendix C**.

3.2 Reserves and conservation areas

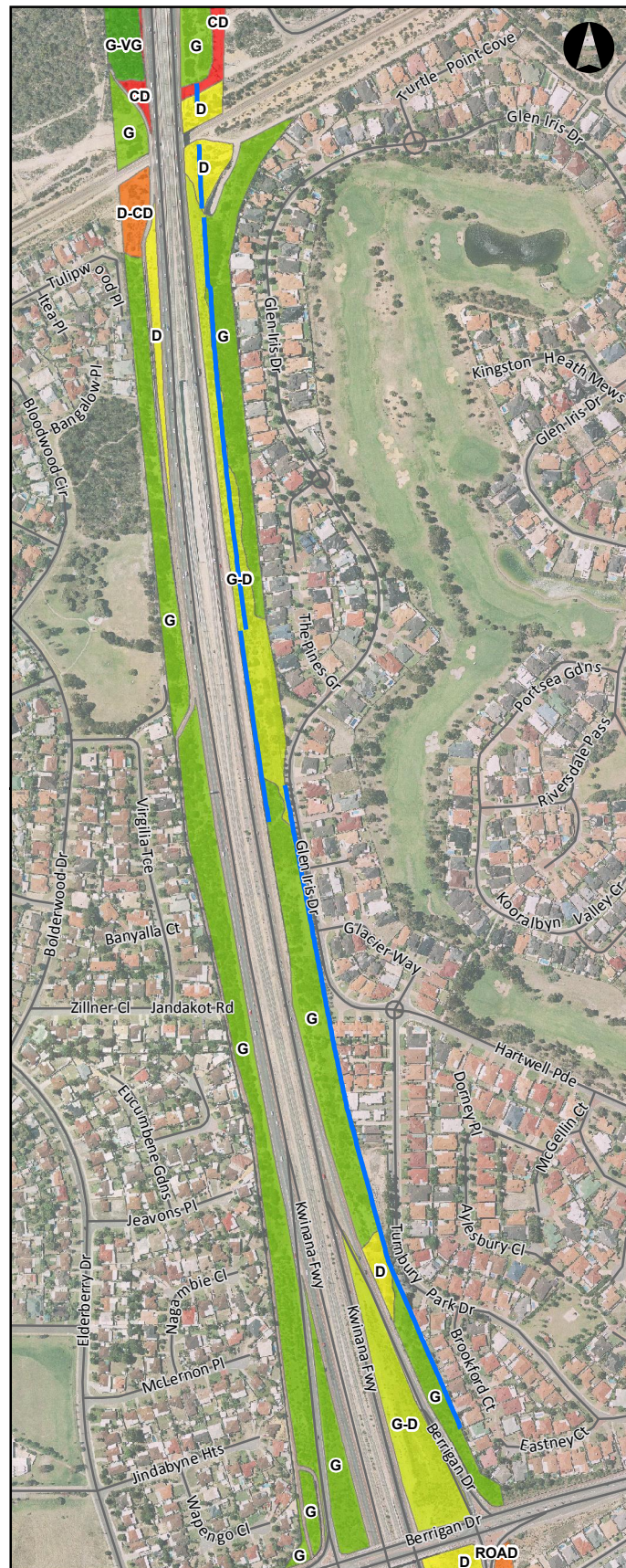
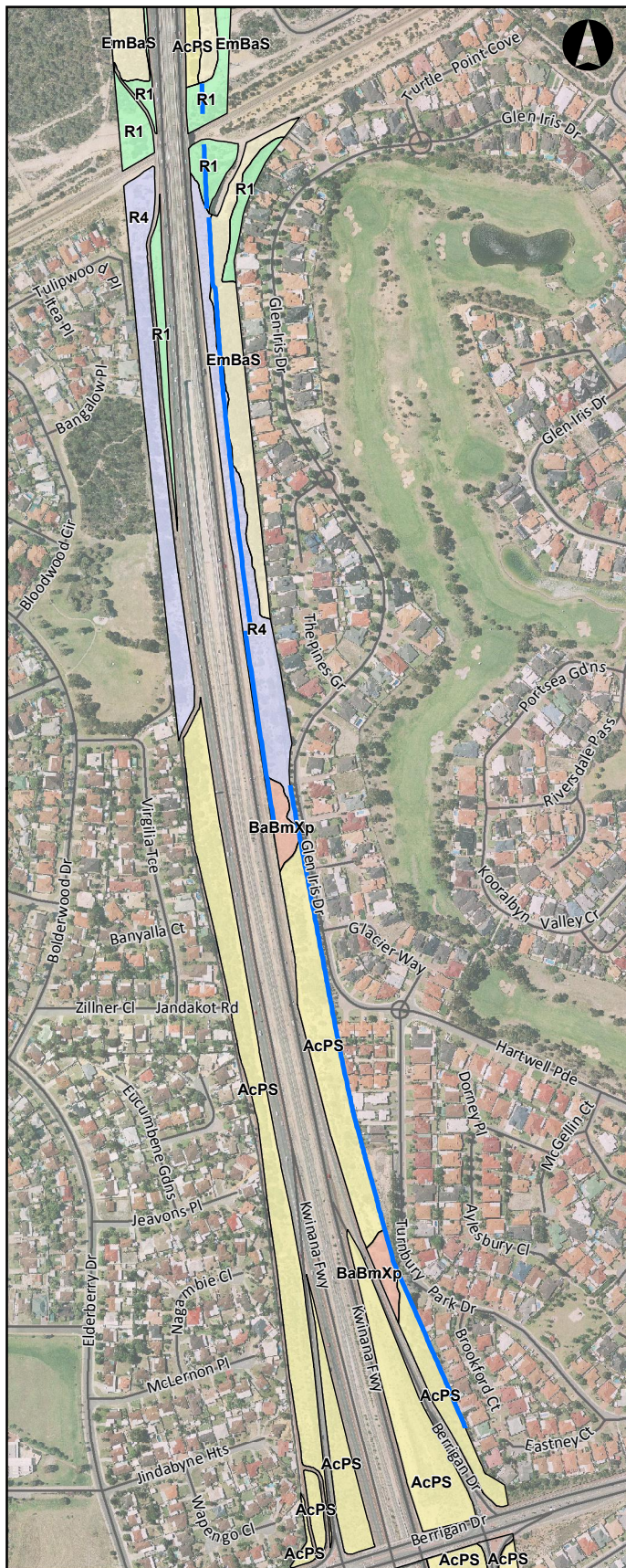
The proposed project area does not include any reserves for conservation and/or recreational purposes such as Bush Forever sites, environmentally sensitive areas or regional parks. There are two regional parks located near the proposed project area; Beeliar Regional Park to the west of the proposed project area and Jandakot Regional Park to the east of the proposed project area. The two regional parks are also classified as Bush Forever Sites. Two environmentally sensitive areas are also located west of the proposed project area. The two regional parks and the two environmentally sensitive areas near the proposed project area are not found within an approximate one km buffer of the proposed project area; therefore impacts are unlikely. Consequently, reserves and conservation areas are not considered further in this report.

3.3 Flora and vegetation

AECOM (2010) conducted a Level 2 flora and vegetation survey of the Kwinana Freeway road reserve between Roe Highway and Beeliar Drive in accordance with EPA Guidance Statement No. 15 (EPA 2004). The survey was undertaken from 12 to 13 April 2010 and 22, 23 and 29 September 2010 and included the proposed project area for this PEIA. The survey comprised of desktop assessment and a reconnaissance field survey, which involved vegetation community and condition mapping combined with recording of all observable flora within the proposed project area.

3.3.1 Vegetation representation and condition

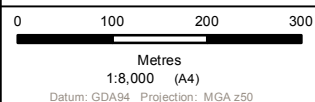
The proposed project area is comprised of five vegetation community types as detailed in **Table 3** that include intact native vegetation types, revegetated and planted areas and degraded communities that are derivatives of intact communities. The condition of the community types (**Table 2**), found within the proposed project area ranges from 'Good' to 'Degraded'; the majority of the proposed project area is in 'Good' condition (**Figure 2**).



Kwinana Freeway Amenity Wall

Vegetation Mapping

Figure 2



— Amenity Wall	 D1	 MpKgLOF	Condition
Community	 EcPCF	 MpLOF	 CD
 AcPS	 EmBaS	 MrLOF	 D-CD
 BaBmLOF	 ErLOF	 R1	 D
 BaBmXp	 ErMnAs	 R4	 G-D
 BaLW	 KgTOS	 ROAD	 G
 BaTs	 MpKgHa		 G-VG
 CcLOW			

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Table 2 Bushland Condition Ratings (adapted from Keighery, 1994 and the Braun-Blanquet Scale of Cover Abundance (from Mueller-Dombois and Ellenberg, 1974))

Descriptor	Explanation
Pristine	Pristine or nearly so, no obvious signs of disturbance. 0% weed cover
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. 1 – 5% weed cover
Very Good	Vegetation structure altered obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing. 5 – 25% weed cover
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing. 25 – 50% weed cover
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance of vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing. 50 – 75% weed cover
Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as “parkland cleared” with the flora comprising weed or crop species with isolated native trees or shrubs. 75 – 100% weed cover

Table 3 Vegetation community descriptions

Community Code	Vegetation Description
AcPS	Revegetated area of scattered planted # <i>Corymbia maculata</i> over a planted Shrubland of # <i>Acacia cochlearis</i> and # <i>Calothamnus rupestris</i> with occasional # <i>Chamelaucium uncinatum</i> and/or a Low Open Shrubland of # <i>Melaleuca systema</i> over introduced species dominated by * <i>Ehrharta calycina</i> , * <i>Avena barbata</i> and * <i>Euphorbia terracina</i> associated with plantings on roadside batters.
BaBmXp	Low Open Forest of <i>Banksia attenuata</i> and <i>Banksia menziesii</i> with scattered <i>Eucalyptus marginata</i> over an Open Heath dominated by <i>Xanthorrhoea preissii</i> and <i>Regelia ciliata</i> over an Open Low Heath dominated by <i>Conostephium minus</i> on grey sand.
EmBaS	Woodland of <i>Eucalyptus marginata</i> over a Low Open Forest of <i>Banksia attenuata</i> and <i>Banksia menziesii</i> over a Tall Shrubland of <i>Xanthorrhoea preissii</i> and <i>Jacksonia furcellata</i> over a Low Shrubland dominated by <i>Hibbertia hypericoides</i> and <i>Gompholobium tomentosum</i> on grey sand.
R1^	Tall Open Shrubland of <i>Banksia menziesii</i> and <i>Banksia attenuata</i> with scattered <i>Eucalyptus marginata</i> and <i>Corymbia calophylla</i> over a Closed Tall Shrubland alternating in dominance between <i>Regelia ciliata</i> and <i>Adenanthos cygnorum</i> with <i>Acacia pulchella</i> and <i>Allocasuarina humilis</i> in association with rehabilitated roadside batters.
R4	Low Open Woodland of <i>Corymbia calophylla</i> with scattered <i>Eucalyptus marginata</i> and <i>Banksia menziesii</i> over a Tall Shrubland of <i>Kunzea glabrescens</i> and # <i>Calothamnus rupestris</i> over introduced grasses on grey sand.

^ Includes additional species from quadrats outside the project area from the South Metro Connect project data

* Denotes introduced (weed) species

Denotes non endemic species

At a regional scale, the proposed project area falls within the vegetation complex classified as the Bassendean Complex: Central and South, described by Heddle *et al.* (1978) as Woodlands of *Jarrah-Sheoak-Banksia* on the sand dunes, to low woodland of *Melaleuca* spp. and sedgelands on the low lying depressions and swamps. Currently 24% of the pre-European extent of the Bassendean Complex; Central and South remains and of this, just over 25% is covered by some level of protection. The proposed project area is considered a constrained area due to its urban zoning and consequently the vegetation of the proposed project area is not considered to be of regional significance.

3.3.2 Threatened and priority ecological communities

A recent search of the DEC's Threatened Ecological Communities (TEC) database found no occurrences of TECs within the proposed project area. Further, no TECs or Priority Ecological Communities (PEC) were recorded during the Kwinana Freeway Southern Extension field survey in 2010 (AECOM 2010). Also, a search of the DSEWPac Protected Matters database (**Appendix C**) found no likely occurrences of any TECs protected under the EPBC Act.

The primary tool for classification of vegetation on the Swan Coastal Plain in order to determine equivalence to TECs is to assign Floristic Community Types (FCTs). The vegetation of the southern Swan Coastal Plain has been classified into FCTs and is documented in Gibson *et al.* (1994). The species composition of the intact vegetation communities recorded from the Kwinana Freeway Southern Extension field survey was analysed and compared to the Gibson *et al.*, (1994) dataset and from this, FCTs, have been inferred (AECOM 2010). None of the recorded vegetation types within the proposed project area have been determined to be equivalent to FCTs that are classified as TECs or PECs.

3.3.3 Declared rare flora

A search of the DSEWPac Protected Matters Search Database (**Appendix C**) identified the potential occurrence of five protected plants, these being:

- *Andersonia gracilis* (Slender Andersonia)
- *Caladenia huegelii* (King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid)
- *Centropelis caespitose*
- *Dawsonia foetida* (Mucous Bell)
- *Lepidosperma rostratum* (Beaked Lepidosperma)

A search of the DEC's threatened and priority flora database found one priority 5 flora species recorded from the proposed project area; however no naturally occurring species of priority flora or Declared Rare Flora (DRF), listed by DEC under the *Wildlife Conservation Act 1950*, or threatened species under the EPBC Act, were recorded during the Kwinana Freeway Southern Extension field survey (AECOM 2010).

3.3.4 Introduced flora

A search of the DSEWPac Protected Matters Search Database (2011) identified the potential occurrence of 12 invasive weed species of National Significance to be within the proposed project area along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity:

- *Asparagus asparagoides*
- *Brachiaria mutica*
- *Cenchrus ciliaris*
- *Chrysanthemoides monilifera*
- *Genista* sp. X *Genista monspessulana*
- *Lantana camara*
- *Lycium ferocissimum*
- *Olea europaea*
- *Pinus radiata*
- *Rubus fruticosus aggregate*

- *Salix* spp. except *S.babylonica*, *S.x calodendron* & *S.x reichardtiji*
- *Salvinia molesta*

Seventy one introduced (weed) species were recorded during the Kwinana Freeway Southern Extension field surveys; this includes six planted non-locally endemic species (AECOM 2010). Of these seventy one introduced species, three are listed as Declared Plants by DAFWA, pursuant to the *Agriculture and Related Resources Protection Act, 1976*. The required control measures for the recorded Declared Plants are available on the DAFWA website (www.agric.wa.gov.au). The Declared Plant species recorded are as follows:

- **Asparagus asparagoides* (Bridal Creeper) (as listed by the EPBC Protected Matters Search)
- **Zantedeschia aethiopica* (Arum Lily) and
- **Moraea flaccida* (One-leaf Cape Tulip).

The Declared Plant species recorded during the Kwinana Freeway Southern Extension field survey were not recorded as being present within the Kwinana Freeway Amenity Wall project area.

3.3.5 Dieback and other diseases or pathogens

No areas of *Phytophthora cinnamomi* (dieback) infestation were apparent within the proposed project area, based on visual inspection of the health of the vegetation (in particular dieback susceptible species, such as Eucalyptus and Proteaceous species) during the Kwinana Freeway Southern Extension field surveys. Much of the vegetation is classified as “uninterpretable” due to a lack of indicator (susceptible) species. Further dieback assessment including inoculation of samples is not considered to be necessary for the proposed project, however mitigation measures should be implemented (refer to **Section 4.2**).

3.4 Fauna

A total of 18 threatened vertebrate fauna species and two invertebrate species were identified as potentially occurring within the Kwinana Freeway Southern Extension project area by the DSEWPac Protected Matters Search Database and the DEC Threatened Fauna Database. Eight of these species are likely or possibly occur within the proposed project area, and these are listed in **Table 4**.

Table 4 Threatened Fauna Species potentially occurring in the Kwinana Freeway Southern Extension project area

Species	Common Name	Conservation Significance - State	Conservation Significance - Commonwealth	Likelihood of occurrence in proposed project area
<i>Calyptorhynchus banksii naso</i>	Forrest Red-tailed Black Cockatoo	Schedule 1	Vulnerable	Likely
<i>Calyptorhynchus latirostris</i>	Carnaby's Black Cockatoo	Schedule 1	Endangered	Likely
<i>Falco peregrinus</i>	Peregrine Falcon	Schedule 4	Migratory (JAMBA [^])	Possible over flier
<i>Merops ornatus</i>	Rainbow Bee-eater	Schedule 3	Migratory (JAMBA [^])	Likely
<i>Macropus irma</i>	Western Brush Wallaby	Priority 3	n/a	Possible
<i>Isodon obesulus fusciventer</i>	Quenda/Southern Brown Bandicoot	Priority 5	n/a	Likely
<i>Lerista lineata</i>	Lined Skink	Priority 3	n/a	Possible
<i>Synemon gratiosa</i>	Graceful Sun Moth	Schedule 1	Vulnerable	Possible

[^] JAMBA = Japan-Australia Migratory Bird Agreement

One fauna species of conservation significance, *Calyptorhynchus banksii naso* (Forrest Red-tailed Black Cockatoo) was recorded from a sighting during the field survey for Kwinana Freeway Southern Extension (AECOM 2010). A single bird was observed flying overhead. The proposed project area is also considered to provide some suitable foraging habitat for Forrest Red-tailed Black Cockatoos and *Calyptorhynchus latirostris* (Carnaby's Black Cockatoo), in particular, vegetation communities BaBmXp, EmBaS and R1.

The rhizomes (roots) of the small perennial herb species, *Lomandra hermaphrodita* provide habitat for the Graceful Sun Moth, which is listed as Vulnerable under the EPBC Act. *Lomandra hermaphrodita* was recorded from BaBmXp and EmBaS vegetation communities (AECOM 2010). The Graceful Sun Moth has the potential to occur within the proposed project area as the area supports populations of *Lomandra hermaphrodita* (AECOM 2010; Phoenix 2010). However the Graceful Sun Moth is unlikely to be found within the proposed project area as potential habitat patches are of insufficient size to represent suitable habitat, as per DEC advice (pers comm. D Mitchell 2011).

One conservation significant reptile species was identified as potentially occurring at site; *Lerista lineata* (Lined Skink). The Lined Skink is found in the southern areas of the Swan Coastal Plain and has been recorded from the Fiona Stanley Hospital site and the nearby Roe Highway Extension project area between Kwinana Freeway and Stock Road. This species is associated with Banksia woodland (Bush *et al.* 1995) and is likely to be supported by the vegetation communities BaBmXp and EmBaS within the proposed project area. This species has been threatened by urbanisation in the southern suburbs and its primary habitat is now within urban backyards (Bush *et al.* 1995; GHD 2006).

The DEC Threatened Fauna Database identified a previous record of Quenda within the proposed project area (**Figure 3**). The Kwinana Freeway Southern Extension survey area identified two wetland vegetation communities that provide suitable habitat for Quenda; however the proposed project area does not include these vegetation communities. Quenda were not directly observed during the field assessment but are likely to use some areas within the proposed project area (AECOM 2010).

3.5 Water resources

This section describes the existing surface water and groundwater resources both within and adjacent to the proposed project area.

3.5.1 Public drinking water source area

Public Drinking Water Source Areas (PDWSA) are areas declared for management and protection of water sources used for public drinking water supply (DoW 2010). PDWSAs are proclaimed under the *Metropolitan Water Supply, Sewerage and Drainage Act 1909* and include underground water pollution control areas, water reserves and catchment areas. The DoW Geographic Data Atlas identifies the north part of proposed project area to be within Priority 3 (P3) Jandakot Underground Water Pollution Control Area. In addition the proposed project area is also adjacent to the P1 PDWSA (**Figure 4**).

3.5.2 Surface waters and wetlands

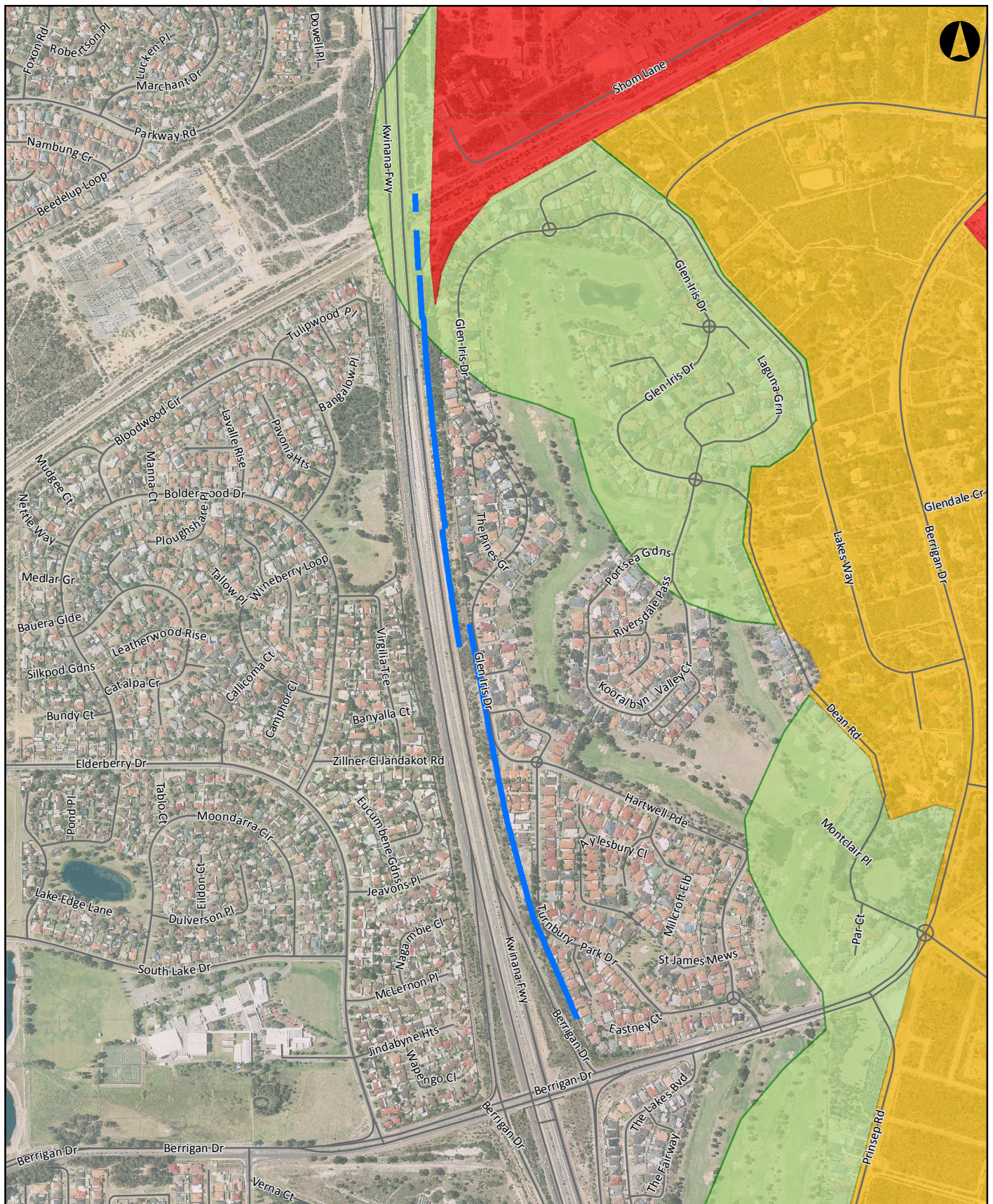
The DoW geographic atlas was reviewed to determine whether the proposed project area supported, or is adjacent to, any significant lakes, rivers, wetlands or proclaimed areas. The proposed project area does not contain any significant lakes, rivers, wetlands or proclaimed areas. The nearest Ramsar listed wetland (Forrestdale and Thomson Lakes) is approximately 22 km south of the proposed project area. Forrestdale Lake and Thomsons Lake are seasonal fresh/brackish wetlands recharged predominately by groundwater. These lakes are the best remaining examples of typical of the Swan Coastal Plain brackish, seasonal lakes with extensive fringing sedgeland.

3.5.3 Groundwater

The DoW hydrogeological atlas identifies the following three aquifers beneath the proposed project area, in order of depth:

- The unconfined superficial aquifer of the Swan Coastal Plain, which consists of Quaternary and Tertiary sediments (e.g. quartz sands)
- The confined Lower Leederville aquifer, which extends north to Ledge Point and south to Augusta. It is a shallow artesian aquifer used for public water supply in the Perth metropolitan area
- The confined Yarragadee North aquifer, which is the largest aquifer in the Perth basin reaching 3000 m thick and extending from north of Dongara to the Serpentine area.

The proposed project area is located within the Lake Coogee sub catchment within the south west division of the Murray River Basin. Data contained in the Perth Groundwater Atlas indicates that the estimated watertable level is about 21 metres Australia Height Datum (AHD) with a corresponding depth to groundwater range of about 8 to 22.5 metres below ground level (mbgl) south to north of the proposed project area respectively. Groundwater flow is generally to the west, with salinity ranging from 500 to 1000 milligrams per litre (mg/l) Total Dissolved Solids within the proposed project area.



Kwinana Freeway Amenity Wall

Public Drinking Water Source Areas

Figure 4

0 100 200 300

Metres

1:10,000 (A4)

Datum: GDA94 Projection: MGA z50

— Amenity Wall

Public Drinking Water Source Areas

— Protection Area-P1

— Protection Area-P2

— Protection Area-P3

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3.6 Geology, landforms and soils

The potential presence of ASS within the proposed project area was examined. ASS are naturally occurring soils, sediments and peats that contain iron sulphides, predominately in the form of pyrite materials. When ASS are exposed to air, the iron sulphides in the soil react with oxygen and water to produce a variety of iron compounds and sulphuric acid. The resulting acid can potentially release other substances, including heavy metals, from the soil and into the surrounding environment (DEC 2009). These soils are most commonly found in low-lying land bordering the coast or estuarine and saline wetlands and freshwater groundwater-dependant wetlands throughout Western Australia.

The proposed project area is located within a moderate to low risk area of encountering ASS within 3 metres of natural ground level (Figure 5).

The proposed project area overlies the Perth Sedimentary Basin on the Swan Coastal Plain south of Perth. The Perth Sedimentary Basin is bounded by the Darling Scarp on the east and the Indian Ocean on the west. Sediments filling the Perth Sedimentary Basin have the maximum thickness of over 10, 000 metres (m) and range from Permian to Quaternary in age (Davidson 1983).

The proposed project area traverses through Bassendean Dunes (Bassendean Sand Formation) which is oriented in a north-south direction. The Bassendean Dunes are the oldest and most leached of the major dune systems within the Swan Coastal Plain, and comprise fine to coarse sand and ferruginous sand.

The surface geology of the proposed project area is mainly class S7 - sand which is very light grey at surface, yellow at depth, fine to medium grained, sub-rounded quartz, moderately well sorted and of eolian origin (Geological Survey of Western Australia 1986).

3.7 Contamination

A search of the DEC Contaminated Sites Database revealed no contaminated sites within the proposed project area.

Bowman Bishaw Gorham (2002) previously conducted a Preliminary Site Investigation to identify historical contaminated sites within the South West Metropolitan Railway between Perth and Mandurah. The investigation identified that the proposed project area is adjacent to the Jandakot Noxious Industry Area located up-gradient in terms of groundwater flow; however the investigation did not recognise the Jandakot Noxious Industry Area as an area of potential contamination. Therefore it can be assumed that the Jandakot Noxious Industry Area is not an area of potential contamination for the proposed project.

3.8 Non-indigenous heritage

Non-Indigenous heritage is inclusive of Commonwealth heritage places, world heritage properties, State heritage places and places of local heritage significance. Searches of the State Register of Heritage Places and City of Cockburn's Municipal Inventory did not identify any places of non-Indigenous heritage within the proposed project area. However according to the EPBC Act Protected Matters Report (**Appendix C**), Ken Hurst Park and Adjacent Areas is classified as an Indicative Place on the RNE and is located approximately one kilometre east of the proposed project area.

3.9 Aboriginal heritage

The *Aboriginal Heritage Act 1972* is the primary legislation ensuring the protection of places and objects customarily used or traditional to the Western Australian Aboriginal people. Aboriginal heritage does not pose a constraint for the proposal. A search of the DIA AHIS revealed the proposed project area does not include any registered Aboriginal heritage sites, however a detailed review is underway for the Kwinana Freeway Third Lane Southern Extension project to confirm this.

3.10 Adjacent land use

Land use to the east of the proposed project area is predominately privately owned and comprises residential areas and a retirement community (**Figure 6**). The metropolitan regional scheme identifies land to the west of the proposed project area to be Kwinana Freeway classified as a primary regional road (**Figure 7**).



Kwinana Freeway Amenity Wall

Land Use

Figure 6

0 100 200 300

Metres

1:10,000 (A4)

Datum: GDA94 Projection: MGA z50

— Amenity Wall

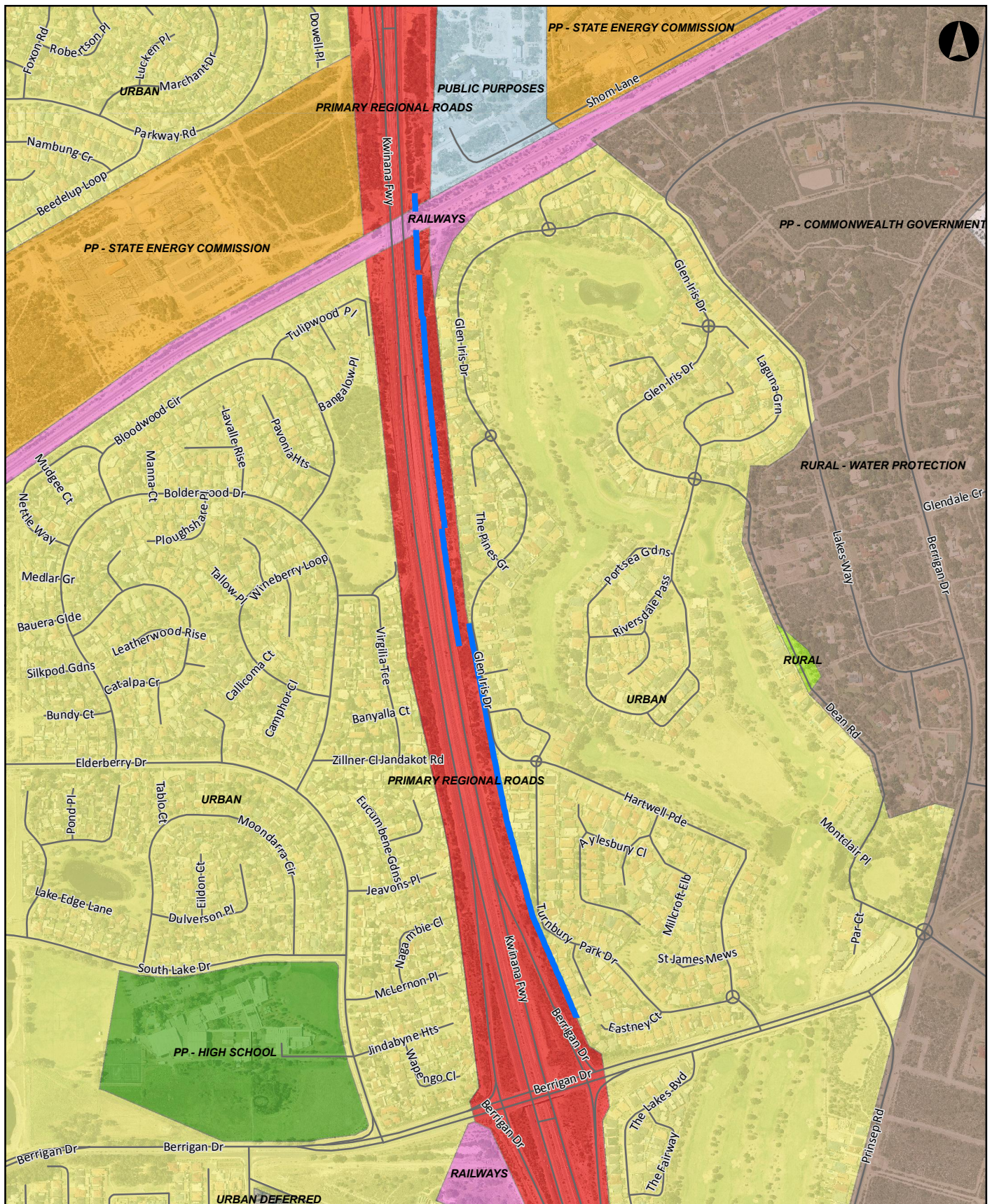
Town Planning Scheme

- COMMERCIAL NON-RETAIL
- NO ZONE
- PARKS AND RECREATION
- RESIDENTIAL A
- RETIREMENT COMMUNITY
- RURAL
- Unknown

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Kwinana Freeway Amenity Wall


Metropolitan
Regional Scheme

Figure 7










0 100 200 300
Metres

1:10,000 (A4)

Datum: GDA94 Projection: MGA z50

 Amenity Wall

Metropolitan Regional Scheme

-  INDUSTRIAL
-  PP - HIGH SCHOOL
-  PP - STATE ENERGY COMMISSION
-  PRIMARY REGIONAL ROADS
-  PUBLIC PURPOSES
-  RAILWAYS
-  RURAL
-  RURAL - WATER PROTECTION
-  URBAN

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3.11 Climate

The climate of the south-western region of Western Australia is characterised as Mediterranean, experiencing hot, dry summers and mild, wet winters. The Perth area experiences predominantly easterly winds which are varied by afternoon sea breezes in the warmer months and by westerlies in the cooler months (BoM 2010a).

The Jandakot AERO bureau station, approximately 5.6 km from the proposed project area, experiences a mean annual rainfall of 832.1 millimetres (mm) predominately during May to September. The mean maximum temperature experienced at Jandakot AERO bureau station ranges from 17.8 degrees Celsius (°C) in June to 31.3°C in February and the mean minimum temperature ranges from 6.9 °C in July and August to 16.8 in February (BoM 2010b).

3.12 Air quality

The Perth Air Quality Management Plan (Department of Environment and Planning (DEP) 2000) reports Perth as being on the threshold on having an air quality problem, with levels of photochemical smog during summer regularly exceeding the relevant guidelines, whilst in winter a smoke haze frequently hangs over the city. These episodes of unacceptable air quality are perpetuated by weather conditions that prevent air pollutants from dispersing rapidly. In general though, Perth air quality is of a high standard compared to other Australian and international cities (EPA 2007).

The two main causes of air pollution in Perth are vehicle emissions and smoke (DEP 1996). Air pollutants are measured at ten sites throughout the Perth metropolitan area although the extent of pollution monitoring varies in response to community health concerns, research studies and investigations, or regulatory requirements. The main air pollutants are carbon monoxide, nitrogen dioxide, photochemical oxidants (measured as ozone), sulphur dioxide, lead and inhalable particles (particulate matter).

Between 1992-93 and 1998-99 emissions estimates of nitrogen (28 %), particulates (58 %) and sulphur dioxide (3.6 %) all increased, while emissions for carbon monoxide, total reactive organic compounds and lead decreased (EPA 2007; DEP 2002).

3.13 Visual amenity

On 23 February 2011 a site inspection was conducted by AECOM to investigate the existing visual amenity of the proposed project area. A limestone amenity wall approximately 1.7 m high currently exists along Glen Iris Drive; along roadside vegetation (**Plate 1**) and in-between property boundaries and Kwinana Freeway. Colorbond fencing approximately 1.7 m high also exists along Turnbury Park Drive alongside roadside vegetation (**Plate 2**). An embankment also exists for the northern section of the proposed project area running approximately 400 m south from the rail line. The current height of existing amenity walls does not eliminate all visual aspects of the Kwinana Freeway such that tall trucks, trains and overhead power lines can be seen over the current height of the wall. The proposed project therefore proposes to include 2.4 m high amenity wall on property boundaries and 1.8 m elsewhere.



Plate 1 Limestone Amenity Wall along Glen Iris Drive (23 February 2011)



Plate 2 Colorbond fencing along Turnbury Park Drive (23 February 2011)

4.0 Potential Impacts

The following section describes potential environmental impacts associated with construction and operation of the proposed development of an amenity wall from Glen Iris Drive to Berrigan Drive. An aspect and impact table summarising the following section is provided in **Table 5**.

4.1 Matters of national environmental significance

Forrestdale Lake and Thompsons Lake are over 20 km from the proposed project area and are unlikely to be affected by the proposed project. In addition Ken Hurst Park and Adjacent Areas is approximately one kilometre from the proposed project area and also is unlikely to be impacted by the proposed project.

Many of the protected fauna species are unlikely to occur within the proposed project area due to a lack of suitable habitat; however, it is possible that the proposed project area provides suitable foraging habitat for Red-tailed Black Cockatoos and Carnaby's Black Cockatoos.

The impact on for Red-tailed Black Cockatoos and Carnaby's Black Cockatoos from clearing of foraging habitat is unlikely to be significant due to clearing of approximately 0.13 ha of potential foraging habitat.

None of the protected flora species or Declared Plant species listed as potentially occurring in the proposed project area were recorded in the proposed project area during the Kwinana Freeway Southern Extension field surveys (AECOM 2010).

4.2 Flora and vegetation

The proposed project is unlikely to have any significant impacts on the abundance, diversity and geographic distribution and productivity of flora and vegetation, provided management measures are put in place to relocate displaced fauna (which may rely on the vegetation and flora) and control the spread of weeds. No naturally occurring species of priority flora or DRF, listed by DEC under the *Wildlife Conservation Act 1950*, or as Threatened under the EPBC Act 1999 were recorded in the proposed project area. Also the existing vegetation within the proposed project area is not considered to be regionally significant.

The field survey did not record any suspected infestations of *Phytophthora cinnamomi* (dieback), based on visual inspection of the health of the vegetation. Much of the vegetation is classified as "uninterpretable" due to a lack of indicator (susceptible) species. Further dieback assessment including inoculation of samples is not considered to be necessary for the project, although hygiene the management of practices are recommended (**Section 6.0**).

4.2.1 Clearing of native vegetation

Assessment of the project against the 10 Clearing Principles has been undertaken in accordance the document "Guide to Assessment of Clearing of Native Vegetation" (DoE 2004a) (**Appendix A**). The proposed project may be at variance with one of the *Ten Clearing Principles*. The possible variance is related to potential foraging habitat for Black Cockatoo species and potential habitat for the Lined Skink within the proposed project area.

Refer to **Section 4.3** for potential impacts on fauna as a result of native vegetation clearing.

4.3 Fauna

Clearing will result in some loss of opportunistic foraging habitat for black cockatoo species, potential habitat for the Lined Skink and Quenda and further degradation of remaining vegetation; however these impacts are unlikely to be significant. The estimated clearing required for the proposed project area is 1.30 ha of which 0.13 ha is potential foraging habitat for black cockatoo species (vegetation community types BaBmXp, EmBaS and R1, excluding Degraded and Completely Degraded vegetation). The proposed project's potential foraging habitat for black cockatoo species clearing area must be considered within the sum of the Kwinana Freeway Third Lane Southern Extension project's total clearing area for potential foraging habitat for black cockatoo species. The current estimated clearing area of black cockatoo species potential foraging habitat for the Kwinana Freeway Third Lane Southern Extension project is 0.81 ha; therefore the total estimated clearing area of potential foraging habitat equates to 0.94 ha which is below the one hectare clearing threshold for foraging habitat currently used to determine the significance of impacts with respect to black cockatoo species.

4.4 Water resources

This section describes potential impacts in relation to surface water and groundwater resources within and adjacent to the proposed project area.

4.4.1 Public drinking water source area

A P3 PDWSA is within the proposed project area and allows for the construction of major transport infrastructure within the source site; therefore the proposal is unlikely to have an impact. DoE (DoE 2004b) states that within P3 areas, major transport infrastructure, such as amenity walls, are compatible with DoW's source protection strategy provided best industry design and construction practice is followed.

In addition the proposed project area is also adjacent to the P1 PDWSA. The P1 PDWSA is unlikely to be impacted by the proposed project provided management measures are implemented in accordance with DoW's Water Quality Protection Note 44, *Roads near sensitive water resources*.

4.4.2 Surface waters and wetlands

As a result of vegetation clearing, indirect impacts on surface waters and wetlands include negligible deposits of sediments, heavy metals and hydrocarbons; in the event of heavy rain or flooding the deposited contaminated sediments have the potential to travel to nearby surface water or wetland areas. It is unlikely that these impacts will be significant, particularly given that there are no natural watercourses or functional wetlands either within or in proximity to the proposed project area. Further, the topography of the proposed project area is relatively flat with a slight incline to the west, reducing the likelihood of high velocity surface water flow.

4.4.3 Groundwater

The depth to groundwater in the proposed project area ranges from 8 to 22.5 mbgl. The likelihood of encountering groundwater during construction is highly unlikely. While a Licence to Abstract will be required should groundwater be necessary for construction purposes, the volumes involved are considered unlikely to result in any significant impact.

4.5 Geology, landforms and soils

Soil or sediment disturbance greater or equal to 100 m³ with excavation below the natural watertable in areas classed as "moderate to low risk of ASS occurrence" require further investigation with respect to ASS. Whilst the risk of disturbing ASS within the proposed project area is moderate to low, further investigation for the presence of ASS would only be necessary in the event that excavation is to occur below the natural water table i.e. if the depth to groundwater is exceeded.

The proposed project is unlikely to have a significant impact on the geology and soils of the proposed project. As there are no landforms or landscapes within the proposed project area with specific outstanding features or values, the proposed project is unlikely to have a significant impact on this factor.

4.6 Contamination

Contaminated sites 1.4 and 1 km to the west and east of the proposed project area are not expected to be impacted by the proposed project. The Jandakot Noxious Industry Area is located up hydrological gradient to the east of the proposed project area. Due to the depth of groundwater, potential contaminants that might be present in the groundwater system due to the Jandakot Noxious Industry Area are unlikely to be disturbed.

4.7 Climate

The proposal is not considered to have a significant impact upon climate with an insignificant contribution of greenhouse gas emissions during the construction of the proposal. The amount of greenhouse gases emitted during construction and operation of the proposal is expected to be minimal due to the small size of the clearing required and the short-term nature of construction (resulting in low greenhouse gas emissions during the construction phase).

4.8 Air quality

Dust is comprised of particles suspended in the atmosphere and is classified on the basis of particle size. Dust size classifications include total suspended particulates (TSP) regarding particulate matter less than 50 micrometres (μm) and dust particles less than 10 μm and 2.5 μm in diameter referred to as PM₁₀ and PM_{2.5} respectively. The proposal has the potential to generate dust and may be a concern for construction personnel, fauna and loss of amenity during the construction phase of the proposal. Long-term, the proposed access road will be sealed and therefore dust impacts are mostly limited to the construction phase of the proposed project.

TSP generation will result from construction activities such as vegetation clearing and earthworks, traffic movements, loading and dumping of material and wind action over cleared areas. TSP has the potential to cause nuisance and loss of amenity within the surrounding environment. In addition, the use of plant machinery during construction of the proposed project will result in production of exhaust fumes creating inhalable PM₁₀ and PM_{2.5}. PM₁₀ and PM_{2.5} that can be inhaled and deposited in the lungs and has potential adverse health effects on fauna and construction personnel and nearby residents.

Impacts on air quality within the vicinity of the proposed project area from generation of dust and inhalable exhaust particles therefore has the potential for adverse impacts upon surrounding vegetation and the health, welfare and amenity of wildlife. However, the impacts are likely to be negligible due to the small size of the area to be cleared and the short-term nature of the construction activity. The presence of the amenity wall will also provide limited protection for nearby residents from the generation of dust by construction activities of the proposed Kwinana Freeway Southern Extension. For these reasons it is expected that dust impacts can be managed by standard construction dust management actions.

4.9 Visual amenity, noise and vibration

The proposed Kwinana Freeway Southern Extension project has the potential to slightly increase long-term noise and vibration levels. The proposed amenity wall will provide limited protection to nearby residents from increased noise and vibration levels due to the proposed Kwinana Freeway Southern Extension. The proposed project also is unlikely to have a significant impact on the landscape due to the current land uses surrounding the proposed project area.

The proposed project also has the potential to produce short-term impacts such as noise and vibration associated with compaction of foundations, clearing activities and machinery movements; however these impacts are negligible due to the small size of the clearing area and short construction period.

The current height of existing amenity walls does not eliminate all visual aspects of the Kwinana Freeway such that tall trucks, trains and overhead power lines can be seen. The proposed project therefore proposes to include 2.4 m high amenity wall on property boundaries and 1.8 m elsewhere and this should assist in the management of visual amenity and noise, related to the proposed road, for neighbouring residents.

The construction of the amenity wall may block views of bushland in the road reserve and some noise and vibration impacts may be experienced by residents during construction of the wall.

4.10 Summary of key aspects and impacts

Table 5 summarises the potential impacts on key relevant environmental aspects that will need to be addressed in a construction environmental management plan.

Table 5 Potential environmental impacts associated with the proposed project

Factor	Assessment of potential impact
Flora and vegetation	<p>Clearing of 1.30ha of native vegetation. There are no naturally occurring Priority, DRF, TECS, EPBC protected plant species nor Declared Plant species present within the proposed project area.</p> <p>In order to minimise the introduction of dieback to the proposed project area, the development and implementation of a dieback management plan is recommended.</p>
Fauna	<p>Proposed project area does not provide suitable nesting habitat for conservation significant fauna such as the Graceful Sun Moth, Red-tailed Black Cockatoos and Carnaby's Black Cockatoo.</p> <p>Loss of potential opportunistic foraging habitat for Black Cockatoo species, potential Lined Skink habitat and Quenda foraging areas and further degradation of remaining vegetation; however clearing is unlikely to result in significant impact to these species.</p>
Water resources	<p>Potential impacts due to accidental spillage and surface water runoff containing pollutants such as hydrocarbons and sediment. Groundwater is unlikely to be affected as the water table is generally 8 mbgl.</p> <p>The proposed project falls within a RIWI Act 1914 proclaimed groundwater area and a licence will be required to abstract water for construction purposes</p>
Air quality	<p>Air pollution has the potential to impact on local residents during construction. Dust is the likely issue during the clearing stage.</p>
Visual amenity, noise and vibration	<p>Noise and vibration levels will increase for the short-term during construction of the proposed project, however the nature of the proposed project itself will result in decreased noise and vibration reaching nearby receptors during operation of the road. Visual amenity will not be significantly impacted as the proposed project area does not constitute high visual amenity value.</p>

5.0 Requirement for Referral

The proposed project is unlikely to have a significant impact on matters of national environmental significance and therefore is unlikely to require referral to DSEWPaC. The only identified trigger for referral is the presence of opportunistic foraging habitat for black cockatoo species; however the area of foraging habitat proposed to be cleared within the proposed project area is below the threshold for determining significance of impact.

The proposed project is unlikely to have a significant impact on the environment pursuant to Part IV of the *EP Act* and is therefore unlikely to require referral to the Environmental Protection Authority.

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6.0 Conclusions and Recommendations

On the basis of this PEIA, it is unlikely that the construction of the proposed Amenity Walls will result in significant impacts on the proposed project area. Likely impacts that will require consideration is the potential noise, vibration and dust generated from clearing of vegetation adjacent to residential areas during construction; and the management of hygiene practices to reduce the potential for the spread of dieback to the proposed project area. It is recommended that a Construction Environment Management Plan to address noise, vibration, dust and hygiene is prepared prior to commencement of construction.

It is recommended that MRWA considers facilitating construction Contractor awareness of the potential significance of the clearing of native vegetation utilised by black cockatoo species in order to limit impacts and to potentially avoid clearing triggers as specified by DSEWPac.

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Appendix A

MRWA Vegetation Clearing Impact Assessment Report

Appendix A MRWA Vegetation Clearing Impact Assessment Report

MRWA Vegetation Clearing Impact Assessment Report

This guideline has been prepared to assist MRWA in addressing condition 7 "Assessment of Clearing Impacts" under Clearing Permit CPS 818.

1.0 Area Under Assessment Details

Proponent details

Proponent's name:

MRWA

Contacts:

Name: Alastair Cowan
Phone: 138 138
Fax: (08) 9323 4309
Email: alastair.cowan@mainroads.wa.gov.au

Property details

Property:

Kwinana Freeway Road Reserve between Glen Iris Railway Bridge and Berrigan Drive

Colloquial name:

Kwinana Freeway Amenity Wall

Area under assessment

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:	Site Plan Attached
Approximately 1.3ha	Not determined	Mechanical	To construct the Kwinana Freeway Amenity Wall	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

Avoidance/Minimise clearing

How have the clearing impacts been minimised?

A construction environment management plan has been recommended to be prepared to minimise clearing impacts on the surrounding environment, particularly with regards to spread of weeds.

2.0 Background

Existing environment and information

Description of the native vegetation under application

(suggestion: To determine Vegetation Condition use - Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.)

Site Visit Undertaken	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Fauna / Flora Survey Undertaken	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Site Report Attached	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Fauna / Flora Survey Report Attached	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Site Photos Attached	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Other Relevant References Attached	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

Vegetation Complex	Clearing Description	Vegetation Condition	Comment
Bassendean Complex	Project is to clear 1.3ha of native vegetation.	Good to degraded.	

3.0 Assessment of application against Clearing Principles

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

Comments **Proposal is not at variance to this Principle**

Results of the Kwinana Freeway Southern Extension field survey (AECOM 2010) identified the project area to be comprised of five vegetation community types as detailed in Table 1 including intact native vegetation types, revegetated and planted areas and degraded communities that are derivatives of intact communities. The condition of the community types found within the project area ranges from good to degraded with the majority of the project area in good condition.

Table 1 Vegetation community descriptions

Community Code	Vegetation Description
AcPS	Revegetated area of scattered planted <i>Corymbia maculata</i> over a planted Shrubland of <i>Acacia cochlearis</i> and <i>Calothamnus rupestris</i> with occasional <i>Chamelaucium uncinatum</i> and/or a Low Open Shrubland of <i>Melaleuca systema</i> over introduced species dominated by <i>Ehrharta calycina</i> , <i>Avena barbata</i> and <i>Euphorbia terracina</i> associated with plantings on roadside batters.
BaBmXp	Low Open Forest of <i>Banksia attenuata</i> and <i>Banksia menziesii</i> with scattered <i>Eucalyptus marginata</i> over an Open Heath dominated by <i>Xanthorrhoea preissii</i> and <i>Regelia ciliata</i> over an Open Low Heath dominated by <i>Conostephium minus</i> on grey sand.
EmBaS	Woodland of <i>Eucalyptus marginata</i> over a Low Open Forest of <i>Banksia attenuata</i> and <i>Banksia menziesii</i> over a Tall Shrubland of <i>Xanthorrhoea preissii</i> and <i>Jacksonia furcellata</i> over a Low Shrubland dominated by <i>Hibbertia hypericoides</i> and <i>Gompholobium tomentosum</i> on grey sand.
R1^	Tall Open Shrubland of <i>Banksia menziesii</i> and <i>Banksia attenuata</i> with scattered <i>Eucalyptus marginata</i> and <i>Corymbia calophylla</i> over a Closed Tall Shrubland alternating in dominance between <i>Regelia ciliata</i> and <i>Adenanthos cygnorum</i> with <i>Acacia pulchella</i> and <i>Allocasuarina humilis</i> in association with rehabilitated roadside batters.
R4	Low Open Woodland of <i>Corymbia calophylla</i> with scattered <i>Eucalyptus marginata</i> and <i>Banksia menziesii</i> over a Tall Shrubland of <i>Kunzea glabrescens</i> and <i>Calothamnus rupestris</i> over introduced grasses on grey sand.

^ Includes additional species from quadrats outside the project area from the South Metro Connect project data

* Denotes introduced (weed) species

Denotes non endemic species

Table 1 identifies a total of 22 (~64%) species including eight (~36%) introduced (weeds) or planted species. Two of the five vegetation communities found within the project area represents revegetated land and the remaining remnant native vegetation is considered to contain a moderate level of biological diversity with a high proportion of weeds.

Methodology AECOM 2010

(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**

One fauna species of conservation significance, a Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*) was recorded from a sighting during the field survey for Kwinana Freeway Southern Extension (AECOM 2010). A single bird was observed flying overhead. The project area is also considered to provide some suitable foraging habitat for Red-tailed Black Cockatoos and Carnaby's Black Cockatoos, in particular, vegetation communities BaBmXp, EmBaS and R1.

Methodology AECOM 2010

3.1.1.2 (c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.**Comments Proposal is not at variance to this Principle**

A search of the SEWPaC Protected Matters Search Database (2011) identified the potential occurrences of five protected plants, these being:

- *Andersonia gracilis* (Slender Andersonia)
- *Caladenia huegelii* (King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid)
- *Centropelis caespitose*
- *Dawinia foetida* (Mucnea Bell)
- *Lepidosperma rostratum* (Beaked Lepidosperma)

A search of the DEC's threatened and priority flora database found one priority 5 flora species within the project area; however no naturally occurring species of priority flora or Declared Rare Flora (DRF), listed by DEC under the Wildlife Conservation Act 1950, or threatened species under the EBPC Act were recorded during the Kwinana Freeway Southern Extension field survey (AECOM 2010).

Methodology AECOM 2010

3.1.1.3 (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 at variance to this Principle**

A recent search of the DEC's Threatened Ecological Communities (TEC) database found no occurrences of TECs within the project area. Further, no TECs or Priority Ecological Communities (PEC) were recorded during the Kwinana Freeway Southern Extension field survey in 2010 (AECOM 2010). Also a search of the SEWPaC Protected Matters database (2011) found no likely occurrences of any threatened ecological communities protected under the EPBC Act.

The primary tool for classification of vegetation on the Swan Coastal Plain in order to determine equivalence to TECs is to assign Floristic Community Types (FCTs). The vegetation of the southern Swan Coastal Plain has been classified into FCTs and is documented in Gibson *et al.* (1994). The species composition of the intact vegetation communities recorded from the Kwinana Freeway Southern Extension field survey was analysed and compared to the Gibson *et al.*, (1994) dataset and from this, FCTs, have been

inferred (AECOM 2010). None of the recorded vegetation types within the project area have been determined to be equivalent to FCTs that are classified as TECs or PECs.

Methodology AECOM 2010
Gibson *et al.* (1994).

3.1.1.4 (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 at variance to this Principle

At a regional scale, the project area falls within the vegetation complex classified as the Bassendean Complex: Central and South, described by Heddle *et al.* (1978) as Woodlands of *Jarrah-Sheoak-Banksia* on the sand dunes, to low woodland of *Melaleuca* spp. and sedgelands on the low lying depressions and swamps. Currently 24% of the pre-European extent of the Bassendean Complex; Central and South remains and of this, just over 25% is covered by some level of protection. The EPA's objective is to protect at least 30% of the original extent of each vegetation complex in unconstrained areas and 10% in constrained areas (i.e. Urban Zoned regions). The project area is considered a constrained area due to its urban zoning; however it is not considered to be under-represented, according to this objective.

Methodology AECOM 2010

3.1.1.5 (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 at variance to this Principle

The DoW geographic atlas was consulted with respect to sensitive water resources to determine whether the project area supported, or is adjacent to, any significant lakes, rivers, wetlands or proclaimed areas. The project area does not contain nor is it adjacent to any significant lakes, rivers, wetlands or proclaimed areas. The nearest Ramsar listed wetland (Forrestdale and Thomson Lakes) is approximately 22 km south of the project area. Forrestdale and Thomsons Lakes are seasonal fresh/brackish wetlands recharged predominately by groundwater. These lakes are the best remaining examples of typical of the Swan Coastal Plain brackish, seasonal lakes with extensive fringing sedgeland.

Methodology AECOM 2011

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

Comments Proposal is not at variance to this Principle

Any clearing within areas of native vegetation will result in further degradation of the natural environment. However, the level of existing degradation and the minimal impact that will result from any clearing confirms that the project will not result in appreciable land degradation. Appropriate management plans will mitigate potential impacts.

Methodology AECOM 2011

3.1.1.7 (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 at variance to this Principle

There are no conservation areas located within the project area. Nearby regional parks such as Beeliar Regional Park to the west of the project area and Jandakot Regional Park to the east of the project area are not expected to be impacted by the clearing or other indirect impacts.

Methodology AECOM 2011

3.1.1.8 (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 unlikely to be at variance to this Principle

As a result of vegetation clearing indirect impacts on surface waters and wetlands include negligible deposits of sediments, heavy metals and hydrocarbons; in the event of heavy rain or flooding the deposited contaminants have the potential to travel to nearby surface water or wetland areas. It is unlikely that these impacts will be significant, particularly given that there are no natural watercourses or functional wetlands either within or in proximity to the project area.

The depth to groundwater in the project area ranges from 8 to 22.5 mbgl, the likelihood of encountering groundwater during construction is highly unlikely. While a Licence to Abstract will be required should groundwater be necessary for construction purposes, the volumes involved are considered unlikely to result in any significant impact.

Methodology AECOM 2011

3.1.1.9 (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 at variance to this Principle

The topography of the project area is relatively flat with a slight incline to the west, reducing the likelihood of high velocity surface water flow. Depth to groundwater for the project area ranges from 8 to 22.5 mbgl. The project area experiences a mean annual rainfall of 832.1 mm predominately during May to September and does not contain any major water courses (BOM 2010). For these reasons, in addition to the small clearing area size, clearing associated with the project is unlikely to cause or exacerbate the incidence or intensity of flooding.

Methodology AECOM 2011

3.1.1.10 Planning instrument, Native Title, RIWI Act Licence, EP Act Licence, Works Approval, Previous EPA decision or other matter.**Comments**

N/A

Methodology AECOM 2011**4.0 Assessor's recommendations****List of Principles seriously at variance, at variance or maybe at variance****Recommendation (does this clearing require a Revegetation Management Plan / Offset Proposal / Environmental Management Plan / Management Strategy/New Application, under CPS 818/2)****None. Clearing is not seriously at variance, at variance or possibly at variance with the list of Principles.****Construction Environmental Management Plan****5.0 References**

- AECOM 2010. DRAFT Kwinana Freeway Third Lane Southern Extension Flora, Vegetation and Fauna Survey. Prepared for Main Roads Western Australia.
- AECOM 2011. Kwinana Freeway Amenity Wall Preliminary Environmental Impact Assessment. Prepared for Main Roads Western Australia.
- Gibson, N., Keighery, B.J., Keighery, G.J., Burbridge, A.H. & Lyons, M.N. 1994. A Floristic Survey of the Southern Swan Coastal Plain. Unpublished Report for the Australian Heritage Commission prepared by Department of Conservation and Land Management and the Conservation Council of Western Australia (Inc).

OFFICER PREPARING REPORT

Position: Title

Date

Appendix B

PEIA Recommendations

Appendix B PEIA Recommendations

PEIA RECOMMENDATIONS – RECOMMENDATION ACTION REPORT		
PROJECT: Kwinana Freeway Amenity Wall		
PEIA PREPARED BY: AECOM Australia Pty Ltd		
Recommendation	Agency required Approval/Referral (Yes or No)	Relevant Agency
Development of Construction Environment Management Plan	No	MRWA
Vegetation clearing controls for black cockatoo species' habitat to be communicated to construction Contractor.	No	MRWA

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Appendix C

EPBC Protected Matters Search Report

Appendix C EPBC Protected Matters Search Report



EPBC Act Protected Matters Report: Coordinates

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

You may wish to print this report for reference before moving to other pages or websites.

Information about the EPBC Act including significance guidelines, forms and application process details can be found at <http://www.environment.gov.au/epbc/assessmentsapprovals/index.html>

Report created: 16/02/11 14:51:31

[Summary](#)

[Details](#)

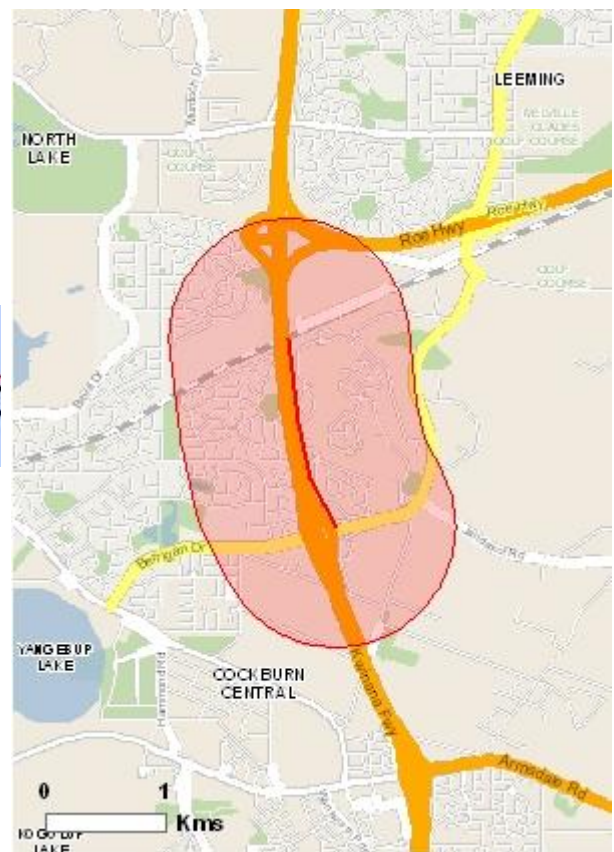
[Matters of NES](#)

[Other matters protected by
the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)



This map may contain data which are
©Commonwealth of Australia (Geoscience
Australia), ©PSMA 2010

[Coordinates](#)

Buffer: 1Kms

Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance - see <http://www.environment.gov.au/epbc/assessmentsapprovals/guidelines/index.html>.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Significance (Ramsar Wetlands):	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Areas:	None
Threatened Ecological Communities:	None
Threatened Species:	11
Migratory Species:	7

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place and the heritage values of a place on the Register of the National Estate. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage/index.html>

Please note that the current dataset on Commonwealth land is not complete. Further information on Commonwealth land would need to be obtained from relevant sources including Commonwealth agencies, local agencies, and land tenure maps.

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species. Information on EPBC Act permit requirements and application forms can be found at <http://www.environment.gov.au/epbc/permits/index.html>.

Commonwealth Lands:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	5

Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves:	None

Report Summary for Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

Place on the RNE:	1
State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	16
Nationally Important Wetlands:	None

Details

Matters of National Environmental Significance

Wetlands of International Significance (RAMSAR Sites) [\[Resource Information \]](#)

Name	Proximity
Forrestdale & thomsons lakes	Within 10km of Ramsar site

Threatened Species [\[Resource Information \]](#)

Name	Status	Type of Presence
------	--------	------------------

BIRDS

[Calyptrorhynchus banksii naso](#)

Forest Red-tailed Black-Cockatoo [67034]	Vulnerable	Species or species habitat may occur within area
--	------------	--

[Calyptrorhynchus latirostris](#)

Carnaby's Black-Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Species or species habitat likely to occur within area
---	------------	--

INSECTS

[Synemon gratiosa](#)

Graceful Sun Moth [66757]	Endangered	Species or species habitat may occur within area
---------------------------	------------	--

MAMMALS

[Dasyurus geoffroii](#)

Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat likely to occur within area
-------------------------------	------------	--

[Phascogale calura](#)

Red-tailed Phascogale [316]	Endangered	Species or species habitat may occur within area
-----------------------------	------------	--

[Setonix brachyurus](#)

Quokka [229]	Vulnerable	Species or species habitat may occur within area
--------------	------------	--

PLANTS

[Andersonia gracilis](#)

Slender Andersonia [14470]	Endangered	Species or species habitat may occur within area
----------------------------	------------	--

[Caladenia huegelii](#)

King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat likely to occur within area
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[Centrolepis caespitosa](#)

[6393]	Endangered	Species or species habitat likely to occur within area
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[Darwinia foetida](#)

Muchea Bell [83190]	Critically Endangered	Species or species habitat likely to occur within area
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[Lepidosperma rostratum](#)

Beaked Lepidosperma [14152]	Endangered	Species or species habitat likely to occur within area
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Migratory Species	[Resource Information]
--------------------------	---------------------------------

Name	Status	Type of Presence
------	--------	------------------

Migratory Marine Birds[Apus pacificus](#)

Fork-tailed Swift [678]		Species or species habitat may occur within area
-------------------------	--	--

[Ardea alba](#)

Great Egret, White Egret [59541]		Species or species habitat may occur within area
----------------------------------	--	--

[Ardea ibis](#)

Cattle Egret [59542]		Species or species habitat may occur within area
----------------------	--	--

Migratory Terrestrial Species[Haliaeetus leucogaster](#)

White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
-------------------------------	--	--

[Merops ornatus](#)

Rainbow Bee-eater [670]		Species or species habitat may occur within area
-------------------------	--	--

Migratory Wetlands Species[Ardea alba](#)

Great Egret, White Egret [59541]		Species or species habitat may occur within area
----------------------------------	--	--

[Ardea ibis](#)

Cattle Egret [59542]		Species or species habitat may occur within area
----------------------	--	--

Other Matters Protected by the EPBC Act

Commonwealth Lands	[Resource Information]
---------------------------	---------------------------------

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land -

Listed Marine Species	[Resource Information]
------------------------------	---------------------------------

Name	Status	Type of Presence
------	--------	------------------

Birds[Apus pacificus](#)

Fork-tailed Swift [678]		Species or species habitat may occur within area
-------------------------	--	--

[Ardea alba](#)

Great Egret, White Egret [59541]		Species or species habitat may occur within area
----------------------------------	--	--

[Ardea ibis](#)

Cattle Egret [59542]		Species or species habitat may occur within area
----------------------	--	--

[Haliaeetus leucogaster](#)

White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
-------------------------------	--	--

[Merops ornatus](#)

Rainbow Bee-eater [670]

Species or species habitat may occur within area

Extra Information

Places on the RNE

[Resource Information]

Note that not all Indigenous sites may be listed.

Name

Status

Natural

[Ken Hurst Park and Adjacent Areas WA](#)

Indicative Place

Invasive Species

[Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit, 2001.

Name

Status

Type of Presence

Mammals

[Felis catus](#)

Cat, House Cat, Domestic Cat
[19]

Species or species habitat likely to occur within area

[Oryctolagus cuniculus](#)

Rabbit, European Rabbit [128]

Species or species habitat likely to occur within area

[Sus scrofa](#)

Pig [6]

Species or species habitat may occur within area

[Vulpes vulpes](#)

Red Fox, Fox [18]

Species or species habitat likely to occur within area

Plants

[Asparagus asparagoides](#)

Bridal Creeper, Bridal Veil
Creeper, Smilax, Florist's
Smilax, Smilax Asparagus
[22473]

Species or species habitat likely to occur within area

[Brachiaria mutica](#)

Para Grass [5879]

Species or species habitat may occur within area

[Cenchrus ciliaris](#)

Buffel-grass, Black Buffel-grass
[20213]

Species or species habitat may occur within area

[Chrysanthemoides monilifera](#)

Bitou Bush, Boneseed [18983]

Species or species habitat may occur within area

[Genista sp. X Genista monspessulana](#)

Broom [67538]

Species or species habitat may occur within area

[Lantana camara](#)

Lantana, Common Lantana,
Kamara Lantana, Large-leaf
Lantana, Pink Flowered
Lantana, Red Flowered Lantana,
Red-Flowered Sage, White
Sage, Wild Sage [10892]

Species or species habitat may occur within area

[Lycium ferocissimum](#)

African Boxthorn, Boxthorn [19235] Olea europaea	Species or species habitat may occur within area
Olive, Common Olive [9160] Pinus radiata	Species or species habitat may occur within area
Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780] Rubus fruticosus aggregate	Species or species habitat may occur within area
Blackberry, European Blackberry [68406] Salix spp. except S.babylonica, S.x calodendron & S.x reichardtiji	Species or species habitat may occur within area
Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497] Salvinia molesta	Species or species habitat may occur within area
Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]	Species or species habitat may occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World Heritage and Register of National Estate properties, Wetlands of International Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed

- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites;
- seals which have only been mapped for breeding sites near the Australian continent.

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

115.84985
 -32.09495,115.85058
 -32.10124,115.85153
 -32.10561,115.85336
 -32.10915,115.85336 -32.10915

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [-Department of Environment, Climate Change and Water, New South Wales](#)
- [-Department of Sustainability and Environment, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment and Natural Resources, South Australia](#)
- [-Parks and Wildlife Service NT, NT Dept of Natural Resources, Environment and the Arts](#)
- [-Environmental and Resource Management, Queensland](#)
- [-Department of Environment and Conservation, Western Australia](#)
- [-Department of the Environment, Climate Change, Energy and Water](#)
- [-Birds Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-SA Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Atherton and Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [-State Forests of NSW](#)
- Other groups and individuals

Environment Australia is extremely grateful to the many organisations and individuals who provided

expert advice and information on numerous draft distributions.

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