



PRELIMINARY ENVIRONMENTAL IMPACT ASSESSMENT

**M045 Indian Ocean Drive – Kings Drive Intersection and 2
Passing Lanes Upgrade**

September 2012

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PART A

1. PROJECT INFORMATION

Project Title: M045 Indian Ocean Drive – Kings Rd Intersection and 2 Passing Lanes Upgrade.

Project location(s): Indian Ocean Drive, Kings Rd Intersection section and 2 Passing Lanes 43.5 to 48.7 SLK, Shire of Gingin.

Area proposed to be cleared: Total 3.1 ha (Kings Drive – 0.5 ha, Passing Lane 1 – 1.6 ha and Passing Lane 2 – 1.1 ha) hectares

Project purpose / components: Intersection upgrades and construction of passing lanes.

Temporary clearing: None.

2. PROJECT SUMMARY

- The project proposes to clear 3.1 ha of native vegetation over an approximately 20 km section of Indian Ocean Drive (IOD).
- The project is not likely to be at variance to any of the 10 Clearing Principles.
- The project area contains potential for *Calyptorhynchus latirostris* (Carnaby's black cockatoo) foraging habitat. However the Carnaby's foraging habitat is unlikely to be considered significant given that the project area is a small linear section (1.6 ha) of native vegetation in varying condition and is surrounded by numerous larger areas of native vegetation, including the Gnangara-Moore River State Forest, that is in similar or better condition.
- No offset proposals, management plans or revegetation plans are required.
- No other approvals are required.

3. ASSESSMENT SCOPE

The preliminary assessment will involve a desktop analysis of environmental aspects and impacts, a site investigation and an assessment of native vegetation clearing.

Due to the close proximity of the three projects to each other this PEIA will assess the potential environmental impacts of all projects.

The study area is confined to a local area of a 5 km radius. The preliminary assessment will determine whether an Environmental Impact Assessment is necessary and if referral to State and/or Commonwealth authorities is required.

4. PROJECT DESCRIPTION

The projects occur on IOD, within the Shire of Gingin. The reason for these projects is to upgrade IOD to meet current standards of road safety and to increase the flow of traffic.

- Project One involving improvements to the Kings Drive intersection between 27.52 and 27.92 SLK.
- Project Two involving adding a south bound passing lane between 43.5 and 45.8 SLK.
- Project Three involving adding a north bound passing lane between 47.38 and 48.7 SLK.

The intersection at Kings Drive is to be upgraded to improve safety entering and exiting the intersection. The two passing lanes will involve constructing a lane eight meters wide on the south and north bound sections of IOD.

4.1 Project Location

The project area is located on Indian Ocean Drive road, Shire of Gingin. Kings Drive Intersection is located at 27.52 to 27.92 SLK, Passing Lane 1 (southbound) is from 43.5 to 45.8 SLK and Passing Lane 2 (northbound) is from 47.38 to 48.7 SLK

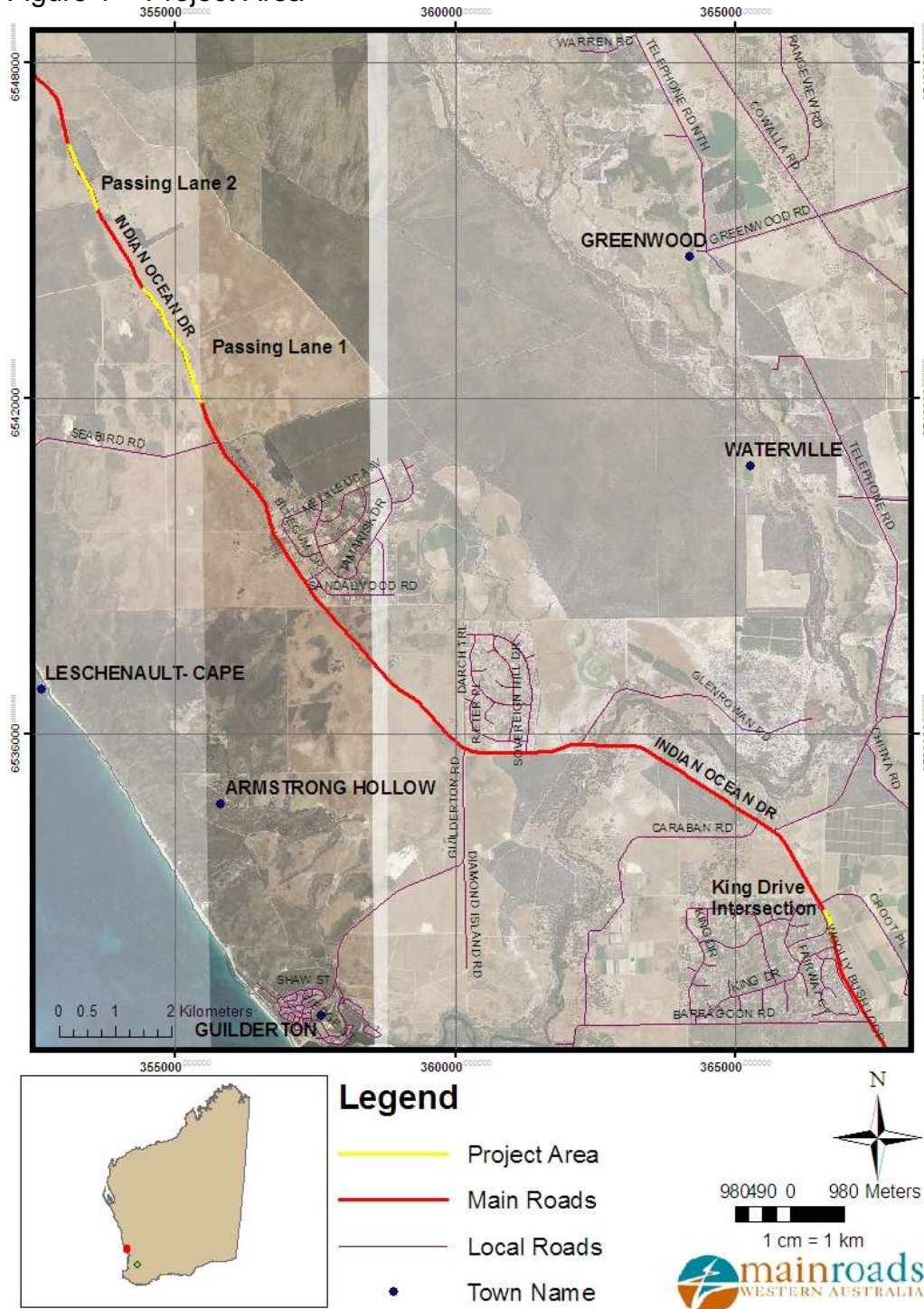
MGA Coordinates:

E: 355 040

N: 6 543 776

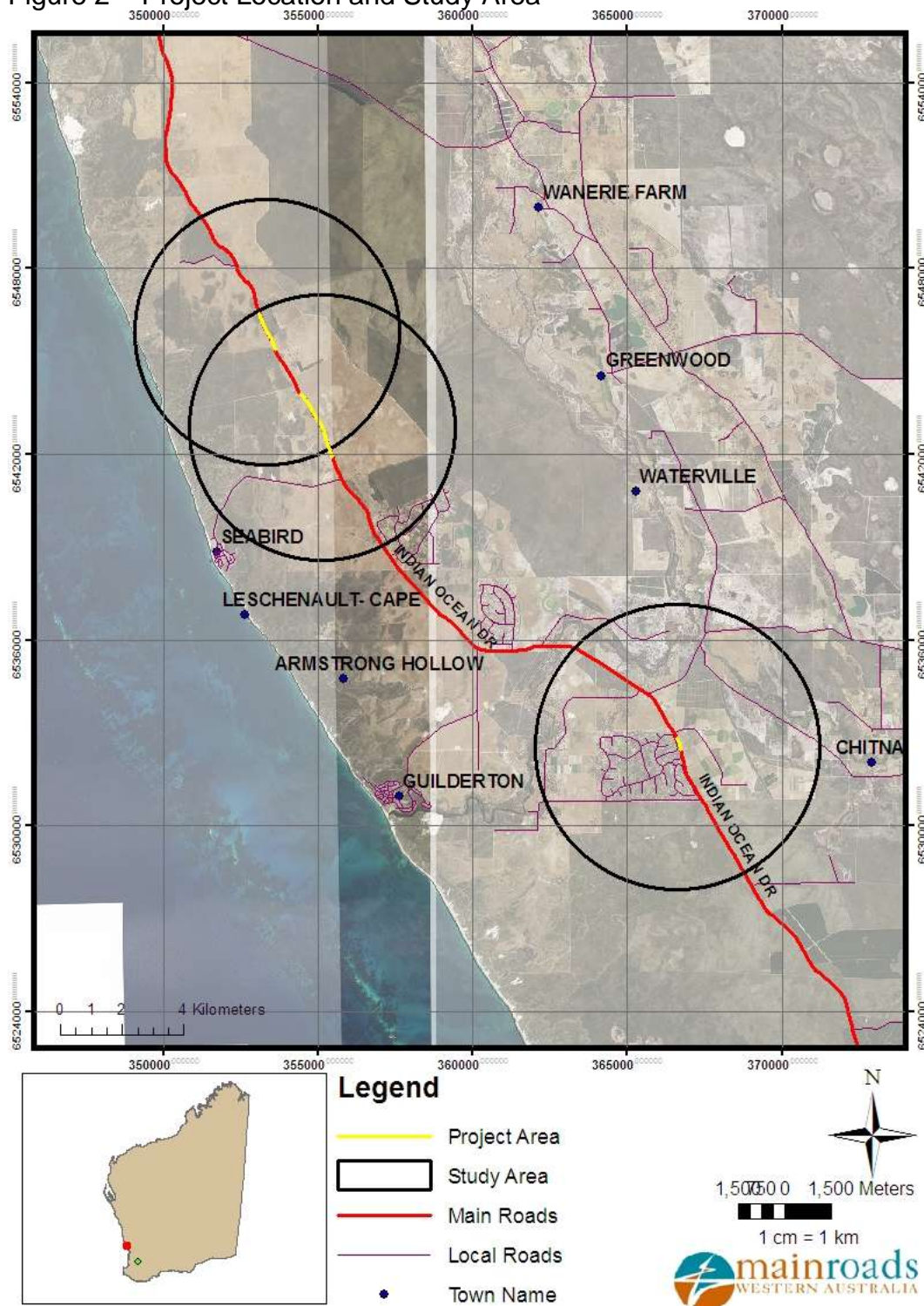
The project area is shown in Figure 1:

Figure 1 – Project Area



The location and boundaries of the study area (5km radius) for the project are shown in Figure 2:

Figure 2 – Project Location and Study Area



5. METHODOLOGY

5.1 Preliminary Desktop Study

A preliminary assessment of the project area and the potential constraints of the proposal was undertaken by reviewing a number of government agency managed databases, viewing GIS shapefiles and consulting with relevant stakeholders where necessary.

5.1.1 Commonwealth Referral

The decision whether to refer the project to the Commonwealth DSEWPC was based upon whether the project would impact Commonwealth land, or may have a significant impact upon matters of national significance, which are protected under the EPBC Act. These are; World Heritage properties, National Heritage places, wetlands of international importance (listed under the Ramsar convention), Commonwealth Marine Areas, migratory species protected under international agreements, nuclear actions, nationally threatened species and ecological communities.

The DSEWPC protected matters search tool was used to determine if the project will impact upon any matters of national significance: (<http://www.environment.gov.au/erin/ert/epbc/index.html>) refer to Appendix G for the results of this search and Section 7 for a discussion on the findings.

5.1.2 State Referral

The decision whether to refer the project to the State's EPA was based on whether the project would impact on environmental factors significantly enough to require referral under section 38 of the *Environmental Protection Act 1986*.

6. ASSESSMENT OF ASPECTS AND IMPACTS

6.1 Aspects and Impacts

Table 1: Aspects and Impacts – Indian Ocean Drive – Kings Drive Intersection and 2 Passing Lanes Upgrade.

Aspect	Evaluation of Potential Impacts
Heritage (non-indigenous)	A search of the Australian Heritage Places Inventory, Heritage Council of Western Australia and the Shire/ of Gingin Municipal Heritage Inventory on-line databases has indicated that there are no known site(s) of heritage significance within the vicinity of the project area.
Aboriginal heritage	A search of the DIA's database/Heritage survey identified no known site(s) of Aboriginal heritage significance within the study area of the project area.
Air quality	As per Main Roads WA Corporate Procedure air quality assessment is only required for 'all for new road proposals and major upgrades'.
Acid Sulfate Soils	The SLIP database indicates that the area is classified as low risk, as there is no dewatering or excavation below the water table planned no further investigations are required.
Dust	Likely to be a minor issue during earthworks. No major sensitive receivers adjacent to the proposed works, but excessive dust could impact vegetation. This is likely to be easily managed by standard construction dust management techniques.
Native Vegetation	See Section 8 Clearing of Native Vegetation for further information.
Vegetation – declared weeds	Consultation with the Department of Agriculture and Food is only required where declared plants are identified in the project area.
Vegetation – dieback	Not an issue given the project area is located above the 26° parallel.
Noise and vibration	No major sensitive local receivers. Construction works is not expected to significantly contribute to noise levels at the nearest sensitive receivers, provided works are limited to normal working hours. The requirements of the Shire of Gingin must be met in respect of noise management and construction working hours.
Visual amenity	The proposed works will result in minor and short-term visual impacts during construction.

Table 1: Aspects and Impacts – Indian Ocean Drive – Kings Drive Intersection and 2 Passing Lanes Upgrade.

Aspect	Evaluation of Potential Impacts
Hazardous substances	Not relevant to the proposed works, the project requires no hazardous substances to be used.
Contamination	A search of the DEC's contaminated sites database indicates there are no identified contaminated site(s) within the project area.

PART B

7. METHODOLOGY

7.1 Preliminary Desktop Study

A preliminary assessment of the project area and the potential constraints of the proposal was undertaken by reviewing a number of government agency managed databases, viewing GIS shapefiles and consulting with relevant stakeholders where necessary.

Refer to MRWA Guide to Desktop Reference document.

8. CLEARING OF NATIVE VEGETATION

Native vegetation describes all indigenous aquatic and terrestrial vegetation (living or dead). The term does not include vegetation that was intentionally sown, planted or propagated unless it was required under a statutory condition.

Apart from activities that are exempt under the clearing regulation (Section 5 – Prescribed Clearing), typically Main Roads WA clearing will be undertaken using a permit.

The clearing of native vegetation for this project will be done undertaken the Statewide Purpose Permit CPS818/6.

8.1 Details of Vegetation Associations to be Cleared

8.1.1 Avoidance / Minimise Clearing:

Justification for how the alignment / location of passing bays was chosen.

- Need to meet Australian standards.

How have the clearing impacts been minimised?

- The current road alignment was chosen to avoid several sections that contained areas of *Banksia* woodland in excellent to good (Keighery, 1994) condition.

8.1.2 Existing environment and information

Kings Drive Intersection: The vegetation on the eastern side of IOD is in good (Keighery, 1994) condition with some weed infestation and on the western side of IOD it is in degraded (Keighery, 1994) condition with a heavy weed infestation. The native vegetation within the Kings Drive intersection area includes *Banksia attenuata*, *Banksia sessilis* (parrot bush), *Eucalyptus decipiens* and *Xanthorrhoea* species. There is limited evidence of natural regeneration in this area. The western side of King Drive intersection is adjacent to a strip (50-100m wide) of *Banksia attenuata* and *Banksia sessilis* woodland in good (Keighery, 1994) condition and the eastern side is adjacent to a row of pine trees and cleared agricultural land.

Passing Lane 1: The native vegetation along the Passing Lane 1 (2.3km long) is in predominately excellent to good (Keighery, 1994) condition with some areas of weed infestation. The native

vegetation within the Passing Lane 1 area includes *Eucalyptus tottiana* (coastal blackbutt), *Banksia attenuata*, *Banksia sessilis* (parrot bush), *Nuytsia floribunda*, *Acacia pulchella* (prickly moses), Petrophile species and Xanthorrhoea species. There is good evidence of natural regeneration in this area. Passing Lane 1 is adjacent to cleared agricultural land.

Passing Lane 2: The native vegetation along the Passing Lane 2 (1.3km long) is in predominately degraded to good (Keighery, 1994) condition with some areas of heavy weed infestation. The native vegetation within the Passing Lane 2 area includes *Eucalyptus tottiana* (coastal blackbutt), *Eucalyptus gomphocephala* (Tuart), *Banksia attenuata*, *Banksia sessilis* (parrot bush), *Nuytsia floribunda*, *Hakea trifurcata*, *Acacia pulchella* (prickly moses), *Acacia cyclops*, Petrophile species and Xanthorrhoea species. There is some evidence of natural regeneration in this area. The majority of Passing Lane 2 is adjacent to cleared agricultural land with a small north east section adjacent to native bushland.

Overall the project areas vegetation Community was predominately a closed Banksia Woodland with areas of shrubland. The project area had moderate plant diversity but no riparian vegetation.

Table 2: Existing Environment – Indian Ocean Drive – Kings Drive Intersection and 2 Passing Lanes Upgrade.

Project Vegetation Complex	Project Clearing Description	Project Vegetation Condition	Comments
<p>Beard Vegetation Association 949 described as a Low woodland; banksia.</p> <p>Beard Vegetation Association 1029 described as a Shrublands; scrub-heath Dryandra-Calothamnus assoc. with B. prionotes on limestone in the northern Swan Region</p> <p>(Government of Western Australia, 2011).</p>	<p>Clearing of up to 3.1 ha for intersection upgrade and passing lane construction on Indian Ocean Drive, Gingin.</p>	<p>Completely Degraded to Excellent (Keighery, 1994)</p>	<p>Vegetation description and condition determined from MRWA site visit on 26 June 2012.</p>

8.1.3 Vegetation complexes and representation

Table 3: Existing Environment – Indian Ocean Drive – Kings Drive Intersection and 2 Passing Lanes Upgrade.

	Pre-European (ha)	Current Extent (ha)	% Remaining	% Remaining in DEC reserves
IBRA Region Swan Coastal Plain	1 501 209	587 832	39	35
Shire Gingin	319 671	177 340	55	43
Beard Vegetation Association In IBRA region 949	209 983	121 248	58	52

Table 3: Existing Environment – Indian Ocean Drive – Kings Drive Intersection and 2 Passing Lanes Upgrade.

1029	68 329	48 903	72	34
Beard Vegetation Association 949	2 661 088	1 844 267	69	80
1029	71 035	51 030	72	39

8.2 Assessment Against the 10 Clearing Principles

In assessing whether the project is likely to have a significant impact on the environment, the project was assessed against the ten clearing principles (EP Act 1986 Schedule 5).

The project is not likely to be at variance with the 10 clearing principles.

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

Comments	Proposal is not likely to be at variance to this Principle
	<p>The condition of the vegetation within the project area ranges from excellent to completely degraded (Keighery, 1994) condition. Approximately 1.5 ha is predominately degraded and 1.6 ha is predominately good to excellent (Keighery, 1994) condition (MRWA Site Inspection, 2012). The total area to be cleared is approximately 3.1 hectares and is mapped as Beard vegetation association 949 described as Low woodland: Banksia and 1029, Dryandra-Calothamnus assoc. with B. prionotes on limestone in the northern Swan Region (Government of Western Australia, 2011). The project is in a highly vegetated landscape with approximately 70% remaining vegetated in the study area.</p> <p>There are no recorded priority flora or priority ecological communities in the study area. The project area contains potential for <i>Calyptorhynchus latirostris</i> (Carnaby's black cockatoo) foraging habitat. However the Carnaby's foraging habitat is unlikely to be considered significant given that the project area is a small linear section (1.6 ha) of native vegetation in varying condition and is surrounded by numerous larger areas of native vegetation, including the Gngangara-Moore River State Forest, that is in similar or better condition.</p> <p>Given the above the proposal is not likely to be at variance to this Principle.</p>
Methodology	<p>MRWA Site Inspection (2012) DEC shapefiles Government of Western Australia (2011) NatureMap (Accessed 3 July 2012) Keighery (1994)</p>

(b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.

Comments	Proposal is not likely to be at variance to this Principle
	<p>There are two protected species recorded within the study area, <i>Isoodon obesulus</i> (Quenda) and <i>Calyptorhynchus latirostris</i> (Carnaby's black cockatoo).</p> <p>Quenda typical inhabit dense scrubby, often swampy, vegetation with dense cover up to one metre high. Carnaby's black cockatoo typically nest in Eucalyptus trees and use Banksia spp as foraging habitats. The project area is mapped as having a Beard vegetation association of 949 described as a low woodland of Banksia. The vegetation condition for the project area ranges from completely degraded to very good (Keighery, 1994).</p> <p>The project area contains limited dense cover and lacks nearby watercourses. The</p>

	<p>project area does contain <i>Banksia attenuata</i> and <i>Banksia sessilis</i> which are potential foraging habitat for <i>Calyptorhynchus latirostris</i> (Carnaby's black cockatoo). This suitable foraging habitat for Carnaby's is only present in the passing lane 1 section of the project. This section proposes to clear along an area 2.3km long and 9m wide. There is evidence of edge effects, such as weed infestation, deterioration in the native vegetation condition close to the existing road edge and a lack of regeneration of the <i>Banksia</i> species (MRWA Site Inspection, 2012). The mapped Beard Vegetation Associations (949 and 1029) are both well represented in the region and the project is in a highly vegetated landscape with approximately 70% remaining vegetated. Given this and the edge effects in this section and it is considered unlikely to be significant foraging habitat for Carnaby's black cockatoo.</p> <p>The remaining project areas are unlikely to be considered significant fauna habitat given they are two small linear sections, totalling 1.5 ha of native vegetation in mainly degraded (Keighery, 1994) condition over a 20km section of road and are surrounded by numerous larger areas of native vegetation, including the Gngangara-Moore River State Forest, that is in similar to better condition (MRWA Site Inspection, 2012).</p> <p>Given the above the proposed clearing is not likely to be at variance with this Principle.</p>
Methodology	<p>MRWA Site Inspection (2012) Government of Western Australia (2011) Keighery (1994) Hydrography, Linear NatureMap (Accessed 3 July 2012)</p>

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

Comments	<p>Proposal is not likely to be at variance to this Principle</p> <p>There are two recorded species of rare flora within the study areas, <i>Chorizema varium</i> and <i>Eucalyptus argutifolia</i>. The closest of which is over 2km from the project area. <i>Chorizema varium</i> prefers habitats of Coastal limestone hills & outcrops and <i>Eucalyptus argutifolia</i> prefers habitats of Slopes or gullies of limestone ridges, outcrops. Neither of these habitats was observed during the site inspection of the project area (MRWA Site Inspection, 2012).</p> <p>Given the above and that given the project area is a small linear section of native vegetation in varying condition over a 20km section of road the proposed clearing is not likely to be at variance with this Principle.</p>
Methodology	<p>MRWA Site Inspection (2012) DEC shapefiles NatureMap (Accessed 3 July 2012)</p>

(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	<p>Proposal is not likely to be at variance to this Principle</p> <p>There are no known records of Threatened Ecological Communities within the study area. Given the small amount proposed to be cleared the project is not likely to be at variance to this Principle.</p>
Methodology	<p>DEC shapefiles</p>

(e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.

Comments	Proposal is not likely to be at variance to this Principle				
		Pre-European (ha)	Current Extent (ha)	% Remaining	% Remaining in DEC reserves
	IBRA Region Swan Coastal Plain	1 501 209	587 832	39	35
	Shire Gingin	319 671	177 340	55	43
	Beard Vegetation Association In IBRA region 949	209 983	121 248	58	52
	1029	68 329	48 903	72	34
	Beard Vegetation Association 949	2 661 088	1 844 267	69	80
	1029	71 035	51 030	72	39
	<p>The project is in a highly vegetated landscape with approximately 70% remaining vegetated and the mapped vegetation types all have high percentages remaining. Given the highly vegetated surrounding lands and the small area proposed to be cleared the project is not considered to comprise an important ecological linkage.</p> <p>Given the above the project areas are not considered to be significant remnants in a highly cleared landscape. Therefore the project is not likely to be at variance to this Principle.</p>				
Methodology	Government of Western Australia (2011)				

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

Comments	Proposal is not likely to be at variance to this Principle
	The only watercourse or wetland mapped in the study area is the Moor River, 2km north and west of the Kings Drive intersection. Given the distance and that no riparian vegetation was noted during the site inspection the proposed project is not likely to be at variance to this Principle.
Methodology	MRWA Site Inspection (2012) Hydrography, Linear

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

Comments	Proposal is not likely to be at variance to this Principle
Methodology	<p>The project areas soils contain a majority of yellow/brown sandy type with sections containing some rocky areas (MRWA Site Inspection, 2012). There is a low to moderate risk for wind erosion and low to moderate risk for water erosion for the project area (Natural Resource Management SLIP Soil Systems, 2012). Some of the Passing Lane 2 section had a medium relief but the remainder of the project area had a low relief due to the relatively flat landscape (MRWA Site Inspection, 2012).</p> <p>Given the small size of the project area and the limited land degradation risks, the proposal is not likely to be at variance to this Principle.</p>
Methodology	MRWA Site Inspection (2012) Natural Resource Management SLIP Soil Systems (Accessed 3 July 2012)

(h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.

Comments	Proposal is not likely to be at variance to this Principle
	<p>The closest conservation area is the Gngangara-Moore River State Forest located 1.5km to the east of the project areas. Given the highly vegetation surrounding lands and the small area proposed to be cleared the project is not considered to comprise an important ecological linkage and is considered unlikely to impact on the environmental values of the nearby conservation areas.</p> <p>Therefore the project is not likely to be at variance to this Principle.</p>
Methodology	DEC 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	Proposal is not likely to be at variance to this Principle
	<p>The projects are located in the RIWI Gingin Ground Water Area. Kings Drive intersection is in the Woodridge Public Drinking Water Source Area (P3) and RIWI Moore River Surface Water Area. Due to the small amount of clearing and the highly vegetated surrounding area, it is unlikely that the groundwater will be affected by the clearing required for this project.</p> <p>The closest surface water is Moore river 2km north and west of from the project areas. The watercourse is surrounded by existing vegetation. Due to the distance and small amount of clearing it is unlikely that surface water deterioration will occur.</p> <p>Given the above it is considered not likely to be at variance to this principle.</p>
Methodology	MRWA Site Inspection (2012) Hydrography, Linear PDWSA RIWI Areas

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

Comments	Proposal is not likely to be at variance to this Principle
	Given the sandy well draining soils and thin linear section proposed to be cleared it is not likely to be at variance to this Principle.
Methodology	MRWA Site Inspection (2012)

9. ADDITIONAL ACTION REQUIRED

The following table summarizes what further assessment and management is required in accordance with MRWA State-wide vegetation Clearing Permit (CPS 818/6).

Table 4: Summary of Additional Management Actions – Indian Ocean Drive – Kings Drive Intersection and 2 Passing Lanes Upgrade.

Impact of Clearing	Yes/No or NA	Further Action Required
1. Does the assessment indicate that the clearing is may be at variance, is at variance or is seriously at variance with one or more of the principles for	No	No further action required.

Table 4: Summary of Additional Management Actions – Indian Ocean Drive – Kings Drive Intersection and 2 Passing Lanes Upgrade.

clearing?		
2. Does the assessment indicate that the clearing is at variance with one or more of the principles for clearing?	No	No further action required.
3. Does the assessment indicate that the clearing is at variance with clearing principle (g) land degradation, (i) surface or underground water quality or (j) the incidence of flooding?	No	No further action required.
4. Will the project involve clearing for purposes considered temporary in nature under Condition 13 of CPS818?	No	No further action required.

10. ENVIRONMENTAL MANAGEMENT

Main Roads WA attempts to avoid clearing vegetation if possible, where clearing cannot be avoided then this clearing is kept to a minimum. An Environmental Management Plan (EMP) has been developed to manage and minimise vegetation clearing for the Indian Ocean Drive – Kings Drive Intersection and 2 Passing Lanes Upgrade (see appendix M)

PART C

11. COMMONWEALTH ASPECTS AND IMPACTS

Table 5: Commonwealth Aspects and Impacts – Indian Ocean Drive – Kings Drive Intersection and 2 Passing Lanes Upgrade.

Aspect	Evaluation of Potential Impacts
World Heritage properties	The project will not impact any World Heritage properties i.e. <u>Shark Bay</u>
National Heritage places	A search of the Australian Heritage Places Inventory Database located no site(s) within the vicinity of the project.
Wetlands of international importance (Ramsar)	A search of the Department of Sustainability, Environment, Water, Population and Communities Protected Matters Search Tool located no Ramsar Wetland(s) within the vicinity of the project.
Nationally threatened species or ecological communities	A search of the Department of Sustainability, Environment, Water, Population and Communities Protected Matters Search Tool located no threatened ecological communities, 13 threatened species and 7 listed marine species within the vicinity of the project. The project activities are unlikely to have a significant impact on these species as the vegetation present is unlikely to be habitat for these species.
Migratory species protected under international agreements	A search of the Department of Sustainability, Environment, Water, Population and Communities Protected Matters Search Tool located 9 migratory species within the vicinity of the project. The project activities are unlikely to have a significant impact on these species as the vegetation present is unlikely to be habitat for these species.
Commonwealth marine areas	The project will not impact any Commonwealth marine area or marine protected area i.e. <u>Ningaloo Marine Park</u>
Commonwealth lands	The project is not located on and will not impact any Commonwealth lands.
Nuclear Actions	Not relevant to the proposed works.

12. DECISION TO REFER

12.1 Referral to the Department of Sustainability, Environment, Water, Population and Communities

The preliminary impact assessment determined the project does not, will not, or is not likely to have a significant impact on Matters of National Environmental Significance or impact Commonwealth land as outlined in Table 5 of the report. For this reason the project does not require referral to the Commonwealth Department of Sustainability, Environment, Water, Population and Communities.

12.2 Referral to the Environmental Protection Authority

Due to the small scale of the project, the low significance of its impacts to the surrounding environment and that it is unlikely the project will generate significant public interest, the project does not require referral to the WA Environmental Protection Authority.

13. STAKEHOLDER CONSULTATION

No Stakeholder consultation undertaken due to small size of project.

14. OTHER APPROVALS/PERMITS/LICENCES

No further approvals, permits or licences are required for this project.

15. REFERENCES

Department of Natural Resources and Environment (2002) Biodiversity Action Planning. Action planning for native biodiversity at multiple scales; catchment bioregional, landscape, local. Department of Natural Resources and Environment, Victoria.

Keighery, B. J. 1994. Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.

Government of Western Australia. (2011). 2011 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). Accessed 6 September 2012.

Natural Resource Management in WA, SLIP portal, Soils Systems – Accessed 6 September 2012. http://spatial.agric.wa.gov.au/slip/products_view.asp

Main Roads WA Site Inspection, 2012. Indian Ocean Drive, 25 June 2012.

Western Australian Herbarium (2010) Florabase - The Western Australian Flora. Department of Environment and Conservation. Available online from: <http://florabase.dec.wa.gov.au>. Accessed 26 June 2012.

OFFICER PREPARING REPORT

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9 September 2012

Appendix A

Low Impact Environmental Screening Checklist

The Low Impact Screening Checklist is part of the environmental assessment and approval process, refer to in Figure 2 in the Main Roads environmental guideline Environment Assessment and Approvals. It should be noted that the checklist does not address Aboriginal heritage issues. Please refer to Main Roads guideline *Aboriginal Heritage* for the heritage assessment process.

All projects are to be screened to identify those that are Low Impact.

Projects that have “No” to **all** items are classed as Low Impact and should be implemented using standard contract clauses in the Tender Document Process.

Projects that have “Yes” to **any** item will require further environmental assessment and will be implemented using an Environmental Management Plan.

Tick “Yes” or “No” for every item.

Project Name M045 - IOD Kings Drive and 2 Passing Lanes 43.5 to 48.7 SLK -

ITEM NO.	ITEM	Y	N
1	New road or road reserve to be created or expansion of existing road reserve.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	Works require clearing of native vegetation outside the maintenance zone.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Works require clearing of native vegetation that is older than 10 years old within the maintenance zone.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	Works to occur outside normal working hours.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5	Passes over, adjoins or drains directly into a wetland or sensitive watercourse.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6	Local natural drainage regime / hydrology will be changed.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
7	Dewatering, or a new water bore required.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8	Known potential source of hazardous materials within or adjoining project area. e.g. Acid Sulphate Soils, existing petrol station, industrial site or waste disposal site (landfill)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9	Buildings will require demolition.	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Completed By: *Signature* JWidenbar *Date* 25 June 2012
Name James Widenbar *Title* Senior Environment Officer

To be reviewed by *Signature* _____ *Date* _____
 a Main Roads Environment Officer *Name* _____ *Title* _____

Comments: _____

Appendix B

Site Inspection Report

INDIAN OCEAN DRIVE – KING DRIVE INTERSECTION 27.52 – 27.92 SLK

AND TWO PASSING LANES 43.5 – 45.8 AND 47.38 – 48.7 SLK

ATTENDEES

James Widenbar (MRWA)

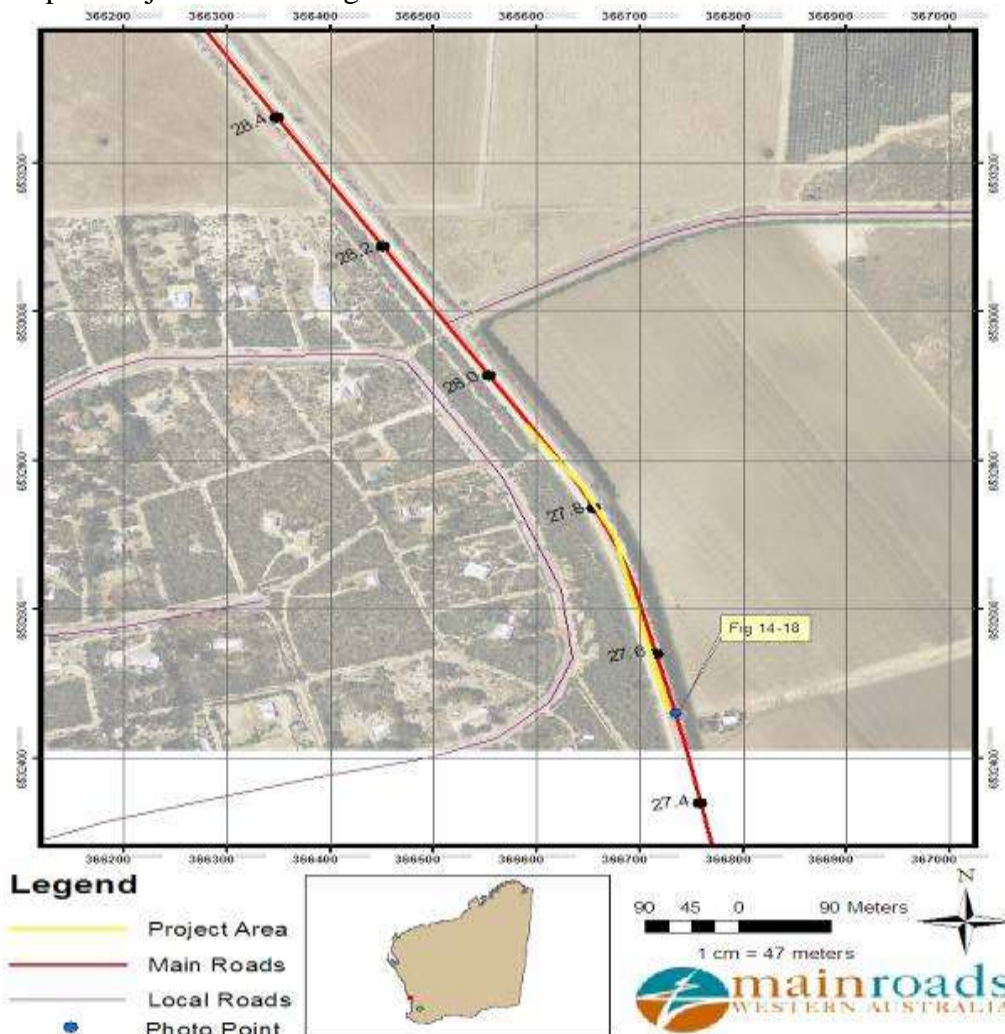
ACTIONS UNDERTAKEN

- I drove along King Drive and the two passing lanes sections and stopped at locations where the vegetation type changed.
- I traversed part of each section on foot.
- Took representative site photos.

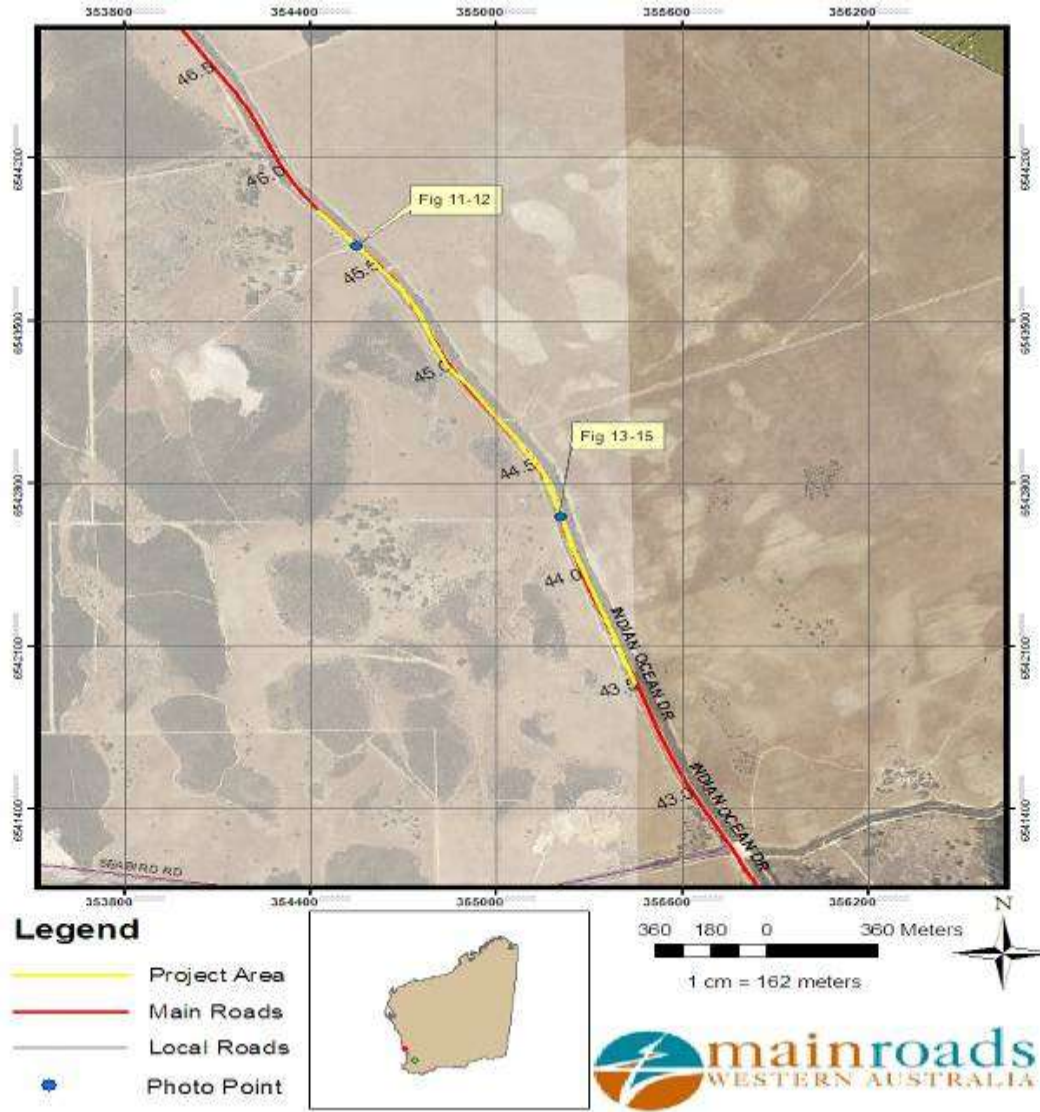
EXISTING ENVIRONMENT & INFORMATION

The project is located in the Shire of Gingin.

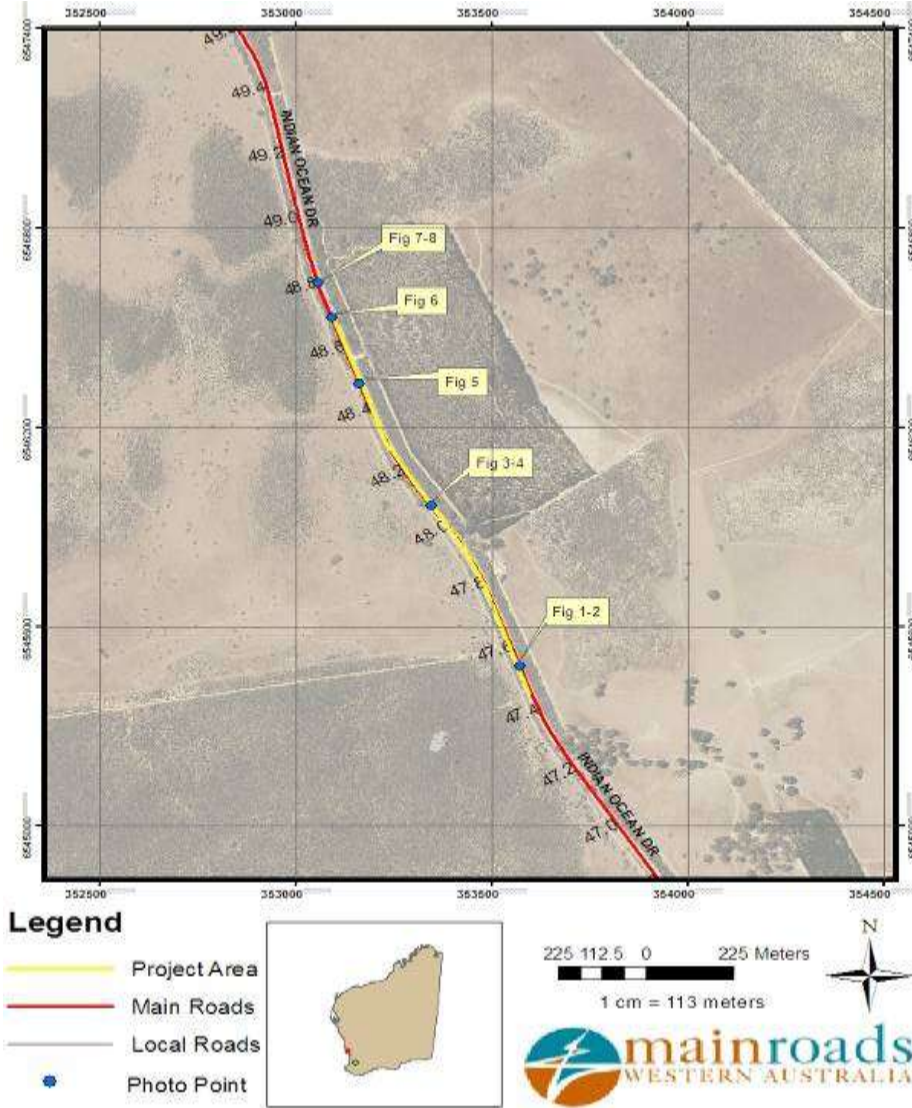
Map 1: Project Area – King Drive Intersection



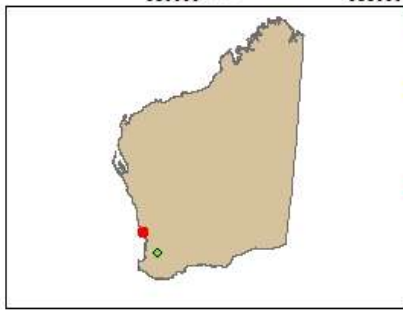
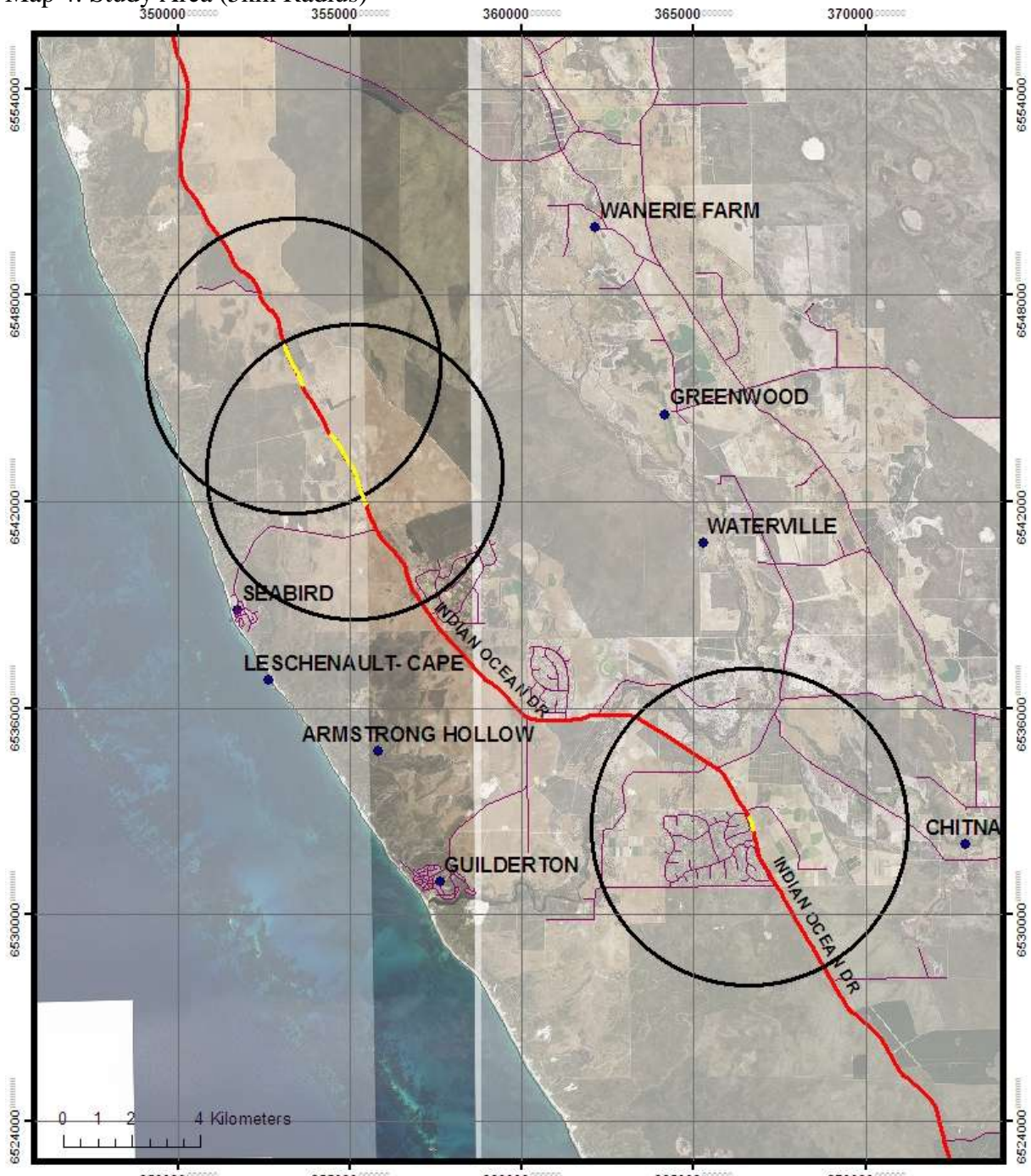
Map 2: South and North Bound Passing Lane



Map 3: North Bound Passing Lane



Map 4: Study Area (5km Radius)



- Legend**
- Project Area
 - Study Area
 - Main Roads
 - Local Roads
 - Town Name

N

1,500 1,500 Meters

1 cm = 1 km

Site description:

The mapped Beard Vegetation Association at King Drive intersection (400m long) is:

- 949 – Low woodland; Banksia.

The vegetation on the eastern side of IOD is in good (Keighery, 1994) condition with some weed infestation and on the western side of IOD it is in degraded (Keighery, 1994) condition with a heavy weed infestation. The native vegetation within the Kings Drive intersection area includes *Banksia attenuata*, *Banksia sessilis* (parrot bush), *Eucalyptus decipiens* and *Xanthorrhoea* species. There is limited evidence of natural regeneration in this area. The western side of King Drive intersection is adjacent to a strip (50-100m wide) of *Banksia attenuata* and *Banksia sessilis* woodland in good (Keighery, 1994) condition and the eastern side is adjacent to a row of pine trees and cleared agricultural land.

The mapped Beard Vegetation Association at the South Bound Passing Lane (Passing Lane 1) is:

- 949 – Low woodland; Banksia.

The native vegetation along the Passing Lane 1 (2.3km long) is in predominately excellent to good (Keighery, 1994) condition with some areas of weed infestation. The native vegetation within the Passing Lane 1 area includes *Eucalyptus todtiana* (coastal blackbutt), *Banksia attenuata*, *Banksia sessilis* (parrot bush), *Nuytsia floribunda*, *Acacia pulchella* (prickly moses), *Petrophile* species and *Xanthorrhoea* species. There is good evidence of natural regeneration in this area. Passing Lane 1 is adjacent to cleared agricultural land.

The mapped Beard Vegetation Association at the North Bound Passing Lane (Passing Lane 2) is:

- 1029 – Shrublands; scrub-heath dryandra-calothamnus association with *Banksia prionotes* on limestone in the northern Swan Region.

The native vegetation along the Passing Lane 2 (1.3km long) is in predominately degraded to good (Keighery, 1994) condition with some areas of heavy weed infestation. The native vegetation within the Passing Lane 2 area includes *Eucalyptus todtiana* (coastal blackbutt), *Eucalyptus gomphocephala* (Tuart), *Banksia attenuata*, *Banksia sessilis* (parrot bush), *Nuytsia floribunda*, *Hakea trifurcata*, *Acacia pulchella* (prickly moses), *Acacia cyclops*, *Petrophile* species and *Xanthorrhoea* species. There is some evidence of natural regeneration in this area. The majority of Passing Lane 2 is adjacent to cleared agricultural land with a small north east section adjacent to native bushland.

- Nil fauna observations.
- Nil Rare flora observations.
- The project area structure was comprised of both mature and juvenile *Banksia* trees with signs of natural regeneration in both the upper storey and mid to lower storey.
- Vegetation Community was predominately a closed *Banksia* Woodland with areas of shrubland. The project area had moderate plant diversity but no riparian vegetation.
- Soil characteristics – majority of soils are a yellow/brown sandy type with sections containing some rocky areas (low to high risk for wind erosion and low to moderate risk for water erosion)
- Landforms – Some of the Passing Lane 2 area had a medium relief but the remainder of the project area had a low relief due to the relatively flat undulating landscape.
- Hydrology – No streams/wetlands were present
- The project area as a whole provides limited ecological connectivity at the landscape level.
- The study area is well vegetated with approximately 70% remaining vegetated.
- Disturbance/Impacts – Moderate to heavy level of weed invasion along the degraded sections of project area.

Avoidance / Minimise Clearing:

How have the clearing impacts been minimised?

- The current road alignment was chosen to avoid several sections that contained areas of Banksia woodland in excellent to good (Keighery, 1994) condition.

Site Photos



Fig 1. Looking south in Passing Lane 2. Shrubland in degraded (Keighery, 1994) condition. Understorey included, *Acacia pulchella* (prickly moses), *Petrophile* and *Xanthorrhoea* species. Moderate weed presence.



Fig 2. Looking north in Passing Lane 2. Scattered *Eucalyptus tottiana* trees present. Understorey included, *Acacia pulchella* (prickly moses), *Petrophile* and *Xanthorrhoea* species. Moderate weed presence.



Fig 3. Looking south in Passing Lane 2. Completely degraded (Keighery, 1994) condition native vegetation. Heavy weed presence



Fig 4. Looking north in Passing Lane 2. Stand of *Eucalyptus gomphocephala* (tuart) trees. Understorey includes *Petrophile* and *Xanthorrhoea* species. Moderate weed presence.



Fig 5. Looking south in Passing Lane 2. Area in completely degraded (Keighery, 1994) condition. Scattered *Eucalyptus tottiana* (blackbutt) trees. Understorey includes Petrophile species. Heavy weed presence.



Fig 6. Looking south in Passing Lane 2. Area in good (Keighery, 1994) condition. Contains *Banksia attenuata*, *Banksia sessilis* (parrot bush), *Macrozamia riedlei* and Petrophile species. Limited weed presences.



Fig 7. Looking south in Passing Lane 2. *Eucalyptus gomphocephala* (Tuart), *Eucalyptus tottiana* (blackbutt), *Banksia sessilis* (parrot bush), *Macrozamia riedlei* and Petrophile and Xanthorrhoea species. Moderate weed presence.



Fig 8. Looking north in Passing Lane 2. Area in good to excellent (Keighery, 1994) condition. Area represents a Eucalyptus and Banksia woodland consisting of *Eucalyptus tottiana* (blackbutt), *Banksia sessilis* (parrot bush), *Macrozamia riedlei* and Petrophile and Xanthorrhoea species. Limited weed presence.



Fig 9. Looking north in Passing Lane 1. Area in predominately excellent (Keighery, 1994) condition. Area represents Banksia woodland consisting of *Banksia attenuata*, *Banksia sessilis* (parrot bush), *Eucalyptus tottiana*, *Macrozamia riedlei* *Acacia pulchella* (prickly moses), and Petrophile and Xanthorrhoea species. Limited weed presence.

Fig 10. Looking north in Passing Lane 1. Area in predominately excellent (Keighery, 1994) condition. Area represents Banksia woodland consisting of *Banksia attenuata*, *Banksia sessilis* (parrot bush), *Eucalyptus tottiana*, *Macrozamia riedlei* *Acacia pulchella* (prickly moses), and Petrophile and Xanthorrhoea species. Limited weed presence.



Fig 11. Looking north in Passing Lane 1. Area in predominately excellent (Keighery, 1994) condition. Area represents Banksia woodland consisting of *Banksia attenuata*, *Banksia sessilis* (parrot bush), *Eucalyptus todtiana*, *Macrozamia riedlei* *Acacia pulchella* (prickly moses), and *Petrophile* and *Xanthorrhoea* species. Limited weed presence.



Fig 12. Looking north in Passing Lane 1. Area in predominately excellent (Keighery, 1994) condition. Area represents Banksia woodland consisting of *Banksia attenuata*, *Banksia sessilis* (parrot bush), *Eucalyptus todtiana*, *Macrozamia riedlei* *Acacia pulchella* (prickly moses), and *Petrophile* and *Xanthorrhoea* species. Limited weed presence.



Fig 13. Looking north in Passing Lane 1. Area in predominately excellent (Keighery, 1994) condition. Area represents Banksia woodland consisting of *Banksia attenuata*, *Banksia sessilis* (parrot bush), *Eucalyptus todtiana*, *Macrozamia riedlei* *Acacia pulchella* (prickly moses), and *Petrophile* and *Xanthorrhoea* species. Limited weed presence.



Fig 14. Looking south to Kings Drive. This area is not being cleared. This area has been avoided due to its good (Keighery, 1994) condition.



Fig 15. Looking north from eastern side of Kings Drive. Area in degraded (Keighery, 1994) condition. Native vegetation includes *Banksia attenuata*, *Banksia sessilis* (parrot bush), *Eucalyptus decipiens* and *Xanthorrhoea* species.



Fig 16. Looking north from eastern side of Kings Drive. Area in degraded (Keighery, 1994) condition. Native vegetation includes *Banksia attenuata*, *Banksia sessilis* (parrot bush), *Eucalyptus decipiens* and *Xanthorrhoea* species.



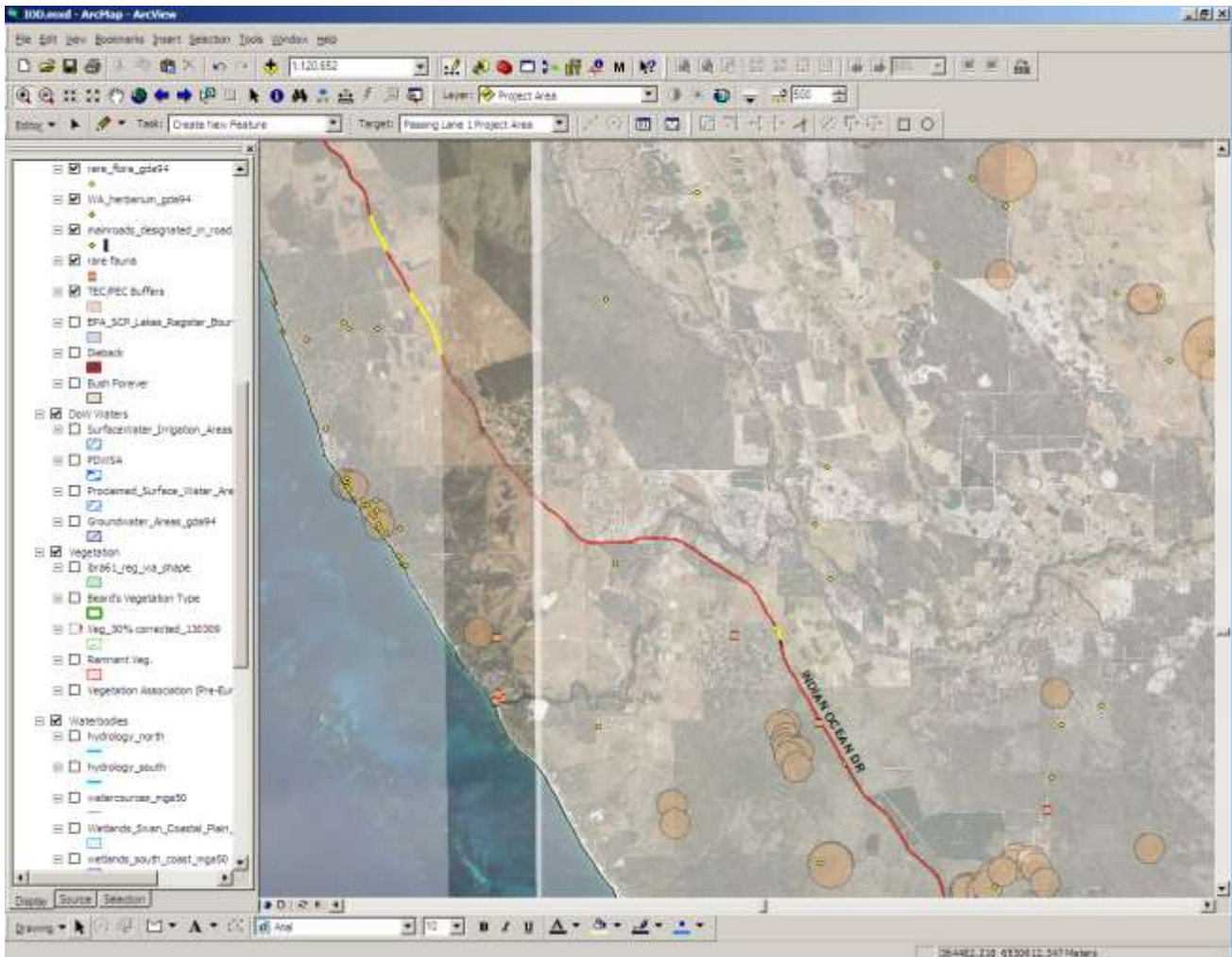
Fig 17. Looking north on western side of Kings Drive. Area in completely degraded (Keighery, 1994) condition. Heavy weed presence. Adjacent to *Banksia attenuata* and *Banksia sessilis* woodland.



Fig 18. Looking north on western side of Kings Drive. Area in completely degraded (Keighery, 1994) condition. Heavy weed presence.

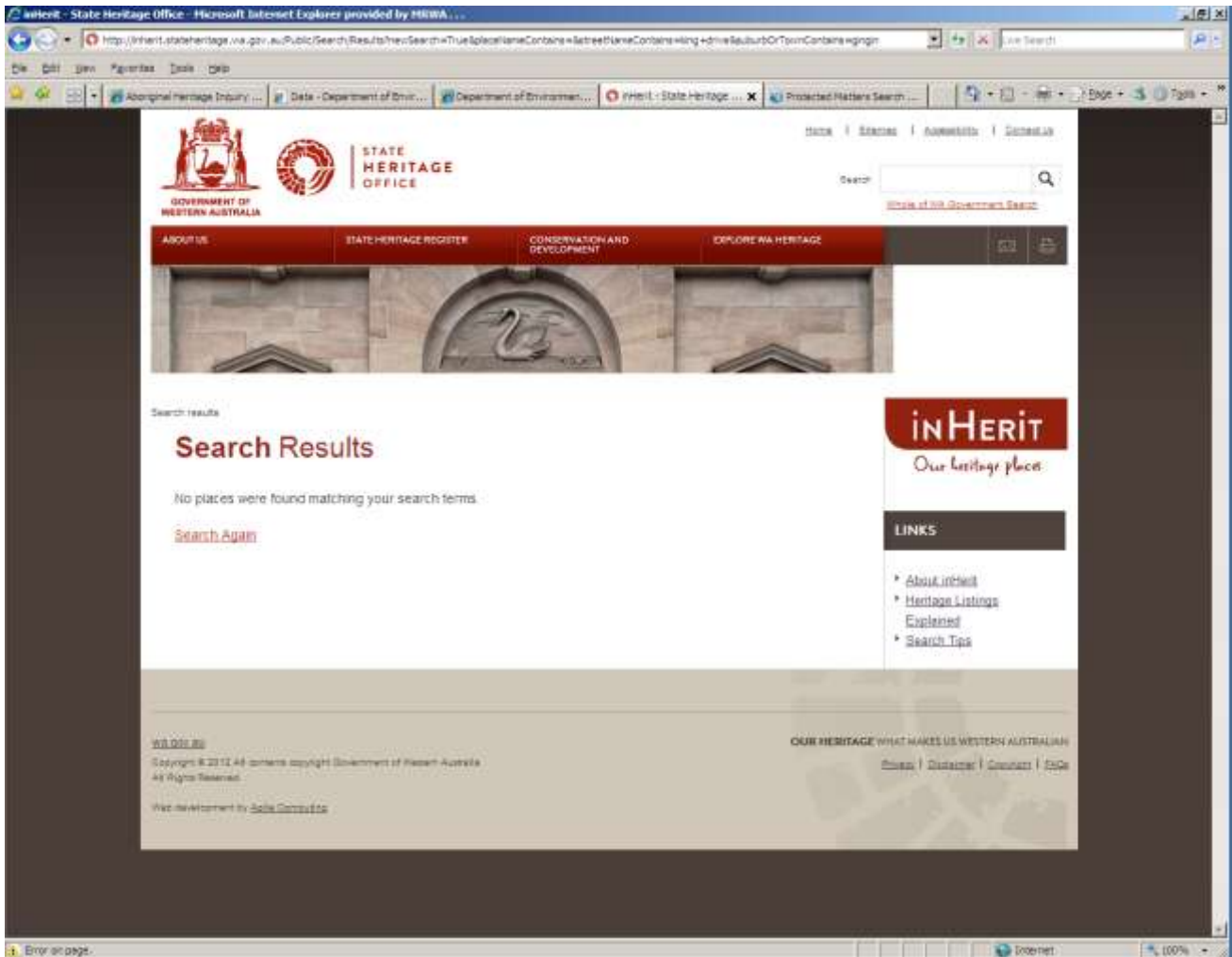
Appendix C

DEC Threatened Flora and Fauna Database Searches



Appendix D

Australian Heritage Places Inventory, Heritage Council of Western Australia and the Municipal Heritage Inventory Database Searches



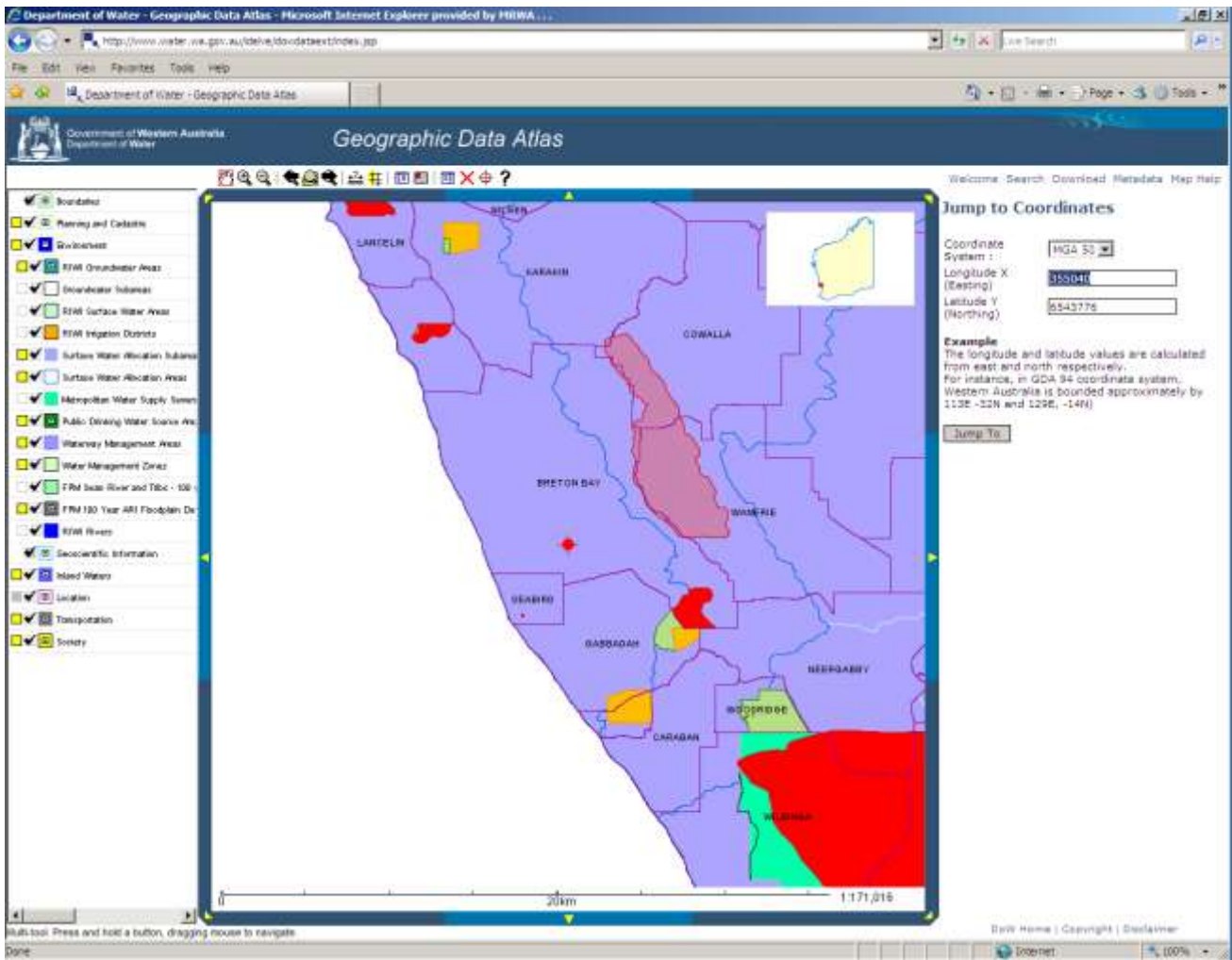
Appendix E

Department of Indigenous Affairs Database Search

The screenshot displays the 'Aboriginal Heritage Inquiry System' web application. The browser address bar shows the URL: <http://www.dia.wa.gov.au/WIS/default.aspx>. The page header includes the Government of Western Australia logo and the title 'Aboriginal Heritage Inquiry System'. Below the header, there is a search bar and navigation links for 'Search', 'Metadata', 'Feedback', and 'DIA Home'. The main content area features a map of the Moore River region, showing various heritage sites and surveys. The map is overlaid with a grid and includes a legend on the left side. The legend has two sections: 'Show on map' with checkboxes for 'Aboriginal Sites' and 'Heritage Surveys', and 'Map size' with radio buttons for 'Small', 'Medium', and 'Large'. The map itself shows the Moore River, Breton Bay, and the town of Moore. Various sites are marked with colored polygons and labels, such as 'Yakurrup Pool', 'Copalup Pool', 'Burringurr Swamps', 'Warrakooloo Pool', 'Redfield Dam', 'Sovereign Hill', and 'Neerjalia'. The map also shows the coastline, including Cape Levecke and Cape Levecke Point. Below the map, there is a coordinate display section with fields for 'Street', 'State', 'Latitude', 'Longitude', 'Northing', 'Easting', and 'Zone'. The footer of the page includes the text: 'Topographic base data provided by Commonwealth of Australia, Resurgence Agency (2012)'. The browser's status bar at the bottom shows the page is loaded from 'inetnet' and is at 100% zoom.

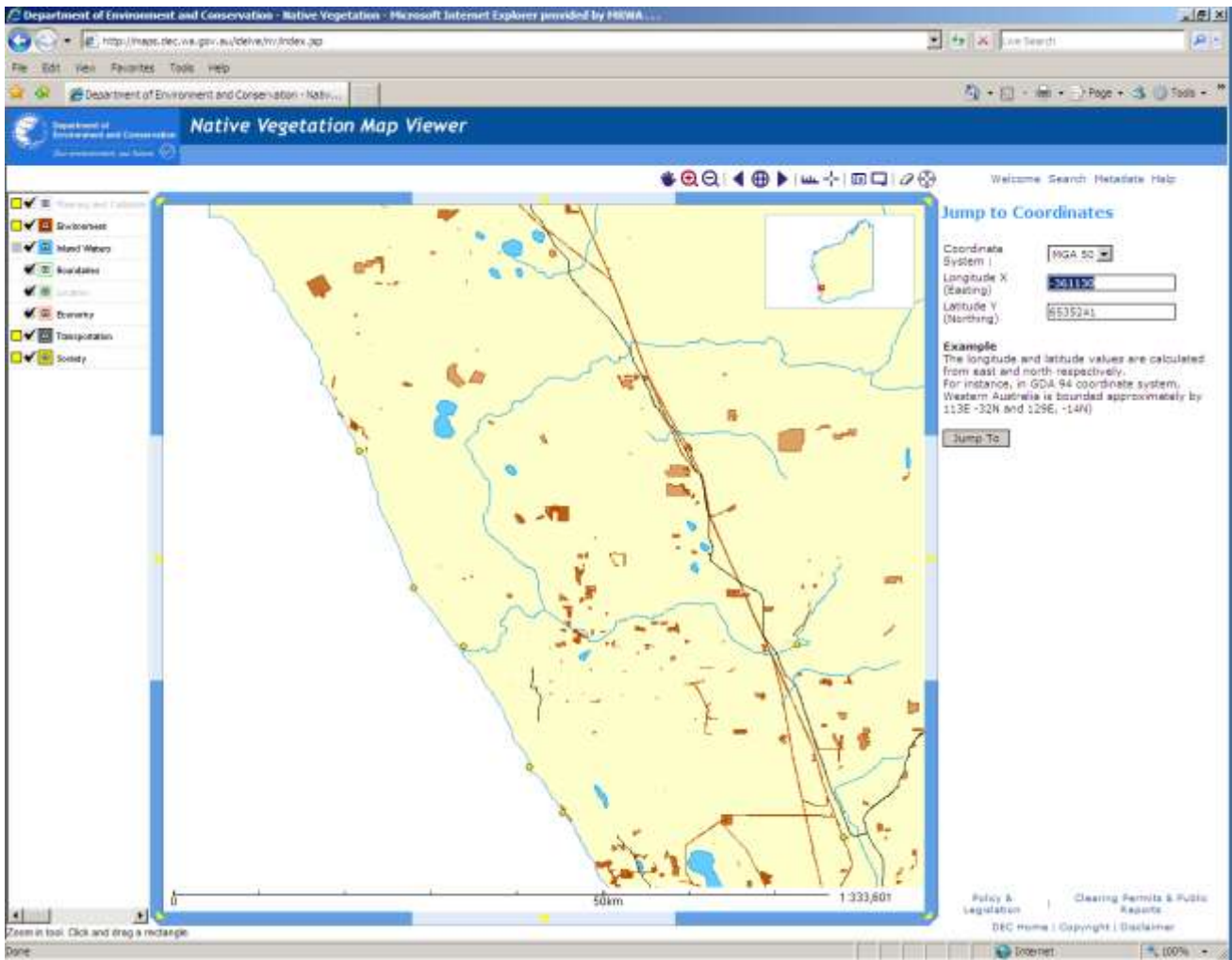
Appendix F

DoW Geographic Data Atlas Database Search



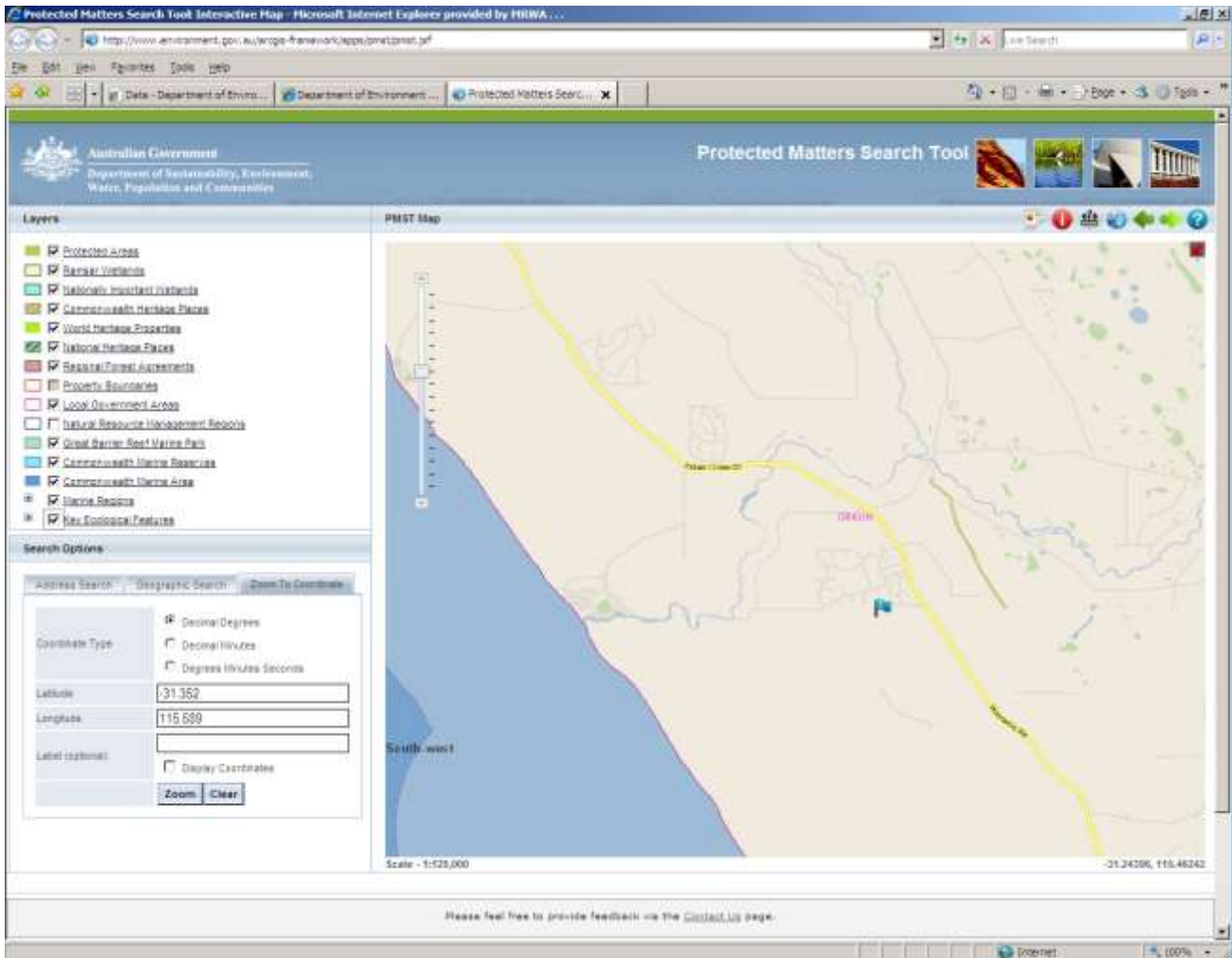
Appendix G

DEC Native Vegetation Map Viewer Database Search



Appendix H

DSEWPC Database Search



Appendix I

Department of Agriculture & Food Advice on Declared Weeds

NA

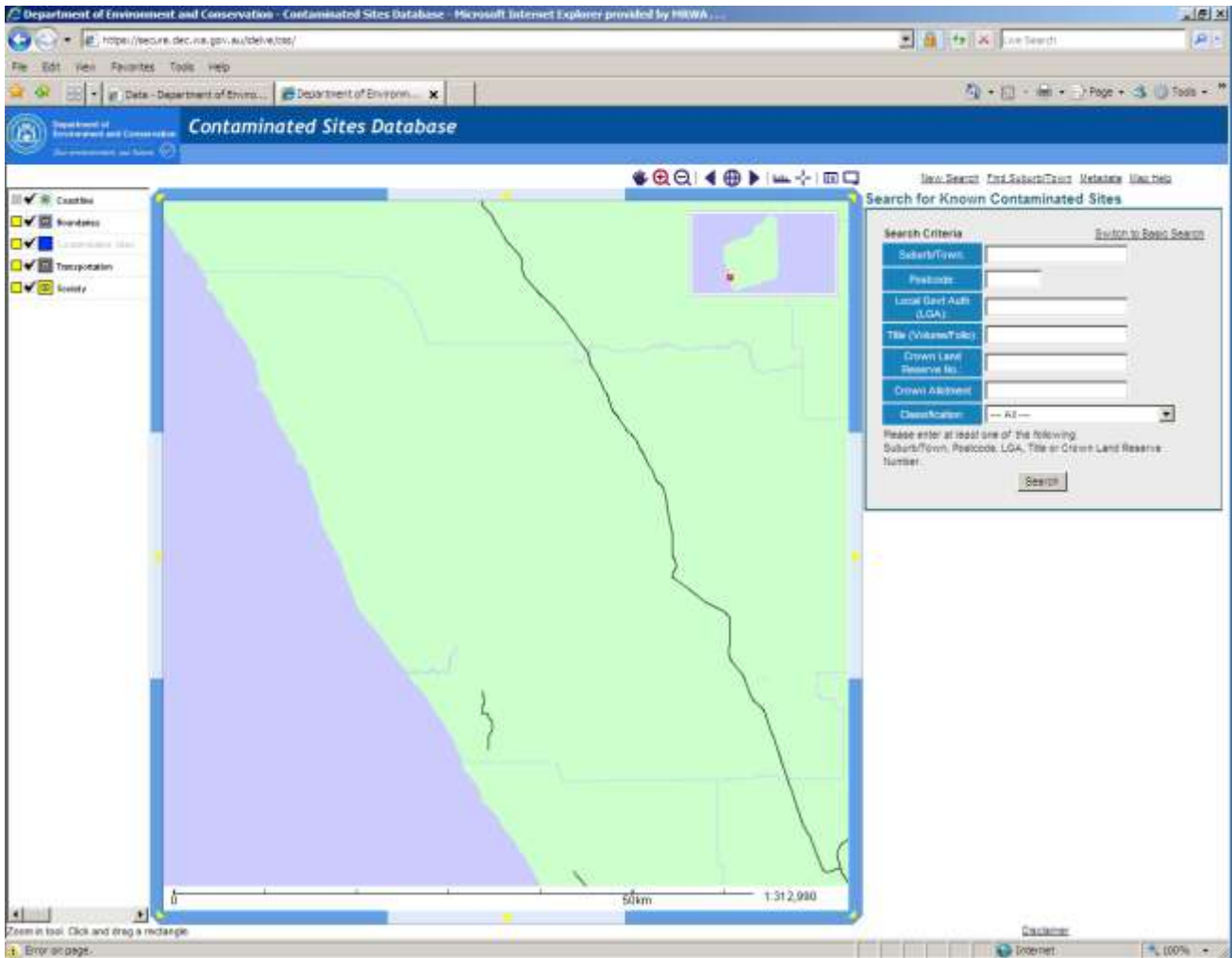
Appendix J

Dieback Consultant / DEC Advice on Dieback

NA

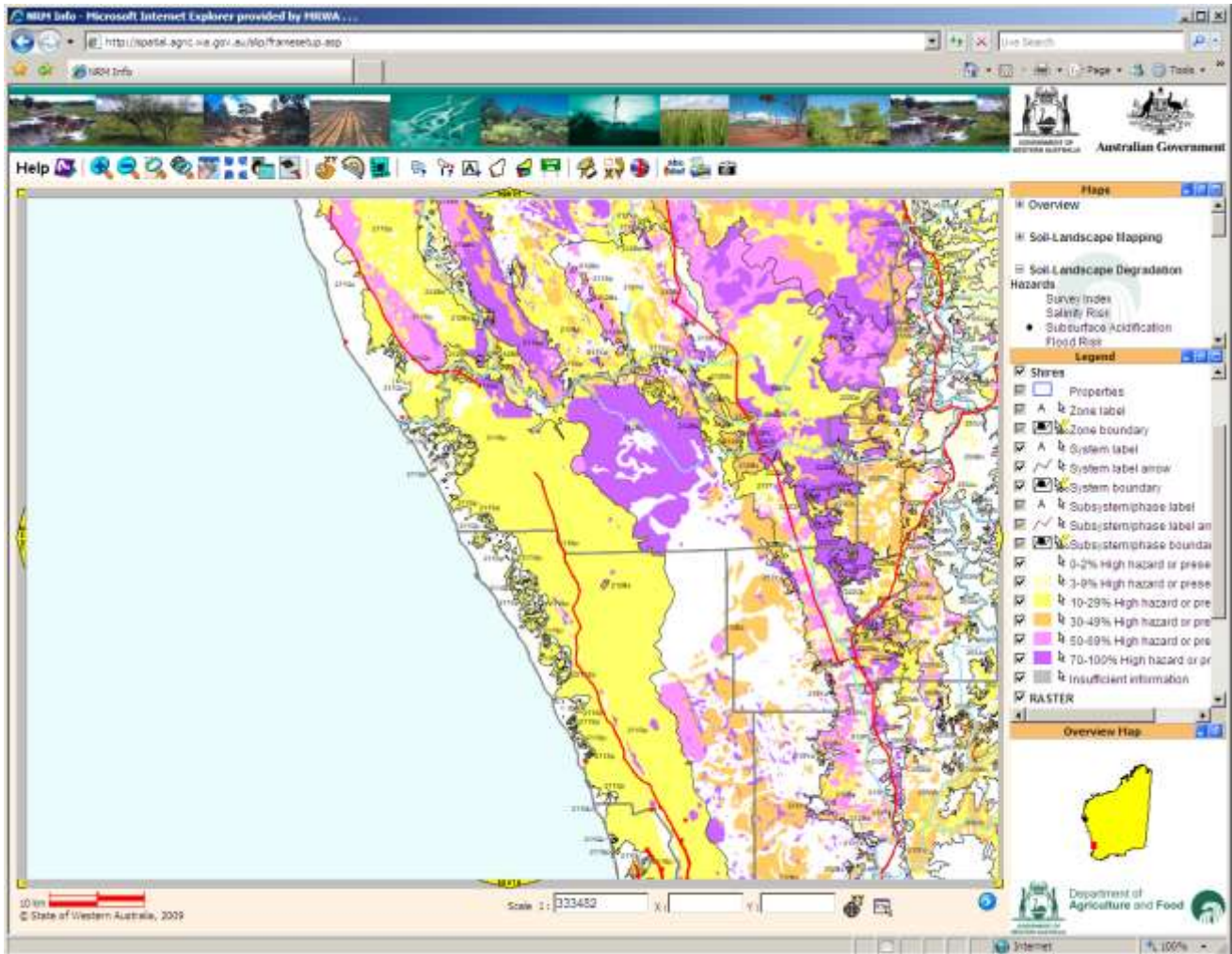
Appendix K

DEC Contaminated Sites Database Search



Appendix L

Acid Sulfate Soils Mapping



Appendix M

Environmental Management Plan

M045 INDIAN OCEAN DRIVE – KINGS DRIVE INTERSECTION AND 2 PASSING LANES UPGRADE

Introduction

This Environmental Management Plan (EMP) has been developed for the project area following the completion of the Preliminary Environmental Impact Assessment (PEIA) report. The aim of this EMP is to minimise the environmental impacts associated with the proposed works as well as to identify areas of responsibilities required for the implementation of management strategies.

This EMP addresses specific issues that were identified during the PEIA. The project management measures identified within this EMP are in addition to the standard environmental management contract specifications used for Category 2 projects. Main Roads' standard environmental contract specifications (Specifications 203, 204, 301, 302 and 304) are to be adhered to where appropriate.

It is critical that all clearing works are carried out in accordance with the management measures prescribed in Specifications 301 (Clearing) and 302 (Earthworks). Also note that all revegetation works should be carried out in accordance with the Main Roads Environmental Guideline Revegetation Planning and Techniques.

The areas that require special management will be addressed in terms of:

- the timing of the various management actions;
- the topic (e.g. vegetation);
- the objectives for each area;
- the actions that are necessary to minimise the impact;
- the responsible party for implementing the action; and
- whether the action arose from external advice or is a Main Roads requirement.

Communication Plan

Environmental issues specific to the project will be communicated as follows.

Method	Frequency	Participants	Reference	Record
Project Site				
Induction	Prior to Work	All personnel and subcontractors	EMP and Contractor Environmental Policy	Induction Meeting
Toolbox Meetings	Weekly	Project Personnel	Contractor Safety Plan	Minutes of Meeting
Authority Consultation				
Department of Environment and Conservation	As required	Main Roads' Project Manager and Contractor Project Manager	-	Minutes of meeting

External Communication and Complaints

A complaints register shall be maintained by the contractor. All complaints received shall be forwarded to the Main Roads' Project Manager for action. Serious complaints shall be investigated within 24 hours of the complaint being received.

Monitoring

After project completion and project handover, the Asset manager should develop a monitoring program to monitor for those aspects that have been identified as requiring monitoring.

Contingency Measures

Due to the scale and nature of the project, no contingency measures are identified as the inherent environmental risks are small.

Auditing

Due to the scale and nature of the project, there is no requirement for auditing the implementation of the EMP as the environmental risks are small.

ENVIRONMENTAL MANAGEMENT PLAN					
Timing	Topic	Objective	Action	Responsible Party	Advice
All phases of Construction	Vegetation Clearing - Record-keeping	All projects should maintain the required records relating to clearing native vegetation under the purpose permit.	Clearing: <ul style="list-style-type: none"> a copy of the PEIA & EMP (Minor projects) for small projects; a map showing the location where the clearing occurred, recorded in an ESRI Shapefile (<i>if below 0.5 ha, a single coordinate is sufficient</i>); the size of the area cleared (in hectares); and the dates on which the clearing was done. 	Project Manager	DEC
All phases of Construction	Vegetation Clearing - Record-keeping	All projects should maintain the required records relating to clearing native vegetation under the purpose permit.	Control of weeds, dieback and other pathogens: <ul style="list-style-type: none"> a copy of any management plan prepared; and for any pathogen other than dieback, the appropriate steps taken. 	Project Manager	Main Roads
Pre - Construction	Visual Amenity	Ensure that road blends into environment.	Develop design documentation to meet project requirements as identified in the visual impact assessment.	Project Manager	Main Roads
Pre-Construction	Vegetation Clearing	Ensure that the overall objectives of the alignment and construction works are compatible with maintaining and, where possible, enhancing the biological integrity of the surrounding environment and minimising vegetation loss and degradation; and Ensure the retention of as many habitat trees, shrubs and vegetated corridors for fauna as possible, particularly where associated with riparian zones.	Selection of designs/locations that minimise adverse impacts on the biological environment.	Project Manager	Main Roads
			Construction works to be undertaken in summer to reduce the potential for soil erosion and drainage line siltation due to vegetation removal and heavy rains.	Project Manager	Main Roads
			Control/spray weeds species within the project area prior to construction to limit the amount of propagative material that may be spread during disturbance.	Contractor	Main Roads
			Any stockpiled vegetation from clearing works shall not be burnt. This vegetation shall be used during any rehabilitation works and either mulched or respread according to the TDP/Revegetation Plan.	Contractor	Main Roads
Pre - Construction	Vegetation Clearing - CPS 818/6 management requirements	Compliance with management conditions of purpose permit.	If clearing is pursuant to Main Purpose Permit (CPS818) ensure compliance with Section 14 of the permit relating to Dieback, other pathogen and weed control.	Contractor/Project Manager	DEC
Pre-Construction	Surface Drainage	Maintain the hydrological regime that exists prior to the construction of the proposal.	Stormwater drainage shall be treated and disposed of in accordance with DEC requirements.	Project Manager	DEC
Construction	Noise, Vibration and Dust	Ensure that the construction of the proposal does not become a nuisance to the public.	Access to private property and appropriate traffic management measures should be planned and implemented prior to the construction of works.	Contractor	Main Roads
			Pedestrian public access should be should be planned and implemented prior to the construction of works.	Contractor	Main Roads

ENVIRONMENTAL MANAGEMENT PLAN					
Timing	Topic	Objective	Action	Responsible Party	Advice
			Any complaints regarding dust will be attended to as soon as possible.	Contractor/Project Manager	Main Roads
			Where it is found that trucks leaving the site are carrying excessive material onto sealed surfaces, these areas will be swept to reduce dust generation and maintain traffic safety.	Contractor	Main Roads
			Watering, the use of hydromulch or other forms of mulching to protect loose surfaces shall be used as mitigation measures.	Contractor	Main Roads
Construction	Pollution and Litter	Ensure that the construction of the proposal is managed to a standard that minimises any adverse impacts on the environment.	The designated servicing area will be bunded to contain any spills or leaks and shall not be located in an area adjacent to any drainage areas or watercourses or will drain into a temporary sump.	Contractor	Main Roads
			Temporary storage of bitumen, asphalt, concrete or aggregate should only occur at designated depots or controlled hardstands. Precoating of aggregate will only occur in approved areas.	Contractor	Main Roads
			Emergency cleanup procedures shall be implemented in the case of any spillage. These will include control of spilled material and removal of contaminated soil to an approved site. The contractor shall ensure appropriate equipment is available at all times and shall notify the Superintendent's Representative of a spill.	Contractor	Main Roads
			All waste oil will be collected for recycling and any empty fuel/oil containers, used filters and waste hydraulic parts to be collected and stored in an allocated area then removed to an approved site.	Contractor	Main Roads
			The project areas, including hardstand areas, will be kept in a tidy manner at all times.	Contractor	Main Roads
Construction	Fire	Ensure that the fire risk associated with the construction of the proposal is minimised.	No fires shall be lit within the project area.	Contractor	Main Roads
			Machinery will be fitted with approved spark arresting mufflers.	Contractor	Main Roads
			A water tanker/fire fighter unit will be on site at all times.	Contractor	Main Roads
Construction	Fauna	Avoid unnecessary impacts to fauna and damage to fauna habitat.	Fauna are not to be fed or intentionally harmed.	Contractor	Main Roads
			No pets or firearms permitted on site.	Contractor	Main Roads
			The WILDCARE Helpline is to be contacted, 9474 9055, in the event of sick, injured or orphaned native wildlife on the site.	Contractor	Main Roads
Construction	Site Management	Ensure that the site is managed to ensure that construction of the proposal will have minimal impact upon the surrounding environment.	Site office and materials storage areas will be located on previously disturbed/ designated area.	Contractor	Main Roads
Construction	Rehabilitation	Rehabilitate the project area to meet project commitments.	Implement the contract specifications for rehabilitation of the site.	Contractor	Main Roads
			All waste materials from the development are to be completely removed from the site upon completion of the project. Final clean-up shall be to the satisfaction of the Project Manager and the Site Superintendent.	Contractor	Main Roads

