



**ENVIRONMENTAL IMPACT ASSESSMENT AND  
ENVIRONMENTAL MANAGEMENT PLAN**

**Narrogin-Kondinin Road Widening (M038) 70.0 – 76.54 SLK**

**January 2012**

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Revision	Prepared by	Date	Reviewed by	Date
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## CONTENTS

<b>SUMMARY .....</b>	<b>4</b>
<b>1. BACKGROUND.....</b>	<b>5</b>
<b>2. DESCRIPTION OF THE PROJECT .....</b>	<b>5</b>
2.1 PROJECT LOCATION.....	5
<b>3. METHODOLOGY .....</b>	<b>6</b>
3.1 DESKTOP STUDY .....	6
3.2 COMMONWEALTH REFERRAL.....	7
3.3 STATE REFERRAL .....	7
<b>4. EXISTING ENVIRONMENT .....</b>	<b>7</b>
4.1 DESCRIPTION .....	7
4.2 SITE INVESTIGATION .....	7
<b>5. CLEARING OF NATIVE VEGETATION .....</b>	<b>9</b>
5.1 DETAILS OF VEGETATION ASSOCIATIONS TO BE CLEARED .....	9
5.2 ASSESSMENT AGAINST CLEARING PRINCIPLES .....	10
5.3 SUMMARY OF MANAGEMENT ACTIONS .....	12
5.4 SUMMARY OF STAKEHOLDER SUBMISSIONS RECEIVED .....	12
5.5 SUMMARY OF OFFSET PROPOSAL.....	13
<b>6. ASSESSMENT OF ASPECTS AND IMPACTS .....</b>	<b>16</b>
<b>7. DECISION TO REFER.....</b>	<b>19</b>
7.1 REFERRAL TO THE DEPARTMENT OF SUSTAINABILITY, ENVIRONMENT, WATER, POPULATION AND COMMUNITIES .....	19
7.2 REFERRAL TO THE ENVIRONMENTAL PROTECTION AUTHORITY .....	19
<b>8. STAKEHOLDER CONSULTATION.....</b>	<b>19</b>
<b>9. OTHER APPROVALS/PERMITS/LICENCES.....</b>	<b>19</b>
<b>10. REFERENCES.....</b>	<b>19</b>
<b>APPENDIX A LOW IMPACT ENVIRONMENTAL SCREENING CHECKLIST .....</b>	<b>20</b>
<b>APPENDIX B DEC THREATENED FLORA, FAUNA AND CONSERVATION AREAS GIS SEARCH.....</b>	<b>22</b>
<b>APPENDIX C AUSTRALIAN HERITAGE PLACES INVENTORY AND HERITAGE COUNCIL OF WESTERN AUSTRALIA DATABASE SEARCHES .....</b>	<b>24</b>
<b>APPENDIX D DEPARTMENT OF INDIGENOUS AFFAIRS DATABASE SEARCH.....</b>	<b>27</b>
<b>APPENDIX E DOW GEOGRAPHIC DATA ATLAS DATABASE SEARCH .....</b>	<b>29</b>
<b>APPENDIX F DEC NATIVE VEGETATION MAP VIEWER DATABASE SEARCH .....</b>	<b>31</b>
<b>APPENDIX G DSEWPC DATABASE SEARCH.....</b>	<b>33</b>
<b>APPENDIX H DEC CONTAMINATED SITES DATABASE SEARCH .....</b>	<b>39</b>
<b>APPENDIX I ACID SULFATE SOILS MAPPING.....</b>	<b>41</b>
<b>APPENDIX J SITE PHOTOS.....</b>	<b>43</b>
<b>APPENDIX K CPS 818 SOIL &amp; LAND STAKEHOLDER CORRESPONDENCE .....</b>	<b>45</b>
<b>APPENDIX L CPS 818 DEC STAKEHOLDER CORRESPONDENCE .....</b>	<b>47</b>
<b>APPENDIX M CPS 818 DEC OFFSET APPROVAL.....</b>	<b>49</b>
<b>APPENDIX N ENVIRONMENTAL MANAGEMENT PLAN .....</b>	<b>51</b>
<b>APPENDIX O REVEGETATION (OFFSET) PLAN .....</b>	<b>56</b>

## **SUMMARY**

The project involves widening the Narrogin-Kondinin Road between 70.0 to 76.54 SLK.

Clearing native vegetation is the main environmental impact of the project with 0.6 ha to be cleared. This clearing will be undertaken using Main Roads' clearing permit CPS 818 and is at variance with the 10 clearing principles.

Due to variance with the ten clearing principles stakeholder consultation has occurred as per Part II, Section 8 of CPS 818/5 and following this an offset has been approved by the CEO of the Department of Environment and Conservation for this project.

No other clearances, permits or further studies are required.

# ENVIRONMENTAL IMPACT ASSESSMENT AND ENVIRONMENTAL MANAGEMENT PLAN

## Narrogin-Kondinin Road Widening

### 1. BACKGROUND

The widening of the Narrogin-Kondinin Road will create a safer road and roadside environment for motorists. The road is one of Main Roads' last narrow seal sections in the Wheatbelt South region and also a designated road train route in urgent need of the proposed road improvements. This upgrade will tie in with other previous projects that have widened this road at various sections.

Following Main Roads' corporate Environmental Assessment and Approval process, an initial 'Low Impact Environmental Screening Checklist' was completed for the proposal. The checklist determined that the project required further environmental assessment resulting in the preparation of a Preliminary Environmental Impact Assessment (PEIA). Following this PEIA under Part II, item 7(d) of Main Roads' Clearing Permit CPS 818 a Environmental Impact Assessment (EIA) was required, this report fulfills this requirement

### 2. DESCRIPTION OF THE PROJECT

Widening of the existing seal will take place on both sides of the road with a slight shift of the centreline to the north side as a water pipeline runs parallel with the road on the south side of the road. Gravel will be sourced from nearby previously cleared farmland with the works occurring during summer.

#### 2.1 Project Location

The location for the project is shown on Figure 1 with the boundaries of the study area being 100 m either side of the road centreline.



Figure 1 – Project Location and Study Area

### **3. METHODOLOGY**

#### **3.1 Desktop Study**

An assessment of the project area and the potential constraints of the proposal was undertaken by reviewing a number of government agency managed databases and viewing GIS shapefiles where necessary.

##### **3.1.1 Threatened Flora, Fauna & Communities, Conservation Reserves and ESAs**

Current GIS shapefiles provided to Main Roads by the DEC were examined for known populations of threatened flora, fauna, Threatened Ecological Communities (TECs) or conservation areas located within the vicinity of the works, refer to Appendix B.

##### **3.1.2 Heritage**

Non-indigenous heritage was examined utilising the Australian Heritage Places Inventory (<http://www.environment.gov.au/heritage/places/wa/index.html>) and the Heritage Council of Western Australia Places Database (<http://register.heritage.wa.gov.au/>), refer to Appendix C.

##### **3.1.3 Aboriginal Heritage**

A search of the Department of Indigenous Affairs' (DIA's) (<http://dia.wa.gov.au/AHIS/>) database was undertaken to determine whether the project area contains any sites of Aboriginal Heritage, refer to Appendix D.

##### **3.1.4 Sensitive Water Resources**

A search of the Department of Water's (DoW's) database was undertaken (<http://www.water.wa.gov.au/idelve/dowdataext/index.jsp>) to determine whether the project area contains any sensitive water resources (including Public Drinking Water Source Areas or Water Pollution Control Areas) or adjacent to any significant lakes, rivers, wetlands or located in proclaimed areas, refer to Appendix E.

##### **3.1.5 Wetlands**

The locations of any wetlands within the project area was determined using the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (DSEWPC) mapping tool, the Department of Environment and Conservation (DEC) "Native Vegetation Map Viewer" mapping tool and viewing current GIS shapefiles, refer to Appendix F.

##### **3.1.6 Weeds**

A site inspection was carried out to identify any declared plants or significant weeds in or adjacent to the project area, refer to site photos Appendix J.

##### **3.1.7 Dieback**

As the project receives <400 mm of rain dieback is considered not to be an issue.

##### **3.1.8 Contaminated Sites**

A search of the DEC's contaminated sites database was undertaken (<https://secure.dec.wa.gov.au/idelve/css/>) to determine whether the project area contains or is adjacent to any contaminated sites, refer Appendix H.

### 3.1.9 Acid Sulfate Soils

The project is outside the DEC's acid sulfate soils maps, refer Appendix I, (<https://uat2.landgate.wa.gov.au/bmvf/app/waatlas/>), a site inspection was used to determine the level of risk for the project.

### 3.1.10 Air Quality

The need for a local air quality assessment was determined using the criteria outlined in the MRWA Environmental Guideline, Air Quality.

## 3.2 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: (<http://www.environment.gov.au/erin/ert/epbc/index.html>) was used to establish if any matters of national significance exist in the immediate area. This was followed by a site visit to determine if they will be significantly impacted by the project. Refer to Appendix G for the results of this search and Section 7 for a discussion on the findings.

## 3.3 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*.

## 4. EXISTING ENVIRONMENT

### 4.1 Description

The vegetation along this section of the Narrogin-Kondinin Road is heavily altered and contains an overstorey mix of Wandoo, Salmon and York Gum, scattered Jam trees with a degraded and weedy understory. Although the work does cross low lying saline areas there is no riparian vegetation to be cleared.

### 4.2 Site Investigation

A site visit was carried out by Nigel Rowe & Peter Denton on the 11<sup>th</sup> of May 2011 to examine the general features of the area. The broad vegetation types in the vicinity of the project area were identified. Other issues that were considered included topography, the impacts on creek lines, property access and if further studies are required. Site photos were taken and are included in Appendix J.

**Table 1: Narrogin-Kondinin Road Species in the Immediate Area**

Species	Common Name
<i>Acacia acuminata</i>	Jam
<i>Acacia microbotrya</i>	Manna Wattle
<i>Allocasuarina huegeliana</i>	Rock Sheoak
<i>Atriplex semibaccata</i>	Berry Saltbush
<i>Austrostipa elegantissima</i>	
<i>Callistemon phoeniceus</i>	Lesser Bottlebrush
<i>Casuarina obesa</i>	Swamp Sheoak
<i>Dianella revoluta</i>	Blueberry Lily
<i>Eucalyptus longicornis</i>	Red Morrel
<i>Eucalyptus loxophleba</i>	York Gum
<i>Eucalyptus salmonophloia</i>	Salmon Gum
<i>Eucalyptus wandoo</i>	Wandoo
<i>Gastrolobium parviflorum</i>	
<i>Gastrolobium spinosum</i>	Prickly Poison
<i>Grevillea huegelii</i>	
<i>Halosarcia sp</i>	
<i>Hakea preissii</i>	Needle Tree
<i>Lepidosperma sp</i>	
<i>Maireana brevifolia</i>	Small Leaf Bluebush
<i>Melaleuca uncinata</i>	Broom Bush
<i>Pimelea argentea</i>	Silvery Leaved Pimelea
<i>Templetonia sulcata</i>	Centipede Bush
Weeds Species	Common Name
<i>Avena sp</i>	Wildoats
<i>Eragrostis curvula</i>	African lovegrass
<i>Eucalyptus camaldulensis</i>	River Red Gum
<i>Eucalyptus leucoxylon</i>	Yellow Gum
<i>Eucalyptus leucoxylon</i> (rosea)	Pink Flowering Yellow Gum
<i>Eucalyptus sideroxylon</i>	Red Ironbark
<i>Hordeum sp</i>	Barley Grass
<i>Solanum hystrix</i>	Afghan thistle
<i>Tamarix aphylla</i>	Tamarisk
	Rivermoor Saltbush



## 5. 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.

Vegetation is proposed to be cleared for this project and as the activities are not exempt under the clearing regulation (Section 5 – Prescribed Clearing), this clearing will be undertaken using Main Roads' clearing permit CPS818.

### 5.1 Details of Vegetation Associations to be Cleared

In order to assess the significance of the vegetation proposed to be cleared for the Narrogin-Kondinin Road widening the vegetation type, condition and percent of pre-European Extent remaining has been identified. Table 2 describes the location and condition of the vegetation association within the project area while Table 3 provides further information regarding the vegetation association's representativeness.

**Table 2: Vegetation Description, Condition and Percent Remaining**

No.	Description	Start & End SLK	Side of Road (L- left, R - right, RBM -road building materials)	Condition (Keighery 1994)	Pre-European Extent Remaining (%)	Area (ha)
1023	Medium woodland; York gum, wandoo & salmon gum	70.0-76.54	Both	Degraded	10.97	0.6
<b>Total Area (ha)</b>						<b>0.6</b>

**Table 3: Vegetation Percent Remaining**

<b>Pre-European Extent Remaining: Vegetation Association No. 1023</b>		
<b>Regional Context</b>	<b>Location</b>	<b>Pre-European Extent Remaining (%)</b>
State-wide	N/A	10.97
Bioregional (IBRA Region)	Avon Wheatbelt (AW)	11.01
Bioregional (IBRA Sub-Region)	Avon Wheatbelt (AW2)	12.58
LGA	Shire of Wickepin	10.50

## 5.2 Assessment Against 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 likely to be at variance with the 10 clearing principles.

<b>(a) Native vegetation should not be cleared if it comprises a high level of biological diversity.</b>	
ASSESSMENT	Vegetation is in degraded condition and primarily overstorey species to be removed. Adjacent vegetation to remain.
METHODOLOGY & REFERENCES	Site Inspection
Proposal is not likely to be at variance to this Principle.	

<b>(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.</b>	
ASSESSMENT	Native vegetation on the site is already disturbed and degraded and unlikely to present significant habitat for fauna - No nesting hollows in the trees proposed to be cleared.
METHODOLOGY & REFERENCES	Site inspection.
Proposal is not likely to be at variance to this Principle.	

<b>(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.</b>	
ASSESSMENT	None present.
METHODOLOGY & REFERENCES	DEC shapefiles and site inspection.
Proposal is not likely to be at variance to this Principle.	

<b>(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.</b>	
ASSESSMENT	None present.
METHODOLOGY & REFERENCES	DEC shapefiles and site inspection.
Proposal is not likely to be at variance to this Principle.	

<b>(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.</b>	
ASSESSMENT	Vegetation Association 1023: Medium woodland; York gum, wandoo & salmon gum with 10.97 % pre European extent remaining. Vegetation is a association that has been extensively cleared.
METHODOLOGY & REFERENCES	Beeston, G.R., Hopkins, A.J.M. and Shepherd, D.P. (2002) – Technical Report 250.
Proposal is at variance to this Principle.	

<b>(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.</b>	
ASSESSMENT	Works cross Boyning Gully however will not impact this watercourse area . The project is located within an ESA however this is the buffer zone for the Ramsar listed Lake Toolibin. The lake is approximately 14 kilometres south of the project area and will not be impacted by these works.
METHODOLOGY & REFERENCES	DoW and DEC shapefiles.
Proposal is not likely to be at variance to this Principle.	

<b>(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.</b>	
ASSESSMENT	As only 0.6 ha is proposed to be cleared with adjacent vegetation to remain and as this is a road widening project where the existing roadside infrastructure already contains roadside drains that will remain this project will not cause appreciable land degradation.
METHODOLOGY & REFERENCES	Site Inspection.
Proposal is not likely to be at variance to this Principle.	

<b>(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.</b>	
ASSESSMENT	The nearest DEC managed land is the Malyalling Nature Reserve seven kilometres to the north and the Yarling & Claypit Nature Reserves over six kilometres to the west of the project. Given the distance to these reserves they will not be impacted by the works.
METHODOLOGY & REFERENCES	DEC shapefiles and Site Inspection.
Proposal is not likely to be at variance to this Principle.	

<b>(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.</b>	
ASSESSMENT	Small amount of clearing spread over 6 ½ kilometres and no impact to groundwater as no dewatering proposed.
METHODOLOGY & REFERENCES	Site Inspection.
Proposal is not likely to be at variance to this Principle.	

<b>(j) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.</b>	
ASSESSMENT	Small amount of clearing, this will not affect flooding.
METHODOLOGY & REFERENCES	Site Inspection.
Proposal is not likely to be at variance to this Principle.	

### 5.3 Summary of Management Actions

Main Roads attempts to avoid clearing vegetation if possible, where clearing cannot be avoided then this clearing is kept to a minimum. The following actions are proposed to manage and minimise vegetation clearing for the Narrogin-Kondinin widening;

- Construction works to be undertaken in summer to reduce the potential for soil erosion impacting adjoining vegetation during heavy rains,
- 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,
- Implement the Project Revegetation Management Plan and monitor effectiveness of revegetation works and weed control.

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

**Table 4: Summary of Additional Management Actions**

Impact of Clearing	Yes/No or NA	Action Required
1. Does the assessment indicate that the clearing may be at variance or is at variance with one or more of the principles for clearing?	Yes	Submissions sought from stakeholders. All submissions received addressed within this EIA.
2. Does the assessment indicate that the clearing is at variance with one or more of the principles for clearing?	Yes	Offset Proposal prepared and approved by the CEO of DEC prior to clearing. Offset Proposal set out in the EIA.
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.

### 5.4 Summary of Stakeholder Submissions Received

Letters were sent to stakeholders on the 22 August 2011 as per condition 8 of CPS 818. Two submissions were received, one from the Commissioner of Soil and Land Conservation sent on the 20<sup>th</sup> September 2011 and the other from the Department of Environment and Conservation sent on the 21<sup>st</sup> September 2011. Copies of this correspondence have been included in Appendix “K” and “L” and are summarised below.

Stakeholder	Comments	Main Roads' Response
Commissioner of Soil and Land Conservation	<ul style="list-style-type: none"><li>• No objection to the clearing provided approved road construction practices are adopted</li></ul>	TDP specifications will be used
Department of Environment and Conservation	<ul style="list-style-type: none"><li>• Consider the proposal is “at variance” not “maybe at variance” as indicated in the invitation for submission letter</li></ul>	Main Roads accepts the project is “at variance” and proposes a offset for this clearing

## 5.5 Summary of Offset Proposal

MAIN ROADS WA – CPS 818 OFFSET PROPOSAL		
<b>Project:</b>	Narrogin Kondinin M38 Widening 70.0 - 76.54 SLK.	
<b>Date:</b>	September 2011.	
<b>Manager:</b>	Nigel Rowe (Environment Officer) – Henryk Marek (Senior Project Manager)	
<b>Clearing location:</b>	Main Roads' road reserve of the Narrogin Kondinin Road (local name Williams Kondinin Road) starting approximately 1.5 kilometres east of Wickepin and continuing for approximately 6.5 kilometres to the intersection with the Wickepin Corrigin Road.	
<b>Offset location:</b>	As above on the northern side of the Narrogin Kondinin Road between 70.18 to 75.5 SLK (117.51097 / -32.78145 to 117.5291 / -32.7814).	
<b>Offset description:</b>	Revegetation of 3.0 hectares of acquired farmland from lot numbers 3864 & 1569. Additional revegetation of 7.5 hectares will also occur on a 20 metre wide strip of land acquired from lot numbers 4551, 1612, 1544, 1743, 1550 and 1704.	
<b>Reason for offset &amp; description of impacts:</b>	Removal of under-represented vegetation (e) – there is 0.6 hectares of clearing proposed from vegetation association 1023 - Medium woodland; York gum, wandoo & salmon gum with 10.97% pre-European coverage remaining.	
<b>Offset Principles addressed:</b>  <i>Insert description of how each offset principle has been or will be addressed by the offset proposal.</i>	<b>Direct offsets:</b>	3.0 hectares of revegetation.
	<b>Contributing offsets:</b>	All purchased land and revegetation areas will be fenced. A further 7.5 hectares will be revegetated in addition to the 3 hectares for the offset, totalling 10.5 hectares of revegetation.
	<b>Hierarchy of avoidance, minimisation, rectification, mitigation:</b>	To achieve the required construction width Main Roads can not avoid clearing for this project. Selective clearing of 60 trees is proposed to undertaken over the 6 ½ kilometre project. Mitigation in the form of revegetation will occur on the north side of the Narrogin Kondinin Road as a water pipeline runs parallel with the road on the south side.
	<b>Like for like or better:</b>	The Revegetation offset area is directly adjacent to the clearing and will comprise species the same as the vegetation being cleared, including additional understorey species that are not currently present in the road reserve.

## MAIN ROADS WA – CPS 818 OFFSET PROPOSAL

	<b>Ratio greater than 1:1 :</b>	0.6 hectares to be cleared and 3.0 hectares to be revegetated (1:5 ratio).
	<b>Robust, consistent assessment:</b>	The offsets have been determined suitable by the composition of vegetation and their position in the landscape (like for like).
	<b>Appropriateness:</b>	The offset aims to protect, enhance and re-create wheatbelt native vegetation in a condition better than that being cleared.
	<b>No net loss / net gain:</b>	The offset will result in a net gain and no net loss of vegetation meeting Main Roads' Objective number five ( <i>Environmental Objective Targets and Indicators 6707/024</i> ).
	<b>Statutory requirements met:</b>	Seed collected for the revegetation offsets will be in accordance with DEC licenses.
	<b>Defined, documented, audited:</b>	Offsets are defined in the revegetation plan with reporting and auditing in accordance with the requirements of CPS 818/6.
	<b>Long-term benefit:</b>	The widened road reserve will be under the tenure of Main Roads providing for long term protection.
	<b>Environmental specialist advice:</b>	Suitably qualified and experienced Main Roads' environmental staff have identified the offset sites and will be involved in implementing the offset proposal.
<b>Offset comparison:</b>	<b>Proposed clearing</b>	<b>Proposed offset</b>
Area:	0.6 ha.	3.0 ha.
Species, Community Type & Condition	Vegetation association 1023 - Medium woodland; York gum, wandoo & salmon gum in a degraded condition.	See species list in Main Roads report, "Narrogin-Kondinin Rd Widening 70.0 - 76.54 Revegetation Plan - August 2011" Appendix O
Ecological function:	Narrow road reserve strips of primarily overstorey vegetation.	Widening of the road reserve to one side creates a wider vegetated strip on one side of the road, improving ecological function through a reduction of "edge effect".
Other values:		Wider vegetated strip provides a better linkage corridor for fauna.

## MAIN ROADS WA – CPS 818 OFFSET PROPOSAL

<b>Monitoring commitments:</b>	Ongoing monitoring will ensure successful establishment of the revegetation areas. Monitoring of these sites will be as per the ' <i>Revegetation Plan</i> ' and opportunistic monitoring will also occur as Main Roads' environmental staff travel past the revegetation site.			
<b>Management commitments:</b>	No specific management requirements are necessary under CPS 818/6 – Part 4, section 12. Management of the offset site and remedial actions will be undertaken if required following the monitoring. This will include infill planting and weed control to ensure successful establishment of revegetation and continued density and diversity of the offset.			
<b>Agencies consulted &amp; submissions received:</b>	Name	Title	Agency	Submission Received
	Kelly Faulkner	Native Veg Cons Branch	Dept of Environment and Conservation	Yes
	Michael Allen	Program Manager	Department of Water	No
	Andrew Watson	Commissioner	Soil and Land Conservation Commissioner	Yes
	Alan Leeson	CEO	Shire of Wickelup	No
	Piers Verstegen	Director	Conservation Council WA	No

## 6. ASSESSMENT OF ASPECTS AND IMPACTS

**Table 5:** Aspects and Impacts – Narrogin-Kondinin Road Widening

Aspect	Evaluation of Potential Impacts
Vegetation – clearing	<p>0.6 ha of native vegetation is proposed to be cleared, the vegetation is described as Vegetation Association 1023: Medium woodland; York gum, wandoo &amp; salmon gum with 10.97 % pre European extent remaining.</p> <p>The native vegetation proposed to be cleared isn't well represented regionally as it possesses less than 30% of its pre-European extent.</p> <p>According to Keighery, (1994) the condition of the native vegetation to be cleared is described as Degraded.</p>
Vegetation – TECs/DRF	<p>None present in the proposed works areas. No significant vegetation types or threatened flora have been recorded within the road reserve see assessment to Clearing Principle 'c &amp; d' in Section 5.2.</p> <p>No Matters of National Environmental Significance as protected under EPBC Act (1999) will be impacted (see Table 6).</p>
Vegetation – weeds	<p>There are numerous common weed species that occur throughout the proposed works areas. These species are likely to be widespread within the reserve and general area.</p>
Vegetation – dieback	<p>Not an issue given the project area receives less than 400 mm of average annual rainfall (Kulin 360.4 mm). Site inspection indicates that the area should be treated as dieback free.</p>
Fauna	<p>No significant fauna issues associated with any of the proposed upgrade works. DEC records indicate a night sighting of a threatened mammal to the north of the Narrogin-Kondinin Road. With the generally degraded and exposed nature of the works areas, no significant impacts would be expected on native fauna generally as a result of the proposed works. No hollows were identified in the vegetation to be cleared.</p> <p>No Matters of National Environmental Significance as protected under the EPBC Act (1999) will be impacted (see Table 6).</p>
Heritage (non-indigenous)	<p>A search of the Australian Heritage Places Inventory and the Heritage Council of Western Australia on-line databases has indicated that there are no known sites of heritage significance within the vicinity of the project area. Two sites were identified in the Shire of Wickepin on the Australian Heritage Places Inventory, including the Ramsar listed Lake Toolibin however these will not be impacted by the project. Three sites were identified in the Shire of Wickepin along the Narrogin-Kondinin (Kulin) Road on the Heritage Council of Western Australia Places Database but these will not be impacted by the works.</p> <p>No Matters of National Environmental Significance as protected under EPBC Act (1999) will be impacted (see Table 6).</p>
Aboriginal heritage	<p>A search of the DIA's database identified no known sites of Aboriginal heritage significance within the vicinity of the project area.</p> <p>No further investigations are required for all aspects of the project.</p>



**Table 5:** Aspects and Impacts – Narrogin-Kondinin Road Widening

<b>Aspect</b>	<b>Evaluation of Potential Impacts</b>
Wetlands	<p>DEC shapefiles show that there are no wetlands within the vicinity of the project area. The site does fall with the buffer zone the of Ramsar listed Lake Toolibin although the lake is approximately 14 kilometres south of the project area and will not be affected by the works.</p> <p>No Matters of National Environmental Significance as protected under EPBC Act (1999) will be impacted (see Table 6).</p>
Surface water/drainage	<p>A search of the DoW's database has identified that Boyning Gully crosses the road within the project site. The proposed works will not disturb or interrupt any natural drainage or surface run-off patterns. The project site is also located within the southern extremity of the Avon River catchment Proclaimed Surface Water Area. There will be no impact to bed and banks and therefore no permits are required.</p>
Groundwater	<p>No dewatering nor drainage modifications are required, hence no change to groundwater level or quality.</p>
Reserves / Conservation areas	<p>There are no conservation areas or reserves that will be impacted by the proposed works, see assessment to Clearing Principle 'h' in Section 5.2.</p>
Air quality	<p>Not relevant to the proposed works. Local air quality assessment is not required for the project since:</p> <ul style="list-style-type: none"> <li>the predicted traffic flow is less than 15,000 vehicles per day in rural areas (390 vehicles per day with 14.3% heavy vehicles in 2008/09 on the Narrogin-Kondinin Road just west of Wickepin-Corrigin Road, 76.54 SLK);</li> <li>residential and other sensitive receptors are not within 200 meters of the road centre.</li> </ul>
Dust	<p>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.</p>
Noise and vibration	<p>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 Wickepin must be met in respect of noise management and construction working hours.</p>
Visual amenity	<p>The proposed works will result in minor and short-term visual impacts during construction.</p>
Public safety and risk	<p>Provided traffic management and signage to Main Roads standards is employed, none of the proposed works present any significant hazards to public safety. The proposed works will serve to enhance public safety by improving local road and pedestrian conditions.</p>
Hazardous substances	<p>Not relevant to the proposed works, the project requires no hazardous substances to be used.</p>
Contamination	<p>The works are within the road reserve and no known previous land use activities on or adjacent to the project area have had the potential to create contamination, e.g. petrol station. A search of the DEC's contaminated sites database indicates there are no identified contaminated sites within the project area.</p>

**Table 5: Aspects and Impacts – Narrogin-Kondinin Road Widening**

<b>Aspect</b>	<b>Evaluation of Potential Impacts</b>
Salinity	There were visual signs of salinity observed in the low lying areas of the project. Given the nature and scale of the project the impact is considered not relevant.
Acid Sulfate Soils	No further investigations are necessary as the site is outside of the high risk area for ASS and there is no dewatering or excavation below the water table planned.
Statutory Land Use Planning	As the proposed works are entirely within the existing road reserve no planning scheme amendments are required.

**Table 6: Commonwealth Aspects and Impacts**

<b>Aspect</b>	<b>Evaluation of Potential Impacts</b>
World Heritage properties	The project will not impact any World Heritage properties i.e. Shark Bay
National Heritage places	A search of the Australian Heritage Places Inventory Database located two sites within the vicinity of the project. These sites are a minimum of 12 kilometres from the works and will not be impacted by 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 Wetlands near the project. Lake Toolibin is the nearest Ramsar wetland, this is not within the vicinity of the project being approximately 14 south of the proposed works.
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, 10 threatened species and 5 listed marine species within the vicinity of the project. The project activities are unlikely to have a significant impact on these species and the marine species are listed as “over fly” with the vegetation present unlikely to be habitat, including breeding, 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 8 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. Ningaloo Marine Park
Commonwealth lands	The project is not located on and will not impact any Commonwealth lands.
Nuclear Actions	Not relevant to the proposed works.

## **7. DECISION TO REFER**

### **7.1 Referral to the Department of Sustainability, Environment, Water, Population and Communities**

The impact assessment determined the project is not likely to have a significant impact on Matters of National Environmental Significance or impact Commonwealth land as outlined in Table 6 of the report. For this reason the project does not require referral to the Commonwealth Department of Sustainability, Environment, Water, Population and Communities.

### **7.2 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.

## **8. STAKEHOLDER CONSULTATION**

Stakeholders consulted due to the vegetation clearing associated with the works are;

- (i) DEC Native Vegetation Conservation Branch;
- (ii) the Office of the Commissioner of Soil and Land Conservation;
- (iii) the Department of Water
- (iv) the Conservation Council of Western Australia;
- (v) the Shire of Wickiepin;

## **9. OTHER APPROVALS/PERMITS/LICENCES**

Due to variance with the ten clearing principles stakeholder consultation was completed as per Part II, Section 8 of CPS 818. A Offset for this project was proposed to meet Part III – Section 9(c) of CPS 818 and has been approved by the CEO of DEC as required under Part I – Section 5(a)(ii) –Appendix M.

No other clearances, permits or further studies are required.

## **10. REFERENCES**

Beeston, G.R., Hopkins, A.J.M. and Shepherd, D.P. (2002). Land-use and vegetation in Western Australia. Department of Agriculture, Western Australia, Resource Management Technical Report 250.

Bureau of Meteorology Australia. Climate Averages for Australian Sites – [Kulin](#).

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

Edmonds, Leigh 1997. *The Vital Link – A History of Main Roads Western Australia 1926-1996*. University of Western Australia Press.

Main Roads Traffic Digest – Wheatbelt South 2003/04 to 2008/09.

## Appendix A

### **Low Impact Environmental Screening Checklist**

**Checklist - Low Impact 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.

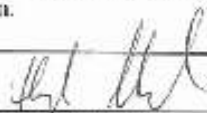
Projects that have "No" to all items are classed as Low Impact and should be implemented using standard contract clauses in the Tender Document Process.

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:** Narrogin-Kondinin Rd Widening 70.0 - 76.54 SLK (11/4756)

ITEM NO.	ITEM	Y	N
1	New road or road reserve to be created or expansion of existing road reserve.	X	
2	Works require clearing of native vegetation outside the maintenance zone.	X	
3	Works require clearing of native vegetation that is older than 10 years old within the maintenance zone.		X
4	Works to occur outside normal working hours.		X
5	Passes over, adjoins or drains directly into a wetland or sensitive watercourse.		X
6	Local natural drainage regime / hydrology will be changed.		X
7	Dewatering, or a new water bore required.		X
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)		X
9	Buildings will require demolition.		X

Completed By: *Signature*  *Date* 24.08.11  
*Name* Henryk Marek *Title* Senior Project Manager

To be reviewed by a Main Roads Environment Officer: *Signature*  *Date* 24/08/2011  
*Name* Nigel Rowe *Title* Environment Officer

Comments: Will be at variance to 10 driving principles

## Appendix B

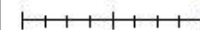
### **DEC Threatened Flora, Fauna and Conservation Areas GIS Search**



#### LEGEND

- THFL - WAHerb - MRWA
- THFL - MRWA
- Threatened Fauna
- TEC / PEC Sites
- ESAs
- DEC Lands

0 0.45 0.9 1.8 Km



MAP INFORMATION  
Geographic Coordinate System: Geocentric  
Datum of Australia 1994 - Projection MGA Zone 51

#### PUBLISHER DETAILS

Directorate: Regional Services  
Branch: Wheatbelt South Region  
Author: Nigel Rowe  
Data Currency: As Supplied  
Project: Narrogin-Kondinin Road

## Appendix C

### **Australian Heritage Places Inventory and Heritage Council of Western Australia Database Searches**



AHPI - Results - Microsoft Internet Explorer provided by MRWA ...

http://www.heritage.gov.au/cgi-bin/ahpi/results.pl?id=&pn=&ad=&lg=Wickepin&st=&country=&ss=&ds=&sc=&submit=SEAF

File Edit View Favorites Tools Help

AHPI - Results

# AUSTRALIAN HERITAGE PLACES INVENTORY

[ [New Search](#) ]

1.	<b><u>East Yornaning Nature Reserve</u></b> Commodine Rd, Wickepin, WA	<b>LGA:</b> Wickepin Shire <b>Source:</b> Register of the National Estate
2.	<b><u>Lake Toolibin and Surrounds Flora and Fauna Habitat</u></b> Wickepin Harrismith Rd, Toolibin via Wickepin, WA	<b>LGA:</b> Wickepin Shire <b>Source:</b> Register of the National Estate

**Query matched 2 records.**

AHPI URL : <http://www.environment.gov.au/heritage/ahpi/index.html>

Done Internet 100%


Heritage Council of WA - Places Database : Search Results - Microsoft Internet Explorer provided by MRWA ...

http://register.heritage.wa.gov.au/search\_results.html

File Edit View Favorites Tools Help

Heritage Council of WA - Places Database : Search Re...

Site Map | Contact Us | Accessibility

 heritage  
a future for our past

Search here...  
Search WA Government

Home » Places Database » Search Results

Places Database

Heritage Council of WA Home  
Quick Search  
Advanced Search  
Results List  
Location Report  
Save Data

What Is The State Register?  
Other Heritage Lists

Displaying results: [1-3] of 3

hide selected hide unselected

<input type="checkbox"/>	<a href="#">Fair View</a> (16775)	Wickepin-Kulin Rd, Wickepin
<input type="checkbox"/>	<a href="#">Ten Mile Settlement - Site</a> (7310)	Cnr Wickepin-Kulin Rd & Ten Mile Rd, Wickepin
<input type="checkbox"/>	<a href="#">Wogolin Townsite - site of</a> (7318)	Cnr Kulin & Dudinin Rds E of, Wickepin

hide selected hide unselected

Perform a new: [QUICK PLACES DATABASE SEARCH](#) | [ADVANCED PLACES DATABASE](#)

wa.gov.au

Home | Site Map | Privacy | Disclaimer | Copyright | FAQs | Links | Contact Us | Places Database

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Last updated: 19/01/2010

Error on page.

Internet 100%

## Appendix D

### **Department of Indigenous Affairs Database Search**



Sites in a search box - Aboriginal Heritage Inquiry System - Microsoft Internet Explorer provided by MRWA ...

http://www.dia.wa.gov.au/AHIS/Default.aspx

File Edit View Favorites Tools Help


Sites in a search box - Aboriginal Heritage Inquiry Sys...

Government of Western Australia  
Department of Indigenous Affairs


### Aboriginal Heritage Inquiry System

What do you want to do? [Search](#) | [Metadata](#) | [Feedback](#) | [DIA Home](#) | [Getting Started](#)

Find specific Sites : Search: Site ID Search text:



**show legend**

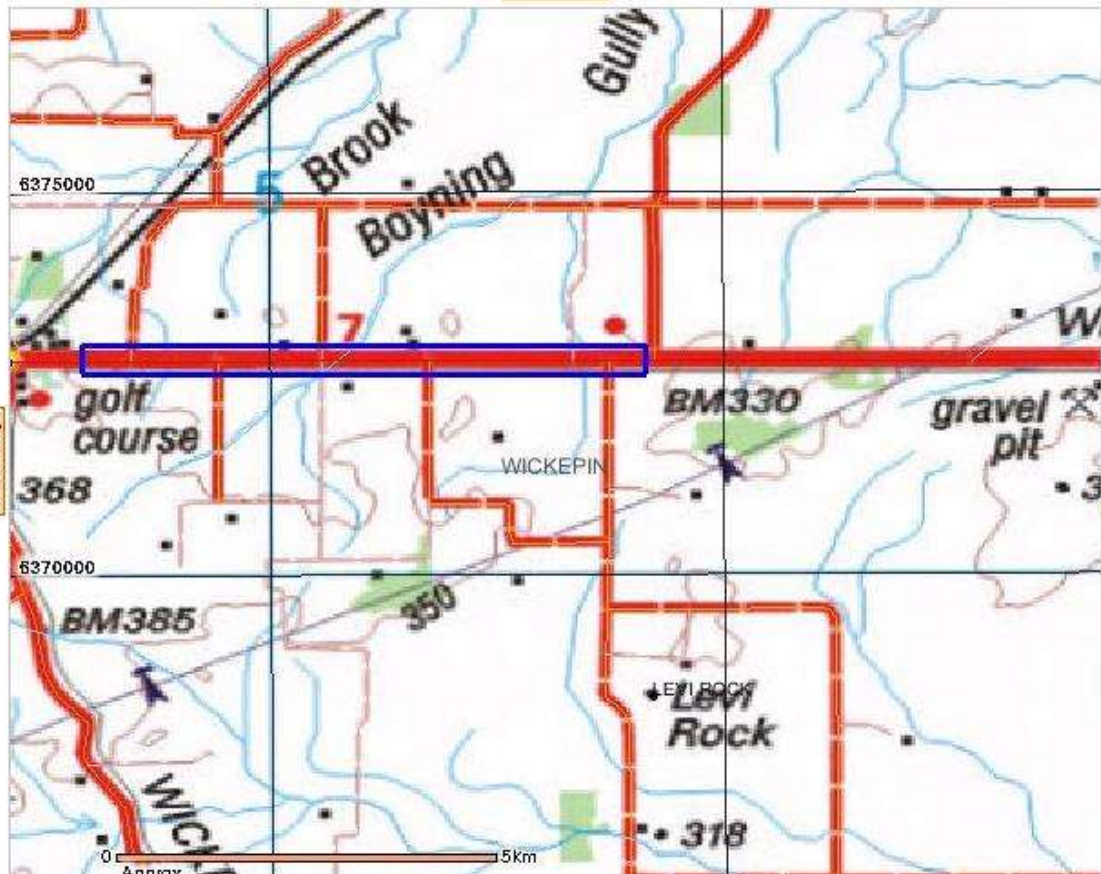


**Show on map**

☒ Aboriginal Sites  
☐ Heritage Surveys

**Map size**

☐ Small  
☒ Medium  
☐ Large



**Sites in a search box**

**0 results**

[Printable - All results \(with map\)](#)

**0 Registered Aboriginal Sites** ☐ No results

**0 Other Heritage Places** ☒ No results

MAIN RO/  
Narrogin-P

Internet 100%

## Appendix E

### **DoW Geographic Data Atlas Database Search**

Department of Water - Geographic Data Atlas - Microsoft Internet Explorer provided by MRWA...

http://www.water.wa.gov.au/idelve/dowdataext/index.jsp

File Edit View Favorites Tools Help

Department of Water - Geographic Data Atlas

Government of Western Australia  
Department of Water

# Geographic Data Atlas

Welcome Search Download Metadata Map Help

**Welcome**

The Geographic Data Atlas is an interactive web mapping tool that allows you to freely view and download DoW geographic data.

Note that some datasets belong to other government agencies and are provided for viewing purposes only. These are identified in the theme selector by an agency acronym (eg: DLI).

All downloads of geographic data are subject to a standard licence agreement for data transfer. Data downloaded is in ESRI shapefile format with symbology and metadata bundled together in a zip file.

Click [here](#) for a quick introduction to using the Geographic Data Atlas mapping interface.

Click [here](#) to contact us or provide feedback on the site.

Zoom in tool. Click and drag a rectangle.

iDelve mapping technology by Amistar. [www.idelve.net](http://www.idelve.net)

DoW Home | Copyright | Disclaimer

Internet 100%

## Appendix F

### **DEC Native Vegetation Map Viewer Database Search**



Department of Environment and Conservation - Native Vegetation - Microsoft Internet Explorer provided by MRWA ...

http://maps.dec.wa.gov.au/idelve/nv/index.jsp

File Edit View Favorites Tools Help

Department of Environment and Conservation - Nativ...

Department of Environment and Conservation  
Our environment, our future

## Native Vegetation Map Viewer

Welcome Search Metadata Help

☒ Planning and Cadastre  
☒ Environment  
☒ Clearing Regs - ESA  
☒ Clearing Regs - Scher  
☒ Clearing Permits  
☒ Inland Waters  
☒ Boundaries  
☒ LGA  
☒ Location  
☒ Localities  
☒ Economy  
☐ Mining Tenements  
☒ Transportation  
☒ State Roads  
☒ Roads major  
☒ Roads local  
☒ Society  
☒ Major Towns  
☒ Minor Towns

0 5km 1:42,694

Multi-tool. Press and hold a button, dragging mouse to navigate.

[Welcome](#) [Search](#) [Metadata](#) [Help](#)

### Welcome

Welcome to the Native Vegetation Map Viewer. This site helps you to identify the following:

- The location of environmentally sensitive areas, as declared by a Notice under section 51B of the Environmental Protection Act 1986.
- Areas where low impact mineral and petroleum activities can NOT occur, as defined under Schedule 1 of the Environmental Protection (Clearing of Native Vegetation) Regulations 2004.

Click on the links below for more information on:

- [Environmentally Sensitive Areas](#)
- [Low Impact Mineral and Petroleum Activities](#)
- [Native Vegetation Disclaimer](#)

Click [here](#) for a quick tutorial on using the Native Vegetation Protection map viewer.

[Policy & Legislation](#) | [Clearing Permits & Public Reports](#)  
[DEC Home](#) | [Copyright](#) | [Disclaimer](#)

Internet 100%



## Appendix G

### **DSEWPC Database Search**



## 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.

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>

### [Summary](#)

### [Details](#)

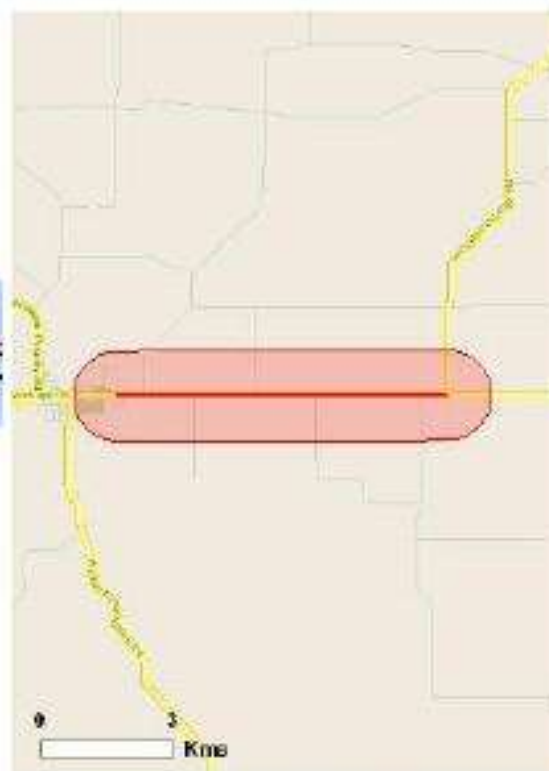
[Matters of NES](#)

[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: 1.0Km

## 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>

<a href="#">World Heritage Properties:</a>	None
<a href="#">National Heritage Places:</a>	None
<a href="#">Wetlands of International Significance (Ramsar Wetlands):</a>	None
<a href="#">Great Barrier Reef Marine Park:</a>	None
<a href="#">Commonwealth Marine Areas:</a>	None
<a href="#">Threatened Ecological Communities:</a>	None
<a href="#">Threatened Species:</a>	10
<a href="#">Migratory Species:</a>	8

### 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>

<a href="#">Commonwealth Lands:</a>	None
<a href="#">Commonwealth Heritage Places:</a>	None
<a href="#">Listed Marine Species:</a>	5
<a href="#">Whales and Other Cetaceans:</a>	None



<a href="#">Critical Habitats:</a>	None
<a href="#">Commonwealth Reserves:</a>	None

## Report Summary for Extra Information

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

<a href="#">Place on the RNE:</a>	None
<a href="#">State and Territory Reserves:</a>	None
<a href="#">Regional Forest Agreements:</a>	None
<a href="#">Invasive Species:</a>	9
<a href="#">Nationally Important Wetlands:</a>	None

## Details

### Matters of National Environmental Significance

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

Name	Status	Type of Presence
<b>BIRDS</b>		
<a href="#">Calyptrorhynchus latirostris</a> Carnaby's Black-Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Breeding likely to occur within area
<a href="#">Leipoa ocellata</a> Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area

#### MAMMALS

<a href="#">Dasyurus geoffroyi</a> Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Phascogale calura</a> Red-tailed Phascogale [316]	Endangered	Species or species habitat may occur within area

#### PLANTS

<a href="#">Acacia insolita subsp. recurva</a> Yornaning Wattle [64495]	Endangered	Species or species habitat likely to occur within area
<a href="#">Banksia oligantha</a> Wagin Banksia [20697]	Endangered	Species or species habitat likely to occur within area
<a href="#">Grevillea divandroides subsp. hirsuta</a> Hairy Phalanx Grevillea [64577]	Endangered	Species or species habitat likely to occur within area
<a href="#">Grevillea scapigera</a> Corrigin Grevillea [12195]	Endangered	Species or species habitat may occur within area
<a href="#">Roycea pycnophylloides</a> Saltmat [21161]	Endangered	Species or species habitat may occur within area
<a href="#">Verticordia fimbrialepis subsp. fimbrialepis</a> Shy Featherflower [24631]	Endangered	Species or species habitat may occur within area

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

Name	Status	Type of Presence
<b>Migratory Marine Birds</b>		
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat may occur within area
<a href="#">Ardea alba</a> Great Egret, White Egret [59541]		Species or species habitat may occur within area
<a href="#">Ardea ibis</a> Cattle Egret [59542]		Species or species habitat may occur within area
<b>Migratory Terrestrial Species</b>		
<a href="#">Haliaeetus leucogaster</a> White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
<a href="#">Leipoa ocellata</a> Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
<a href="#">Merops ornatus</a> Rainbow Bee-eater [670]		Species or species habitat may occur within area
<b>Migratory Wetlands Species</b>		
<a href="#">Ardea alba</a> Great Egret, White Egret [59541]		Species or species habitat may occur within area
<a href="#">Ardea ibis</a> Cattle Egret [59542]		Species or species habitat may occur within area
<b>Other Matters Protected by the EPBC Act</b>		

Listed Marine Species		[ Resource Information ]
Name	Status	Type of Presence
<b>Birds</b>		
<a href="#">Apus pacificus</a> Fork-tailed Swift [678]		Species or species habitat may occur within area
<a href="#">Ardea alba</a> Great Egret, White Egret [59541]		Species or species habitat may occur within area
<a href="#">Ardea ibis</a> Cattle Egret [59542]		Species or species habitat may occur within area
<a href="#">Haliaeetus leucogaster</a> White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
<a href="#">Merops ornatus</a> Rainbow Bee-eater [670]		Species or species habitat may occur within area
<b>Extra Information</b>		

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
<b>Mammals</b>		
<a href="#">Capra hircus</a>		



Goat [2] <a href="#">Felis catus</a>	Species or species habitat may occur within area
Cat, House Cat, Domestic Cat [19]	Species or species habitat likely to occur within area
<a href="#">Oryctolagus cuniculus</a> Rabbit, European Rabbit [128]	Species or species habitat likely to occur within area
<a href="#">Vulpes vulpes</a> Red Fox, Fox [18]	Species or species habitat likely to occur within area

#### Plants

<a href="#">Asparagus asparagoides</a> Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]	Species or species habitat may occur within area
<a href="#">Carrichtera annua</a> Ward's Weed [9511]	Species or species habitat may occur within area
<a href="#">Cenchrus ciliaris</a> Buffel-grass, Black Buffel-grass [20213]	Species or species habitat may occur within area
<a href="#">Chrysanthemoides monilifera</a> Bitou Bush, Boneseed [18983]	Species or species habitat may occur within area
<a href="#">Lycium ferocissimum</a> African Boxthorn, Boxthorn [19235]	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.

## Appendix H

### **DEC Contaminated Sites Database Search**

Department of Environment and Conservation - Contaminated Sites Database - Microsoft Internet Explorer provided by MRWA ...

https://secure.dec.wa.gov.au/idelve/css/

File Edit View Favorites Tools Help

Department of Environment and Conservation - Cont...

Department of Environment and Conservation  
Our environment, our future.

## Contaminated Sites Database

New Search Find Suburb/Town Metadata Map Help

### Search for Known Contaminated Sites

Search Criteria [Switch to Advanced Search](#)

Street/Lot No.:

Street Name:

Suburb/Town:

Title (Volume/Folio):

Crown Land Reserve No.:

Please enter *at least one* of the following:  
Street Name, Suburb/Town, Title or Crown Land Reserve Number.

☒ Coastline

☒ Boundaries

☒ Contaminated Sites

☒ Transportation

☒ Society

☒ Major Towns

☒ Minor Towns

WICKEPIN

0 5km 1:49,259

Multi-tool. Press and hold a button, dragging mouse to navigate.

Disclaimer

Internet 100%



## Appendix I

### **Acid Sulfate Soils Mapping**

WA Atlas - Microsoft Internet Explorer provided by MRWA ...

https://www2.landgate.wa.gov.au/bmvf/app/waatlas/

File Edit View Favorites Tools Help

WA Atlas

Shared Land Information Platform

# WA Atlas

Home  
Search  
Layer Selector

Layer

Multi-tool. Press and hold a button, dragging mouse to navigate.

20km 1:746,040

Trusted sites 100%

MAIN RO  
Narrogin-

## Appendix J

### **Site Photos**



Trees on left to be retained



Trees on right to be removed



York gum & Jam



Low lying Area



Drainage line



No clearing work area



Introduced river gums

## Appendix K

### **CPS 818 Soil & Land Stakeholder Correspondence**

**From:** Watson, Andrew [<mailto:andrew.watson@agric.wa.gov.au>]  
**Sent:** Tuesday, 20 September 2011 8:48 AM  
**To:** WEB Wheatbelt South Region  
**Subject:** Narrogin - Kondinin road widening

Attn: Nigel Rowe

Good afternoon

Thank you for your recent advice of this proposed road widening project between 70.0 - 76.54 SLK. I note that it is proposed to clear about 60 trees on 0.6 ha in order to carry out this work and that nominally 14 ha of cleared farm land will be acquired and replanted in winter 2012.

Provided Main Roads' approved road construction practices are adopted, it is unlikely that land degradation in the form of soil erosion is likely to occur if this work is carried out. The land acquisition and offset planting is also likely to offer significant environmental benefits in the longer term.

Yours sincerely

Andrew Watson  
Commissioner of Soil and Land Conservation



## Appendix L

### **CPS 818 DEC Stakeholder Correspondence**



Your ref: 114755  
Our ref: CPS 618/8 DEC4894/8  
Enquiries: Jane Clarkson  
Phone: 0210 8744  
Fax: 0210 8701  
Email: [nyc@dec.wa.gov.au](mailto:nyc@dec.wa.gov.au)

Mr Bernie Miller  
Regional Manager  
Wheatbelt South Region  
Main Roads Western Australia  
PO Box 194  
NARROGIN WA 6312

MAIN ROADS NARROGIN - WBS

26 SEP 2011

OFFICER: *Alcom - Cancell*

FILE NO: *419756*

FORBES NSW

Dear Mr Miller

CPS 818/8 - SUBMISSION - PROPOSED ROAD WIDENING - NARROGIN - KONDININ ROAD

Thank you for your letter dated 22 August 2011, inviting the Department of Environment and Conservation's (DEC) Native Vegetation Conservation Branch to provide comment on Main Roads Western Australia's (MRWA) proposed road widening of Narrogin – Kondinin Road in the Shire of Wickiepin. I understand that the area of impact involves the clearing of approximately 0.6 hectare (60 trees) of native vegetation.


Submissions are invited in accordance with condition 8 of clearing permit CPS 818/6 for any clearing that 'may be at variance', 'is at variance' or 'is seriously at variance' with the clearing principles contained within Schedule 5 of the *Environmental Protection Act 1986* (EP Act).

DEC has undertaken a desktop assessment of the proposal area against the clearing principles in Schedule 5 of the EP Act. I concur with your determination that the proposed clearing 'is at variance' with clearing principle (e) given the vegetation under application is within a highly cleared landscape (~10% remaining in 20km radius) and contains Beard vegetation complex 1023 of which there is ~11% remaining within the Avon Wheatbelt.

In accordance with conditions 5(a)(ii) and 9(c) and Part V of clearing permit CPS 816/6, MRWA is required to submit for approval an offset proposal as the clearing is at variance to principle (e). Please note that an offset proposal must be approved by DEC's CEO prior to clearing and prior to implementing the offset.

If you have any queries regarding the matters raised above, please contact Ms Jane Clarkson at DEC's Native Vegetation Conservation Branch on (08) 9219 8744.

Yours sincerely



Kelly Gaulkner  
MANAGER  
NATIVE VEGETATION CONSERVATION BRANCH

Officer delegated under Section 20  
of the Environmental Protection Act 1986

21 September 2011

Cc: Mr Murray Limb, Manager, Environment Branch, Main Roads WA, PO Box 5202, East Perth 6892

Native Vegetation Conservation Branch  
Phone: (08) 9213 8700 or (08) 9212 8744 Fax: (08) 9219 6701 E-mail: [nvp@dcwa.gov.au](mailto:nvp@dcwa.gov.au)  
Postal Address: Locked Bag 104, Bentley Delivery Centre, BENTLEY WA 6963  
[www.dcwa.gov.au/nvp](http://www.dcwa.gov.au/nvp)



## Appendix M

### **CPS 818 DEC Offset Approval**

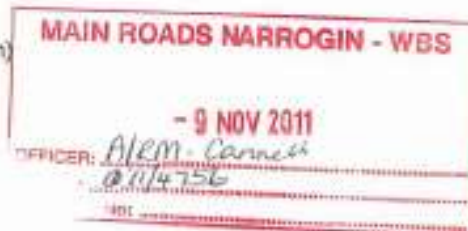


Government of Western Australia  
Department of Environment and Conservation

Journel: 11/4756  
Our ref: CPS 818/6  
Enquiries: Jane Clarkson  
Phone: 9219 8744  
Fax: 9219 8701  
Email: [nvp@dec.wa.gov.au](mailto:nvp@dec.wa.gov.au)

Mr Wayne Cannell  
A/ Regional Manager (Wheatbelt South Region)  
Main Roads Western Australia  
PO Box 194  
NARROGIN WA 6531

Attention: Mr Nigel Rowe



Dear Mr Cannell

**CPS 818/6 – NARROGIN-KONDININ ROAD WIDENING – OFFSET PROPOSAL**

Thank you for your letter dated 14 October 2011 providing Main Roads Western Australia's (MRWA) "Narrogin-Kondinin Road Widening - Offset Proposal". This offset proposal is to meet the requirements of conditions 5(a)(ii), 9(c) and Part V of clearing permit CPS 818/6 for the purpose of MRWA's proposed road reconstruction and widening.

In summary, MRWA proposes to offset the proposed clearing of the 0.6 hectares through:

- the acquiring, fencing and revegetation of 3 hectares of 'completely degraded' native vegetation on Lot 3864 on Plan 114309 and Lot 1569 on Plan 106212; and
- the acquiring, fencing and revegetation of a further 7.5 hectares of 'completely degraded' native vegetation on Lot 4551 on Plan 114333, Lot 1612 on Plan 106210, Lot 1544 on Plan 106202, Lot 1743 on Plan 114335, Lot 1550 on Plan 106439 and Lot 1704 on Plan 106438.

Main Road's offset proposal has been assessed and I consider that it meets the requirements of an offset in respects to your Clearing Permit (CPS 818/6) conditions 5(a)(ii), 9(c) and Part V for the Narrogin-Kondinin Road Widening project. Please be advised that the Department of Environment and Conservation requires a 5 year commitment to monitor and manage offset sites.

Please ensure that formal evidence of land acquisition is provided to DEC by 3 May 2011.

If you have any queries, please contact Ms Jane Clarkson at DEC's Native Vegetation Conservation Branch on (08) 9219 8744.

Yours sincerely

Kelly Faulkner  
MANAGER  
NATIVE VEGETATION CONSERVATION BRANCH

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

3 November 2011

Att: Main Roads "Narrogin-Kondinin Road Widening- Offset Proposal" (4 October 2011)

Native Vegetation Conservation Branch  
Phone: (08) 9219 8700 or (08) 9219 8744 Fax: (08) 9219 8701 Email: [nvp@dec.wa.gov.au](mailto:nvp@dec.wa.gov.au)  
Postal Address: Locked Bag 104, Bentley Delivery Centre, BENTLEY WA 6983  
[www.dec.wa.gov.au/nvc](http://www.dec.wa.gov.au/nvc)  
[wa.gov.au](http://wa.gov.au)

To (E) Denton,  
Please liaise with Nigel  
and progress this  
proposal.  
B. Miller  
14/11/11

## Appendix N

### **Environmental Management Plan**

# Environmental Management Plan

## NARROGIN-KONDININ ROAD WIDENING

### Introduction

This Environmental Management Plan (EMP) has been developed for the project area following the completion of the Environmental Impact Assessment (EIA) 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.

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"> <li>a copy of the PEIA &amp; EMP;</li> <li>a map showing the location where the clearing occurred;</li> <li>the size of the area cleared (in hectares); and</li> <li>the dates on which the clearing was done.</li> </ul>	Project Manager	DEC
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	Revegetation and Landscape planning	To revegetate site.	Prepare a Project Revegetation Plan. Revegetation has previously occurred and will occur as part of this project along the Narrogin-Kondinin Road.	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
			Any stockpiled vegetation from clearing works shall not be burnt. This vegetation shall be mulched and used for the 2012 rehabilitation works, primarily at the western end of the project which comprises the offset area.	Contractor	Main Roads
Pre-Construction	Surface Drainage	Maintain the hydrological regime that exists prior to the construction of the proposal.	Stormwater drainage shall not be altered, the culvert extension will not impact surface drainage.	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
			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

ENVIRONMENTAL MANAGEMENT PLAN					
Timing	Topic	Objective	Action	Responsible Party	Advice
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

## Appendix O

### **Revegetation (Offset) Plan**



# Narrogin-Kondinin Road

Wickepin East 70.0 - 76.54

## Revegetation Plan

Revision 1.0  
August 2011

Prepared by:	<b>Nigel Rowe &amp; Peter Denton</b> Environment Officer
TRIM File Number	<b>11/4756</b>

# TABLE OF CONTENTS

<b>1.</b>	<b>PROJECT INFORMATION</b>	<b>59</b>
1.1	PROJECT LOCATION .....	59
1.2	ROAD HISTORY .....	59
1.3	PROPOSED WORKS .....	59
1.4	VEGETATION DESCRIPTION AT 70.0 TO 76.54 SLK .....	59
	TABLE 1 – SPECIES LIST NARROGIN KONDININ ROAD, 70.0 – 76.54 SLK & SURROUNDING AREA ....	60
<b>2.</b>	<b>REVEGETATION INFORMATION</b>	<b>61</b>
2.1	WEED CONTROL.....	61
2.2	TOPSOIL MANAGEMENT .....	61
2.3	FAUNA MANAGEMENT .....	61
2.4	DIEBACK MANAGEMENT .....	61
2.5	MACHINERY .....	61
2.6	SITE PREPARATION.....	62
2.7	REVEGETATION .....	62
	TABLE 2 – SPECIES LIST FOR REVEGETATION.....	62
2.8	ONGOING MAINTENANCE & MONITORING .....	62
2.9	SIGNAGE.....	63
	TABLE 3 REVEGETATION TIMELINE.....	64
<b>FIGURE 1</b>	<b>REVEGETATION LOCATION</b>	<b>65</b>
<b>FIGURE 2</b>	<b>AERIAL PHOTO, 70.0 TO 76.5 SLK</b>	<b>66</b>
<b>APPENDIX 1</b>	<b>HERBICIDE APPLICATION SHEET</b>	<b>67</b>
<b>APPENDIX 2</b>	<b>REVEGETATION MONITORING SHEET</b>	<b>68</b>

## **11. PROJECT INFORMATION**

### **11.1 Project Location**

The project is located on the Narrogin Kondinin Road between 70.0 to 76.54 SLK which is approximately 1.5 km east of Wickepin (see [Figure 1](#)) and 215 km south-east of Perth. These revegetation works follow the widening of the road along this 6 ½ km section.

### **11.2 Road History**

Gradual and steady increases in traffic levels along the Narrogin Kondinin Road have occurred as a result of increased grain freight movements in the area. This has increased the volume of vehicles using the Narrogin Kondinin Road to access the CBH bin in the town of Wickepin and Brookton. The width of the existing road is unsuitable for the increased traffic and these works are required to improve the road geometry and general road safety attributes along this section of road.

### **11.3 Proposed Works**

The roadworks on this section of road between 70.0 – 76.54 SLK will be constructed in 2011/2012. The works will involve clearing an area up to 0.6 ha.

Following these roadworks 10.5 ha of revegetation will occur in a 20 metre strip of resumed farmland between 70.18 to 75.5 SLK (see aerial photo [Figure 2](#)).

### **11.4 Vegetation Description at 70.0 to 76.54 SLK**

The vegetation in this area is mapped as Medium woodland; York gum, wandoo & salmon gum - Vegetation Association 1023. However in and around the project area only remnants in varying condition remain due to a long history of agricultural settlement. See [Table 1](#) for a list of species identified in the vicinity of the project.

<b>Family</b>	<b>Genus</b>	<b>Species</b>	<b>Common Name</b>
Mimosaceae	Acacia	acuminata	Jam
Mimosaceae	Acacia	microbotrya	Manna Wattle
Casuarinaceae	Allocasuarina	huegeliana	Rock Sheoak
Chenopodiaceae	Atriplex	semibaccata	Berry Saltbush
Poaceae	Austrostipa	elegantissima	
Myrtaceae	Callistemon	phoeniceus	Lesser Bottlebrush
Casuarinaceae	Casuarina	obesa	Swamp Sheoak
Phormiaceae	Dianella	revoluta	Blueberry Lily
Myrtaceae	Eucalyptus	longicornis	Red Morrel
Myrtaceae	Eucalyptus	loxophleba	York Gum
Myrtaceae	Eucalyptus	salmonophloia	Salmon Gum
Myrtaceae	Eucalyptus	wandoo	Wandoo
Papilionaceae	Gastrolobium	parviflorum	
Papilionaceae	Gastrolobium	spinosum	Prickly Poison
Proteaceae	Grevillea	huegelii	
Chenopodiaceae	Halosarcia sp		
Proteaceae	Hakea	preissii	Needle Tree
Myrtaceae	Leptospermum sp		
Myrtaceae	Melaleuca	brevifolia	Small Leaf Bluebush
Myrtaceae	Melaleuca	uncinata	Broom Bush
Thymelaeaceae	Pimelea	argentea	Silvery Leaved Pimelea
Templetonia	Templetonia	sulcata	Centipede Bush

**Table 1 – Species List Narrogin Kondinin Road, 70.0 – 76.54 SLK & Surrounding Area**

## **12. REVEGETATION INFORMATION**

The revegetation along this section of road will be via plantings with locally occurring indigenous species ([Table 2](#)) within the road reserve. The total area to be revegetated is 10.5 ha of previously farmland acquired for this project.

### **12.1 Weed Control**

Weed control will involve herbicide treatments to reduce the amount of weeds present. This will reduce the competition for available water and nutrients with the native seedlings, leading to a more successful revegetation outcome. Weed control will be carried out after the 2012 opening rains and once the annuals emerge, it should also be completed several weeks prior to planting. Herbicide will be applied from a boom spray unit where accessible and hand sprayed in other areas. A herbicide application record sheet will be completed for all weed spray operations ([Appendix 1](#)).

Areas to be planted with seedlings will be sprayed during late April/May before planting (timing may vary with seasonal conditions). These sites will be sprayed with a residual herbicide (e.g. Simazine) and knockdown (e.g. Glyphosate) mix. Simazine will be sprayed at 2 kg/ha and Roundup PowerMax will be sprayed at a minimum 1 L/ha, with the carrier 100 litres of water per hectare.

A follow up spray in spring with Fusilade or Verdict may be required to control narrow leaf grasses. If narrow leaf grasses are prevalent on the site it would be anticipated this herbicide treatment would be required. Fusilade will be sprayed at a maximum 3.3 L/ha and if Verdict is used this will be sprayed at a maximum 0.4 L/ha, with the carrier 100 litres of water per hectare.

### **12.2 Topsoil Management**

For the Wickpin East Project the decision was made to keep the topsoil in situ. Although the area does have weeds present, it is considered the weed control program can tackle the majority of these weed species. By keeping the topsoil on site any nutrients, organic matter or micorrhizal fungi will remain to benefit the revegetation.

### **12.3 Fauna Management**

It is recognised that vegetation inside road reserves can act as corridors for wildlife movement and removal of road reserve vegetation has the potential to impact on the movement of fauna. To increase fauna habitat any large boulders and wood debris brought to the surface during ripping will be left for habitat. Suitable large tree trunks that can be placed in the revegetation site following ripping may also be available from adjacent project clearing.

### **12.4 Dieback Management**

The project area receives less than 400 mm average annual rainfall and as such, dieback is not considered to be an issue.

### **12.5 Machinery**

Large earthmoving machinery and tractors will be required to prepare the site for planting. It is a requirement for the project that:

- Oil changes will not be carried out within the revegetation site.
- All machinery to be fitted with fire extinguishers.
- Any soil contaminated by oil or fuel will be removed from site and disposed of at an approved location.
- Fuel will not be stored on site.

## 12.6 Site Preparation

For the 10.5 ha planting sites mulched vegetation, where available, from the road works will be respread across the planting site to a minimum depth of 50 mm and not more than 100 mm thick. Mulch will be prioritised for the 3.0 hectare offset site with any remaining spread over the other 7.5 hectare revegetation area. After the mulch is spread the area will be ripped along the contour at 1-metre intervals and to a minimum depth of 300 mm with a grader or ideally a dozer. Using a dozer, a D6 or equivalent, means a ripping depth of 450+ mm can be achieved. This will ensure ripping is deep enough in the mulched areas and to create a suitable medium for the plants to establish. This ripping will occur in dry conditions (March/April) as this will shatter the soil and allow time for the site to settle before planting.

All ripping will be undertaken by a machine with a multi shank ripper to reduce the number of passes required and fitted with new Ground Engaging Tools (ripper boots) on the ripping shanks to further improve the quality of the site preparation.

## 12.7 Revegetation

Planting will occur in late June to July with 2,000 stems per hectare (1 plant per 5.0 m<sup>2</sup>). Seedlings are to be 'hardened off' before planting and at this rate approximately 22,000 stems will be required to cover the 10.5 ha site (25,000 will be ordered to ensure there are adequate numbers). Fertiliser for the planting won't be used as the majority of the land to be revegetated is old farmland which has been subjected to high fertiliser use over many years

Species	Common Name	Quantity
<i>Acacia lasiocarpa</i>	Panjang	1,500
<i>Allocasuarina huegeliana</i>	Rock Sheoak	2,000
<i>Allocasuarina humilis</i>	Dwarf sheoak	2,000
<i>Callistemon phoeniceus</i>	Lesser Bottlebrush	2,000
<i>Calothamnus quadrifidus</i>	One-sided Bottlebrush	3,000
<i>Casuarina obesa</i>	Swamp Sheoak	1,000
<i>Dianella revoluta</i>	Blueberry Lily	500
<i>Eucalyptus longicornis</i>	Red Morrel	1,000
<i>Eucalyptus loxophleba</i>	York Gum	1,000
<i>Eucalyptus salmonophloia</i>	Salmon Gum	1,000
<i>Eucalyptus wandoo</i>	Wandoo	1,000
<i>Gastrolobium parviflorum</i>		1,000
<i>Gastrolobium spinosum</i>	Prickly Poison	1,000
<i>Hakea lissocarpa</i>	Honey Bush	2,000
<i>Hakea multilineata</i>	Grass Leaf Hakea	1,000
<i>Hakea preissii</i>	Needle Tree	500
<i>Hakea undulata</i>	Wavy-leaved Hakea	1,000
<i>Melaleuca uncinata</i>	Broom Bush	2,000
<i>Pimelea argentea</i>	Silvery Leaved Pimelea	500
		25,000

**Table 2 – Species List for Revegetation**

## 12.8 Ongoing Maintenance & Monitoring

Monitoring of the revegetation effort will determine if follow up plantings will be required. The methodology for monitoring will involve establishing quadrants, photo monitoring points and utilising Main Roads' rapid assessment 'drive by monitoring'. The quadrants will be 100 m<sup>2</sup> (10 m by 10 m). The fixed corner points for the quadrant can also double as the location for the photo monitoring points. During monitoring revegetation success and weed invasion will be recorded using the monitoring sheets at [Appendix 2](#).

The revegetation site will be inspected in November after planting to assess if infill plantings are required during the following winter. The site may still have a good survival rate in November but it is important to inspect the site early as seedling orders for the following winter are required at nurseries by December. If no infill is proposed a second inspection will occur in April/May of the following year. By this time the seedlings would have gone through their first summer and species density, diversity and weed load can be assessed.

One year after revegetation there should be 1,500 stems per hectare (75 % survival from the 2,000 stems per ha planted) and no less than 5 different species present per 100 m<sup>2</sup>.

If the species density or diversity has dropped significantly below these amounts infill planting will be required. At the time of this inspection (April/May) there are still several months to ring around to nurseries in an attempt to locate seedlings for infill planting during June/July. There is also time to arrange follow up weed control if the weed load is determined to be detrimental to maintaining species density and diversity in the future. This weed control will again be through the use of herbicide and will either be in the form of broadscale application or spot treatment of affected areas.

For follow up weed control if a Simazine/Roundup mix is used (see [Weed Control](#) section) in planted areas this will be spot sprayed on target weeds to avoid overspray onto native plants. Broadscale application will again be through a boom using a Simazine/Fusilade or Simazine/Verdit mix, Roundup should be avoided in a boom spray situation as if sprayed over the planted vegetation this will kill the native plants as well. The only time spraying Roundup over planted vegetation will be considered is in areas with a large amount of broadleaf weed. Roundup can be used when these weeds first germinate at a rate of 0.1-0.2 L/ha, however timing is crucial as spraying must occur before these weeds become established. At this rate the leaves on the planted vegetation will slightly burn and growth might be set back for a few months, so this Roundup option will only be used as a last resort for controlling broadleaf weed in this revegetation site.

For three years after planting the health and quantity of the revegetation will be monitored. If determined during this monitoring that weed control is required then follow up herbicide applications will occur on problem weeds also for up to three years after planting. This monitoring may result in further plantings if species density or diversity has diminished. Generally infill planting will only be a viable option for the year following the initial planting. This is because several years after the initial works the canopy and root systems are beginning to develop, making it hard for newly planted seedlings to take hold and establish themselves.

## **12.9 Signage**

Revegetation sites will be signed with Main Roads' standard sign MR-GM-14 ([http://standards.mainroads.wa.gov.au/NR/rdonlyres/F1263FEB-1A85-496D-8FDB-65C7292770E6/0/E27029\\_20090310130158697.PDF](http://standards.mainroads.wa.gov.au/NR/rdonlyres/F1263FEB-1A85-496D-8FDB-65C7292770E6/0/E27029_20090310130158697.PDF)).

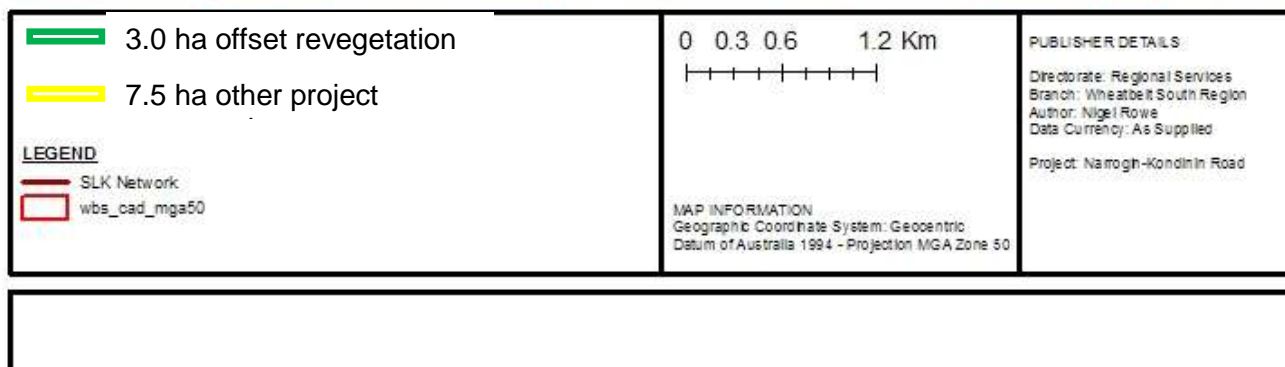
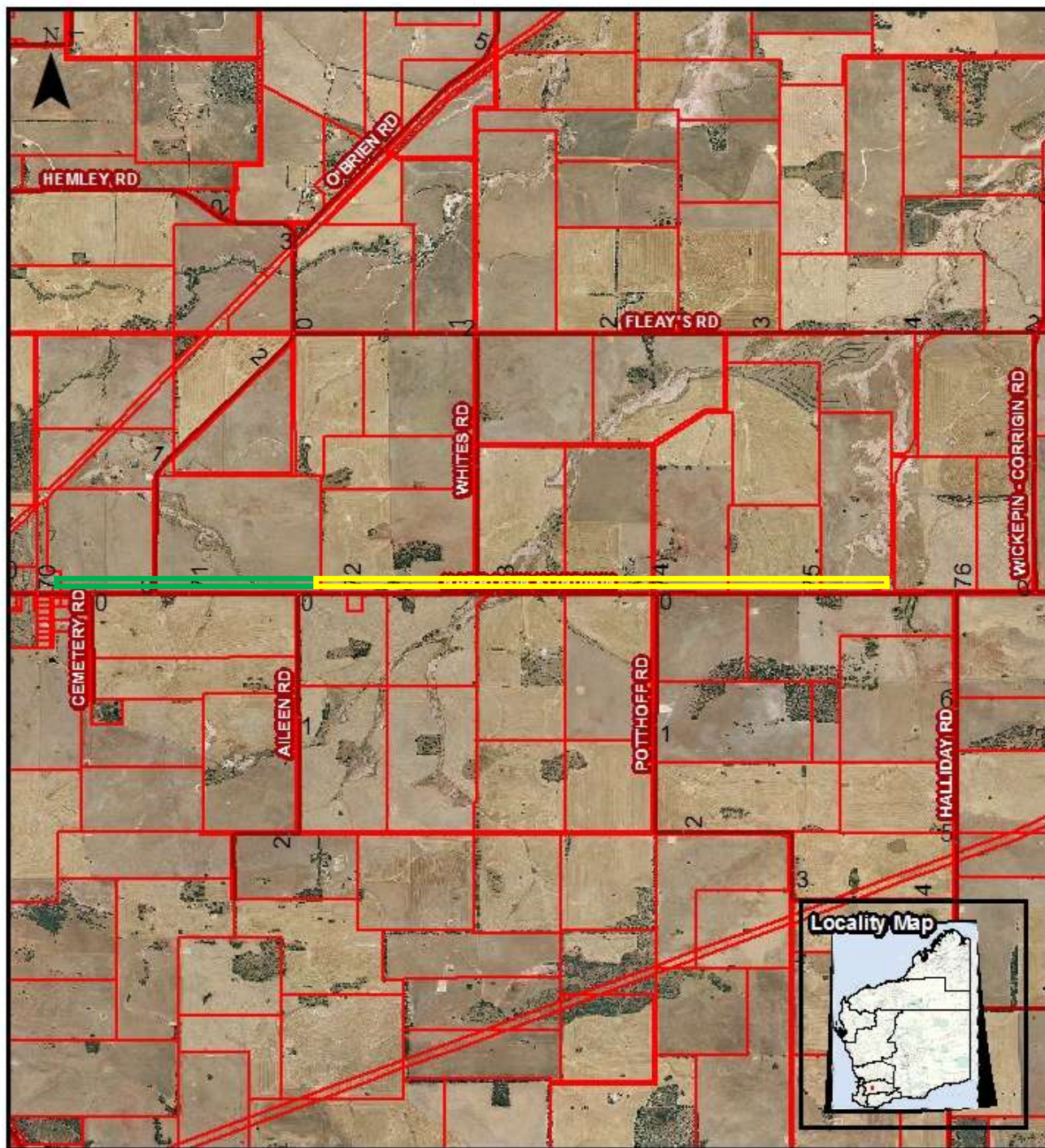
**Table 3 Revegetation Timeline**

<b>Aspect</b>	Summer 2011	Autumn 2012	Winter 2012	Spring 2012	Summer 2012/13	Autumn 2013	Winter 2013	Spring 2013	Summer 2013/14	Autumn 2014	Winter 2014	Spring 2014	Summer 2014/15	Autumn 2015	Winter 2015
Seedling order															
Site preparation															
Initial weed control															
Seedling plantings															
Follow up weed control															
Monitoring															
Infill planting															
Maintenance weed control															





FIGURE 2 AERIAL PHOTO, 70.0 TO 76.5 SLK



## APPENDIX 1 HERBICIDE APPLICATION SHEET

LOCATION AND APPLICATION			SPRAY PARAMETERS				VOLUME OF CHEMICAL PER TANK				
Road/Location : _____			Nozzle Type: _____				Carrier Fluid: _____				
			Nozzle Pressure: _____				Herbicide(s): _____				
Tank Capacity (Full): _____			L/Min Output: _____								
Boom Width: _____			Vehicle Speed: _____								
Hose Reel Description: _____			Operators Name: _____				Surfactant: _____				
Date	Start SLK	Finish SLK	Left	Med	Right	Area(Ha)	Spray Hrs	Application (Boom/Hose)	Rate/Ha	Used(L)	Comments
			TOTALS								
<b>WEATHER</b>						<b>REMARK / FACTORS AFFECTING PERFORMANCE</b>					
Overcast		Fine				_____ _____ _____ _____ _____					
Temp ° C		_____									
Humidity		Low <input type="checkbox"/> Med <input type="checkbox"/> High <input type="checkbox"/>									
Wind		N <input type="checkbox"/> S <input type="checkbox"/> E <input type="checkbox"/> W <input type="checkbox"/>									
Speed km/hr:		Knots: _____									

## APPENDIX 2 REVEGETATION MONITORING SHEET

Used for a Monitoring Quadrants

Site Number		GPS		SLK		Side of Road	
Current Site Conditions							
Revegetation History							
Revegetation Species Present in 10 m x 10 m							
Number of species present in 10 m x 10 m		Number of individual plants present in 10 m x 10 m		Approximate number of plants present in one ha			
Weed Species Present							
Additional Comments							

Used for Rapid Assessment monitoring i.e. drive by monitoring

SLK from	SLK to	Landform	Reveg Treatment	Left Verge			Notes	Action Required
				Width (m)	Plant cover	Weed cover		

Plant Cover	Rating
Good cover > 50%	A
Fair cover 25-50%	B
Poor cover < 25%	C

Weed Cover	Rating
Few weeds present, isolated or small clumps (<10% cover).	1
Some weeds present - weed cover < revegetation cover.	2
Invasive species, grasses - weed cover > revegetation cover.	3