

**PRELIMINARY ENVIRONMENTAL IMPACT ASSESSMENT AND  
ENVIRONMENTAL MANAGEMENT PLAN (MINOR PROJECTS)  
DRAG STRIP AND SIX MILE CREEK CROSSING**



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# DRAG STRIP AND SIX MILE CROSSING

## COMBINED ENVIRONMENTAL REPORT

### 1. INTRODUCTION

The project involves improving the flood crossings at Six Mile Creek (SLK 467.53) and Drag Strip (SLK 462.8) on North West Coastal Highway, south of the Carnarvon townsite. Six Mile creek will have a road realignment to the west in order to improve road safety in times of flooding as well as relocating the culverts 100 meters south of the crossing. Drag Strip will have a culvert upgrade in order to reduce road closure time when flooding occurs.

All works take place within the Shire of Carnarvon.

### 2. BACKGROUND

Heavy rainfall in the catchment of the Gascoyne River can cause severe flooding in Carnarvon and surrounding plantation areas. Floods causing damage and social disruption have occurred at least nine times in the last 50 years.

The measures described in this report will have the effect of increasing the magnitude of flow through the Drag Strip and Six Mile Creek crossings from the Nicol Bay storage basin. It is hoped that these measures will reduce the road closure times of North West Coastal Highway surrounding these sections of road and provide a safer road network.

As per Main Roads' Environmental Assessment and Approval process, the Low Impact Environmental Screening Checklist has been completed for the proposal, refer Appendix A. As the proposed works involves *clearing of native vegetation*), the preparation of a project specific Preliminary Environmental Impact Assessment (PEIA) and Environmental Management Plan (EMP) are required. This report fulfils this requirement.

### 3. DESCRIPTION OF THE PROJECT

The location and boundaries of the study area are shown in Figures 2 and 3 and include the following features:

#### 1) Six Mile Creek Upgrade

The upgrade involves the construction of a culvert and floodway as well as realignment at Six Mile creek crossing to reduce road closure periods at times of flooding.

#### Culvert Details

It is proposed that a new culvert structure be relocated approximately 100m south of the existing culvert location so as to be positioned more centrally in the channel openings for low flows. Therefore, retaining of the channel approximately 150m upstream and downstream of the proposed culverts will be required for this option. The invert of the proposed culverts has been set only 200mm below the natural ground level to minimise the length of retaining due to the relatively flat terrain.

#### Road Realignment.

Due to the existing horizontal curve in the road at the northern approach to Six Mile crossing it is proposed that the highway be realigned to the west from (467.53 to 468.63 SLK) to provide sufficient site distance to the floodway for safety. See Figures 2 and 3 for a map of the road realignment proposal.

## **2) Drag Strip**

Together with the upgrade of Six Mile crossing, it is proposed that the existing Drag Strip floodway alignment and profile be retained with the construction of a new drainage culvert and floodway scour protection.

### Drainage Culvert Details

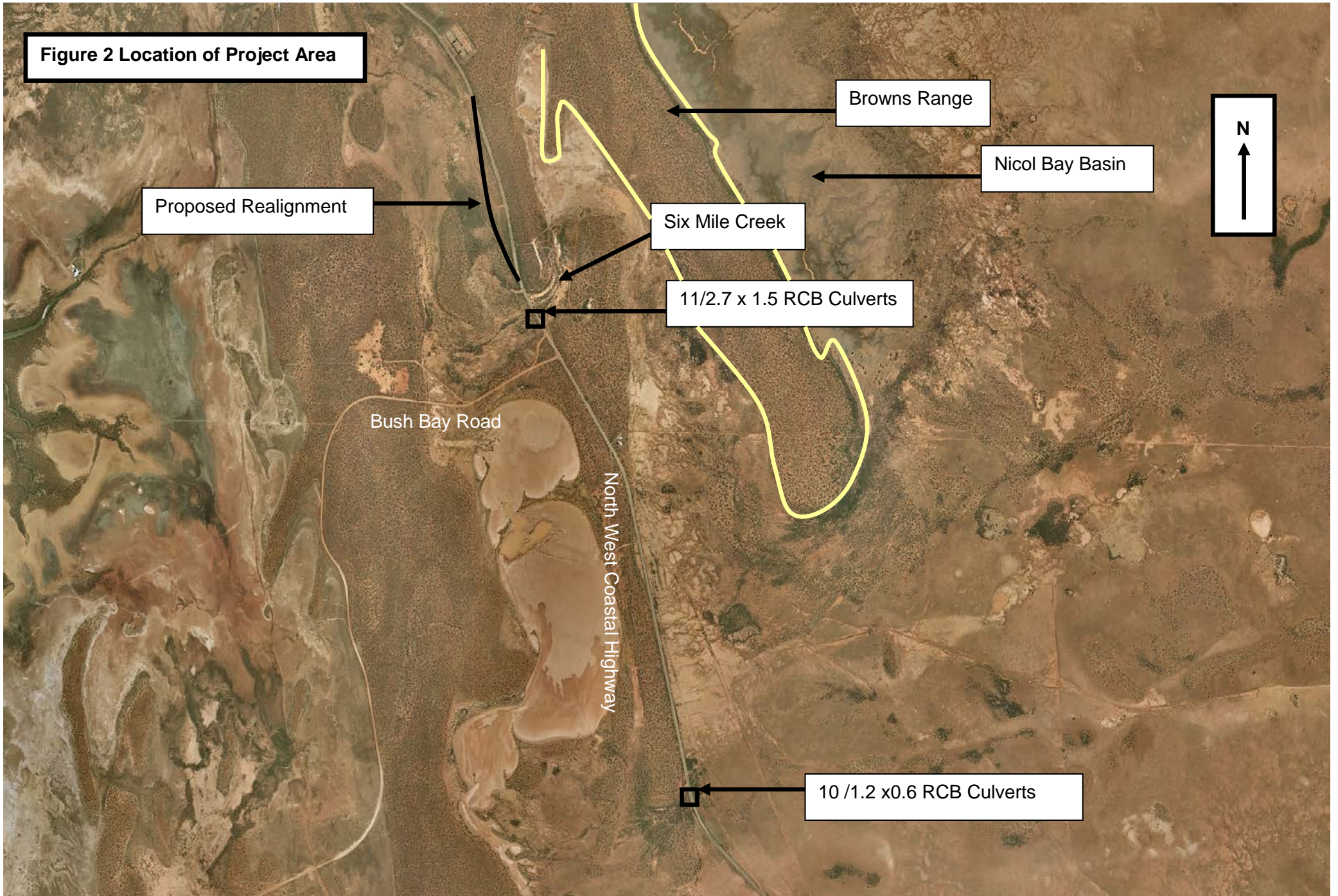
It is proposed that 10/ 1.2 x 0.6 m RCB culverts replace the existing 1/ 600mm diameter RCP at the northern low point of the floodway purely for drainage purposes. Some nominal retained excavation is likely to be required upstream and downstream of the proposed culvert. No inlet rock protection is required at the culvert, and outlet protection is to match the embankment batter protection.

### Scour Protection Requirements

Light class rock is to be provided on the downstream batter slope over a length of 700m at the northern end of the floodway. The remaining 1.1 km of floodway at the southern end of the Drag Strip crossing is proposed to have Facing Class rock protection on the downstream batter. It is also recommended that a downstream concrete cut off wall be constructed.

Figure 1 Broad Location Map





**Figure 2 Location of Project Area**

Browns Range

Nicol Bay Basin

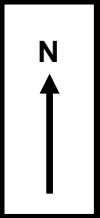
Proposed Realignment

Six Mile Creek

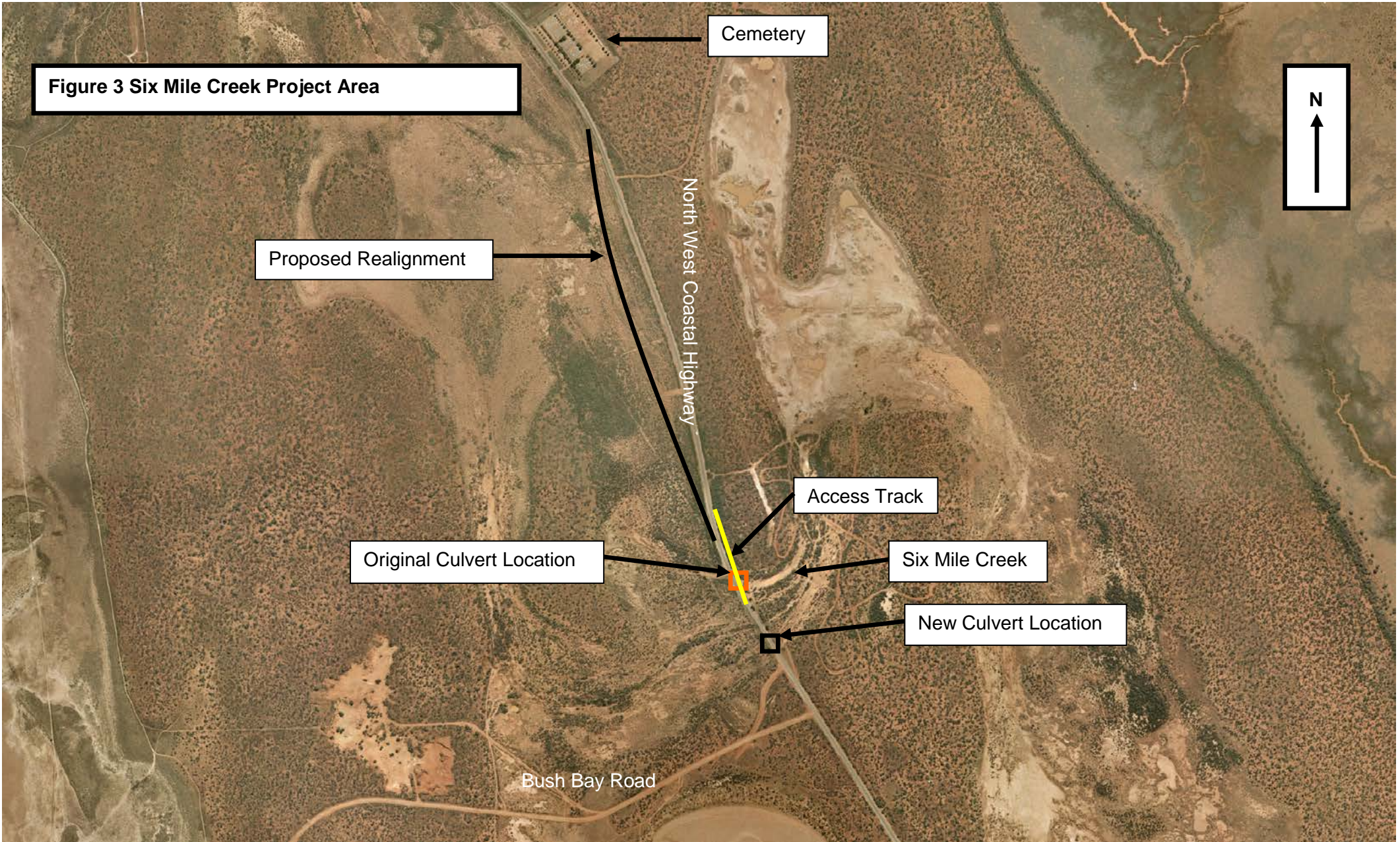
11/2.7 x 1.5 RCB Culverts

Bush Bay Road

North West Coastal Highway



10 /1.2 x0.6 RCB Culverts



### **3.1 Methodology**

#### **3.1.1 Preliminary Desktop Study**

A preliminary assessment of the project area and its potential constraints was undertaken by reviewing a number of government agency managed databases.

A preliminary assessment of the project area and its potential constraints was also undertaken by GHD in June 2004.

#### **Wetlands**

The locations of wetlands within the project area was determined using the Commonwealth Department of Environmental and Heritage (DEH) mapping tool, Department of Environment (DoE) Environmentally Sensitive Area (ESA) mapping tool ([http://portal.environment.wa.gov.au/portal/page?\\_pageid=53,2569721&\\_dad=portal&\\_schema=PORTAL](http://portal.environment.wa.gov.au/portal/page?_pageid=53,2569721&_dad=portal&_schema=PORTAL)) and by seeking advice from the regional DoE officer.

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

Department of Conservation and Land Management's (CALM's) database was searched for known populations of threatened flora, fauna and Threatened Ecological Communities (TECs) and conservation reserves, refer Appendix C (Table taken from GHD,2004 Report). A quick TEC check can be done using the ESAs mapping tool [http://portal.environment.wa.gov.au/portal/page?\\_pageid=53,2569721&\\_dad=portal&\\_schema=PORTAL](http://portal.environment.wa.gov.au/portal/page?_pageid=53,2569721&_dad=portal&_schema=PORTAL). Consultation with CALM regional staff also took place.

#### **Air Quality**

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

#### **Heritage**

Non-indigenous heritage was examined utilising the Australian Heritage Places Inventory (<http://www.heritage.gov.au>), Heritage Council of Western Australia (<http://register.heritage.wa.gov.au/>) and the City of Carnarvon's Municipal Heritage Inventory refer Appendix D.

#### **Aboriginal Heritage**

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

Copies of the Conclusion and Recommendations from the Ethnographic Heritage survey by the Yamatji Marlpa Barna Baba Maaja Aboriginal Corporation and the Archaeological Survey by Eureka Archaeological Research and Consultation (UWA) have also been included in Appendix E.

#### **Sensitive Water Resources**

The Water Information Officer of the Department of Water's regional office was consulted on sensitive water resources (including Public Drinking Water Source Areas) to determine whether the project area supported, or was adjacent to, any significant lakes, rivers or wetlands or proclaimed areas, refer Appendix F.

#### **Contaminated Sites**

The project area is within a reserve that has remained in control of Main Roads and there is no evidence of contamination therefore it is not considered a contaminated site.



### **Acid Sulfate Soils**

The Western Australian Planning Commission's acid sulfate soils maps were reviewed and the self assessment done (<http://www.wapc.wa.gov.au/Publications/213.aspx>) to determine what level of risk the project area is exposed to, refer Appendix G.

### **Weeds**

Consultation was undertaken with the Department of Agriculture to determine whether there are any known populations of declared plants or significant weeds in or adjacent to the project area, refer Appendix H.

### **Dieback**

Project receives <400 mm of rain so determined not to be an issue.

### **Commonwealth Referral**

The decision to refer the project to the Commonwealths DEH was based upon whether the project was going to impact upon matter of national significance, eg World Heritage properties, protected wetlands and migratory species, Commonwealth marine areas, threatened species or communities or nuclear actions (refer to the Commonwealth webpage [www.deh.gov.au/epbc/assessmentsapprovals/index.html](http://www.deh.gov.au/epbc/assessmentsapprovals/index.html) for further information and the search tool page at <http://www.deh.gov.au/erin/ert/epbc/imap/map.html>), refer Appendix I.

#### 3.1.2 Site Investigation

A site visit was carried out by Matthew Oswald on 12/05/06 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 the potential for noise and vibration impacts (dilapidation).

## **4. EXISTING ENVIRONMENT**

The 6-Mile Creek area includes a variety of vegetation types, due mainly to the variation in topography and soil types. The survey area includes the red sand dunes of the Brown Range, Acacia scrublands on slopes and flats, claypans and the creek channel and associated taller vegetation. The vegetation was in generally good condition, with some evidence of stock grazing. The creek bed has been used for sand extraction to the east side of the Highway and borrow has also occurred off Bush Bay Road to the west, but in most areas the vegetation is still intact.

Vegetation descriptions are as follows:

**Acacia shrubland:** This shrubland is widespread within the area but varies locally in terms of species dominance and vegetation density. Typical shrubland consists of *Acacia tetragonophylla*, *Acacia sclerosperma* to a height of 3m over chenopods such as *Rhagodia eremaea*, and *Atriplex semilunaris*, *Eremophila sp.*, *Ptilotus ?schwartzii*, with a ground layer of buffel grass and *Zygophyllum*. The cover of the dominant Acacia shrubs is generally 30 to 40% with denser areas up to 70% cover due presumably to better water availability.

#### **Dune shrubland:**

Open shrubland on deep red sands of the Brown Range and other dunes. Dominated by *Acacia sclerosperma*, *Verticordia forrestii*, *Eremophila maitandii*, *Eremophila fraseri*, *Lycium australe*, *Ptilotus obovatus*. This vegetation is considered less dense than the

Acacia shrubland on lower ground due to the dry conditions in the dune. Vegetation cover of the shrub species is around 10 to 20%.

**Clay pan perimeter:**

A narrow strip of vegetation around the clay pans on the south-west and north-east portions of the study area includes some species which are different from the surrounding areas. This vegetation can be temporarily inundated and is scattered and patchy and included low to medium shrubs, sedges and some ephemeral plants. Species include: *Scaevola spinescens*, *Olearia Muelleri*, *Commicarpus australis*, *Halosarcia sp*, *Rhagodia sp.*, *Meulenbeckia cunninghamii* and *Lycium australe*.

**Eucalyptus victrix woodland:**

This open woodland is primarily found on creeklines and adjoining floodplains. The presence of the trees is generally indicative of shallower water tables and periodic flooding. The trees occur relatively densely along the creek channel edges and become sparser up to a distance of about 150m either side of the creek. Understorey and other species are generally sparse, with the area having many bare, muddy areas and drifts of riverine sand. Species include: *Ptilotus schwartzii*, *Acacia tetragonophylla*, *Muelenbeckia cunninghamii*, *Alectryon oleifolius ssp. Oleifolius*, *Marsilea drummondii*, *Abutilon sp.*, *Stemodia viscosa*, *Amyema sp.*, *Exocarpos aphyllus*, *Sclerolaena sp.*, *Atriplex semilunaris*.

## 5. CLEARING OF NATIVE VEGETATION

Under the amended *Environmental Protection Act 1986 (EP Act)* clearing of native vegetation must be under the authority of a clearing permit.

In assessing whether the project is likely to have a significant impact on the environment, the project has been assessed against the DoE's 10 principles of clearing, see table below.

<b>Clearing Principles - <i>Environmental Protection Act</i> Section 5</b>	Yes/No
Does the area to be cleared comprise a high level of biological diversity?	No
Does the area to be cleared comprise the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia?	No
Does the area to be cleared include, or is necessary for the continued existence of, rare flora?	No
Does the area to be cleared comprise the whole or a part of, or is necessary for the maintenance of, a threatened ecological community?	No
Is the area to be cleared significant as a remnant of native vegetation in an area that has been extensively cleared?	No
Does the area to be cleared within, or in association with, an environment associated with a watercourse or wetland?	No
Is the clearing of the vegetation likely to cause appreciable land degradation?	No
Is the clearing of the vegetation likely to have an impact on the environmental values of any adjacent or nearby conservation area?	No
Is the clearing of the vegetation likely to cause deterioration in the quality of surface or underground water?	No
Is the clearing of the vegetation likely to cause, or exacerbate, the incidence or intensity of flooding?	No

The Six Mile realignment is expected to be 1.1 kilometres long with a total clearing width requirement of 20 meters. This makes the total clearing area 2.2 hectares.

In order to undertake the culvert and realignment work a side access track has been proposed on the eastern side of North West Coastal Highway. The access track is expected to be 200 meters long with a width of 8 meters making total clearing requirement 0.16 hectares. It should be noted that the east side of six mile creek has in the past been used for sand extraction, but in most areas the vegetation remains intact. All vegetation to be impacted is well represented in the region and no Declared Rare Flora or Priority Flora has been recorded in the GHD (2004) report. (See Appendix C)

No clearing is required for the installation of culverts.

Clearing Principle 'f'; "Does *the area to be cleared within, or in association with, an environment associated with a watercourse or wetland?*" was discussed with the Department of Water (Carnarvon office) and Department of Environment and Conservation (Geraldton office). Katrina Burton from the Department of Water confirmed that the project works is not within a significant watercourse or wetland (Appendix F). All efforts will be made to minimise the impacts of clearing. The alignment of the access track will be designed in order to avoid clearing mature stands of *Eucalyptus vitrix*.

Please note that consultation was undertaken with Kylie Bauer from Department of Water in regards to the access track crossing the Six Mile creek bed. Following her advice, a Permit to Disturb Bed and Bank is not required. (See Appendix F)

## ASSESSMENT OF ASPECTS AND IMPACTS

**Table 1: Aspects and Impacts – Six Mile Creek Realignment and Culvert Improvement**

<b>Aspect</b>	<b>Evaluation of Potential Impacts</b>
Air quality	Not relevant to the proposed works. Local air quality assessment is not required for the project since: <ul style="list-style-type: none"> <li>the predicted traffic flow is less than 15,000 vehicles per day;</li> <li>residential and other sensitive receptors are not within 200 meters of the road centre</li> </ul>
Dust	Likely to be a minor issue during earthworks.
Fauna	<p>The EPBC Act Protected Matters Report listed two threatened species likely to occur in the area. These are the Slender-billed Thornbill (western) and the Western Spiny-tailed Skink. Both species were not observed in the field survey undertaken as part of the GHD (2004) report (Appendix C).</p> <p>The CALM Rare Fauna Database listed the following species likely to occur in the Carnarvon area:</p> <ul style="list-style-type: none"> <li>Western Spiny-tailed Skink</li> <li>Peregrine Falcon</li> <li>Grey Flacon, and;</li> <li>Eastern Curlew</li> </ul> <p>These species were not observed in the field survey undertaken as part of the GHD (2004) report (Appendix C).</p> <p>Scott Godley (Acting Senior Operations Officer) from CALM in Carnarvon was consulted. He is familiar with the works area and has no concerns with the project. (Appendix C)</p> <p>Some fauna habitat will be disturbed as a result of vegetation clearing. However, most fauna will have the opportunity to move from the site to adjoining areas. The following commitments will be made for the project:</p> <ul style="list-style-type: none"> <li>Vegetation clearing in the creek zones will be minimised as far as possible</li> <li>Any fauna encountered during vegetation clearing or soil movement will be allowed or encouraged to move off site, and;</li> <li>If any animals can't be moved, a fauna handler will be called to remove them safely</li> </ul>
Vegetation – clearing	The native vegetation to be cleared will be done so using the purpose permit as the project does not occur within an ESA.
Vegetation – TECs/DRF	A Declared Rare and Priority Flora list from the CALM database can be seen in Appendix C (Taken from GHD, 2004 Report). None of the species listed in the table were observed during a site investigation by John Stretch (Department of Agriculture) on the 28/08/06. A complete flora list observed throughout the project site can be viewed in Appendix H.
Vegetation – weeds	Consultation with the Department of Agriculture confirms that there are no declared plants in the project area (Appendix H).
Vegetation – dieback	Not an issue given the project area receives less than 400 mm of average annual rainfall.
Reserves / Conservation areas	None within or adjacent to the project area.
Heritage (non-indigenous)	<p>A search of the Australian Heritage Places Inventory, Heritage Council of Western Australia and the Shire of Carnarvon's Municipal Heritage Inventory on-line databases has indicated that there are no heritage significance listed sites present in the currently proposed works areas.</p> <p>The nearest site on the North West Coastal Highway is the Carnarvon cemetery. The realignment will finish approximately 80 meters south of the cemetery (See Figure 3). No impact from the works is expected on the cemetery site.</p>
Aboriginal heritage	<p>A search of the DIA database identified 2 known sites of Aboriginal heritage significance.</p> <p>Archaeological and Ethnographic Heritage surveys were undertaken as part of the GHD (2004). Both reports state that there are no known sites of cultural significance within the project area and that approval is granted for the works to proceed (Appendix E).</p>

**Table 1: Aspects and Impacts – Six Mile Creek Realignment and Culvert Improvement**

<b>Aspect</b>	<b>Evaluation of Potential Impacts</b>
Surface water/drainage	Consultation with Department of Water has confirmed that the proposed works will not disturb or interrupt any natural drainage and surface run-off patterns (Appendix F).
Wetlands	There are no wetlands within the vicinity of the project area.
Groundwater	No dewatering nor drainage modifications are required, hence no change to groundwater level or quality.
Noise and vibration	No major sensitive local receivers. Construction works would not be 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 Carnarvon 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. Suitable site completion treatments, including landscape planting and rehabilitation, could result in an improvement in local visual amenity.
Public safety and risk	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 road conditions during flooding events.
Hazardous substances	Not relevant to the proposed works.
Contamination	The works is 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, eg petrol station.  Since the works is adjacent to a small drainage line, a spill management plan will be prepared. DoE will provide advice on this issue.
Salinity	Given the nature and scale of the project the impact is not relevant.
Acid Sulfate Soils	The WAPC's self-assessment (Planning Bulletin 64) indicates that no further soil investigation is required for the project.
Statutory Land Use Planning	As the proposed works is entirely within the existing road reserve, no further amendments would be required to the Local Government Planning Scheme or Region Scheme.

## 6. DECISION TO REFER

Given the scale of the project, the low significance of its impacts to the surrounding environment and the environmental management measures proposed, the project does not require referral to the WA Environmental Protection Authority or the Commonwealth Department of the Environment and Heritage.

## **7. ENVIRONMENTAL MANAGEMENT PLAN**

This section of the report (the EMP) has been developed for the project area following the completion of the above sections. The main aims of this EMP is to provide a management plan to assist in minimising the environmental impacts of the activities associated with the proposed works and identify who is responsible for the implementation of the management strategies.

This EMP will only address the actions already listed as well as any site-specific issues that were identified during the PEIA. The project specific management measures identified within this EMP are in addition to the standard specifications used for Category 2 projects. The environmental management measures/conditions in Main Road's Specifications 203, 204, 301, 302 and 304 are still to be followed where applicable.

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

- area of management (eg vegetation);
- the timing of the various management requirements;
- the management objectives for each area;
- the management strategies that are necessary to minimise the impact;
- the person/s responsible for implementing the management action; and
- on whose advise or Main Roads requirement

ENVIRONMENTAL MANAGEMENT PLAN					
Area of management	Timing	Management objective	Management Strategy	Responsibility	Whose advice
Communication	All phases of Construction	The Project Manger is required to identify both internal and external stakeholders, obtain their requirements on the Project and communicate as required or at regular intervals with key stakeholders.	Develop and implement a communication plan including response to complaints, liaising/reporting to government agencies, engagement with the community and other when work is performed outside the normal hours with specific reference to nuisance issues such as noise, dust and lightning spill.	Project Manager	Main Roads
Vegetation Clearing - Record-keeping	All phases of Construction	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 (Minor projects) for small projects;</li> <li>a map showing the location where the clearing occurred, recorded in an ESRI Shapefile;</li> <li>the size of the area cleared (in hectares);</li> <li>the dates on which the clearing was done.</li> </ul>	Project Manager	DoE
			Revegetation and rehabilitation of areas: <ul style="list-style-type: none"> <li>a copy of each Revegetation Plan;</li> <li>a map showing the location of any area revegetated and rehabilitated recorded in an ESRI Shapefile;</li> <li>a description of the revegetation and rehabilitation activities undertaken; and</li> <li>the size of the area revegetated and rehabilitated (in hectares).</li> </ul>	Project Manager	DoE
Vegetation - Clearing	Pre-Construction	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	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 used during any rehabilitation works and either chipped or replaced according to the EMP.	Project Manager	Main Roads

**ENVIRONMENTAL MANAGEMENT PLAN**

Area of management	Timing	Management objective	Management Strategy	Responsibility	Whose advice
		Ensure the retention of as many habitat trees, shrubs and vegetated corridors for fauna as possible, particularly where associated with riparian zones.			
Surface Drainage	Pre-Construction	Maintain the hydrological regime that exists prior to the construction of the proposal	Stormwater drainage shall be treated and disposed of in accordance with DoE requirements	Project Manager	DoE
Visual Amenity	Pre-Construction	Ensure that the road blends in with the surrounding environment	Ensure that the road blends in with the surrounding environment	Project Manager	Main Roads
Noise, Vibration and Dust	Construction	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	Project Manager	Main Roads
			Works associated with the construction of the development should not prevent public access along the adjacent reserve. Public access should be maintained along the reserve at all times	Project Manager	Main Roads
			Any complaints regarding dust will be attended to as soon as possible	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.	Project Manager	Main Roads
			Watering shall be used as a mitigation measure to protect loose surfaces.	Project Manager	Main Roads
Pollution and Litter	Construction	Ensure that the construction of the proposal is managed to a standard that minimises any adverse impacts on the environment.	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 to control any spills and shall notify the Superintendent's Representative or	Project Manager	Main Roads



ENVIRONMENTAL MANAGEMENT PLAN					
Area of management	Timing	Management objective	Management Strategy	Responsibility	Whose advice
			works foremen as soon as possible following a spill.		
			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.	Project Manager	Main Roads
			Dumping or temporary storage of bitumen, asphalt, concrete or aggregate should only occur at designated depots or controlled hardstands.	Project Manager	Main Roads
			The project areas, including hardstand areas, will be kept in a tidy manner at all times.	Project Manager	Main Roads
			All litter on the project will be placed into lidded bins and disposed of at an approved landfill.	Project Manager	Main Roads
Fire	Construction	Ensure that the fire risk associated with the construction of the proposal is minimised.	A water tanker will be on site at all times.	Project Manager	Main Roads
			No fires shall be lit within the project area	Project Manager	Main Roads
Aboriginal Heritage	Construction	Ensure that there is no unauthorised disturbance to Aboriginal heritage sites during construction	If any materials of significance to Aboriginal people are discovered, works will immediately cease within 100m of the material and the site will be examined by a qualified archaeologist.	Project Manager	DIA
			The DIA will be notified in the event of any significant Aboriginal Heritage discovery.	Project Manager	DIA
			If skeletal material is uncovered during works the WA Police Service will also be advised immediately.	Project Manager	DIA
Site Management	Construction	Ensure that the site is managed to ensure that construction of the proposal will have minimal impact upon the	A formal induction program will be conducted for all personnel prior to commencing work on the site. The program will aim to make them fully aware of all management strategies.	Project Manager	Main Roads

**ENVIRONMENTAL MANAGEMENT PLAN**

Area of management	Timing	Management objective	Management Strategy	Responsibility	Whose advice
		surrounding environment	Site office and materials storage areas will be located on previously disturbed/designated areas.	Project Manager	Main Roads
Rehabilitation	Post-Construction	Leave the project area free from debris; and Rehabilitate the project area so that the revegetated area provides a net increase in area of native vegetation at the site.	Stockpiled vegetative material will be respread in accordance with the Revegetation Plan.	Project Manager	Main Roads
			All waste materials from the development are to be completely removed from the site upon completion of the development. Final clean-up shall be to the satisfaction of the Project Manager and the Site Superintendent.	Project Manager	Main Roads

## 8. REFERENCES

*GHD (2004) Proposed Carnarvon Flood Mitigation Works, Environmental Impact Assessment and Management Plan. Report for MRWA.*

Ryan, I., Morse, K., and Marwick, B (2004). *Report on the results of an Archaeological Survey of the Carnarvon Flood Mitigation Works, Carnarvon, Western Australia for Main Roads Western Australia.* Eureka Archaeological Research and Consulting. The University of Western Australia.

Farnham, T (2004). *An Ethnographic Heritage Survey for the Proposed Carnarvon Flood Mitigation Works Carnarvon.* A report for Main Roads Western Australia. Yamatji Marlpa Barna Baba Maaja Aboriginal Corporation. Yamatji Land and Sea Council.

## **Appendix A**

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



# **Appendix B**

## **Site Photographs**



Photograph 1 - Six Mile Realignment (467.65 SLK) South View.



Photograph 2 - Six Mile Realignment (467.65 SLK) North View



Photograph 3 - Six Mile Realignment (467.65 SLK) South View  
*A.sclerosperma* lining the road verge where the re-alignment will go through.



Photograph 4 - Six Mile Realignment (467.65 SLK) North View  
Vegetation type behind the line of *A.sclerosperma*.





Photograph 5 – Northern End of Proposed Six Mile Realignment (469.07 SLK)  
North View



Photograph 6 – Northern End of Proposed Six Mile Realignment (469.07 SLK)  
South View



Photograph 7 – Six Mile Creek Side Access Track (467.65 SLK) North View



Photograph 8 – Six Mile Creek Side Access Track (467.78 SLK) North View



Photograph 9 – Six Mile Creek Culvert Relocation (467.55 SLK) North View



Photograph 10 – Drag Strip Culvert Upgrade Location (462.8 SLK) North View

## **Appendix C**

### **Department of Conservation and Land Management's Threatened Flora and Fauna Database Searches**



**Declared Rare and Priority Flora known from vicinity of Carnarvon.**

Taxon (species or subspecies)	Conservation Code (CALM)	Description	Preferred Habitat	Known Localities
<i>Acacia ryaniana</i>	P2	Prostrate, straggly or domed, spinescent shrub, 0.1–0.4 m high. Fl. yellow, Jun–Nov.	White or red sand. Coastal sand dunes.	Cape Cuvier, Quobba, Coral Bay
<i>Bergia auriculata</i>	P2	Prostrate perennial, herb.	Clay soils. Mud flats.	Nallan, Doorawarra Station, Muggon Stn
<i>Chthonocephalus tomentellus</i>	P2	Prostrate to ascending annual, herb. Fl. yellow, Aug–Nov.	Red sand. Undulating plains, sand dunes, near saline depressions.	Shark Bay, Billabong Roadhouse
<i>Genephosis</i> sp. Billabong (B.Nordenstam & A.Andenberg 203)	P1	Annual, herb. Fl. yellow, Sep–Oct.	Clay. Claypans.	Carnarvon, Overlander Roadhouse
<i>Lepidium biplicatum</i>	P2	Erect shrub. Fl. white, Sep.	Coastal regions	Carnarvon, Shark Bay
<i>Rumex crystallinus</i>	P2	Annual, herb, 0.06–0.4 m high.	Arid & semi-arid areas.	Lyndon River, Carnarvon, Rowles Lagoon, All other States
<i>Schoenia filifolia</i> ssp. <i>arenicola</i>	P1	Erect, single-stemmed annual, herb, to 0.5 m high. Fl. yellow, Aug–Sep.	Sand, red clay. Sub-coastal sand ridges.	Carnarvon, Champion Bay
<i>Sondottia glabrata</i>	P2	Annual, herb, to 0.1 m high. Fl. white, yellow, Sep–Oct.	Saline flats.	Peron Peninsula, Wooramel River, Edaggee.

These taxa are assigned a code of conservation significance by CALM

No Declared Rare or Priority Flora species were observed during the field survey. The time of the survey – January – meant that all known potential DRF and Priority species were finished flowering for the year. Three of the species are shrubs or herbs which would be generally recognisable at any time of the year whereas five are annual species which were not likely to be present at the time of survey. There had been rain a few weeks before the survey and some annual and ephemeral species were germinating but none had reached flowering stage. All species could possibly occur within the study area under the right conditions.

*(GHD (2004) Proposed Carnarvon Flood Mitigation Works, Environmental Impact Assessment and Management Plan. Report for MRWA)*

**Rare and Priority Fauna Species from the CALM Rare Fauna Database, likely to occur in the Carnarvon area.**

Degree of Threat	Family	Genus	Species	Common Name
<b>Schedule 1</b>	Scincidae	<i>Egernia</i>	<i>stokesii badia</i>	Western Spiny-tailed Skink
<b>Schedule 4</b>	Falconidae	<i>Falco</i>	<i>peregrinus</i>	Peregrine Falcon
<b>Priority 4</b>	Falconidae	<i>Falco</i>	<i>hypoleucos</i>	Grey Falcon
<b>Priority 4</b>	Scolopacidae	<i>Numenius</i>	<i>madagascariensis</i>	Eastern Curlew

Other significant species, protected under the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* species thought likely to exist in the area include:

- ▶ White-bellied Sea Eagle, *Haliaeetus leucogaster*;
- ▶ Barn Swallow, *Hirundo rustica*;
- ▶ Oriental Plover, *Charadrius veredus*;
- ▶ Grey Plover, *Pluvialis squatarola*;
- ▶ Wood Sandpiper, *Tringa glareola*;
- ▶ Common Greenshank, *Tringa nebularia*;
- ▶ Slender-billed Thornbill, *Acanthiza iredalei* ssp. *iredalei*; and
- ▶ Soft Plumaged Petrel, *Pterodroma mollis*.

No rare or specially protected terrestrial mammals, reptiles or amphibians were recorded within the project area.

*(GHD (2004) Proposed Carnarvon Flood Mitigation Works, Environmental Impact Assessment and Management Plan. Report for MRWA)*

## OSWALD Matt (GEnv)

---

**From:** Godley, Scott [Scott.Godley@dec.wa.gov.au]  
**Sent:** Tuesday, 12 September 2006 1:43 PM  
**To:** OSWALD Matt (GEnv)  
**Subject:** RE: Six Mile Creek Realignment - Fauna Impacts

Hi Mat,

I am familiar with the 6 Mile Creek area. I understand the realignment will take place just to the west of the existing alignment. I am not aware of any major fauna impacts that will be caused by this realignment, and am happy to defer to your Main Roads Environmental Management Plan to manage any other impacts on native fauna.

Please contact me on 99413754 if you have any further queries.

Regards Scott Godley  
Acting Senior Operations Officer  
DEC Carnarvon

---

From: OSWALD Matt (GEnv) [mailto:matthew.oswald@mainroads.wa.gov.au]  
Sent: Tue 9/12/2006 11:32 AM  
To: scottg@dec.wa.gov.au  
Subject: Six Mile Creek Realignment - Fauna Impacts

Scott,

As we have previously discussed, Main Roads Western Australia proposed to realign part of the North West Coastal Highway around the Six Mile Creek area (the works area is just south of the cemetery on the highway). The reason for the realignment is in order to provide a safer road network over the creek area at times of flooding.

Although you have indicated that you have no concerns with the project in terms of impacts to threatened fauna, I need a written response from yourself so your comments can be inserted into our Preliminary Environmental Impacts Assessment Report.

Impacts to fauna will be minimised using the Main Roads Environmental Management Plan.

Please can you respond to this email.

Regards,

Matthew Oswald  
Environment Officer  
Main Roads Western Australia  
Gascoyne Region  
Phone (08) 9941 0713





## **Appendix D**

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

# HERITAGE COUNCIL OF WESTERN AUSTRALIA

HERITAGE COUNCIL | PLACES DATABASE | HERITAGETRAILS

HELP | MEDIA | NEWS HIGHLIGHTS | LINKS | FAQs | CONTACT US

ABOUT | DEVELOPMENT | INSURANCE | ASSISTANCE | PUBLICATIONS | CASE STUDIES | EDUCATION | COMMUNITY | HERITAGE TOURISM

Search this site

Displaying results: [1-50] of 95

QUICK SEARCH  
ADVANCED SEARCH  
RESULTS LIST  
LOCATION REPORT  
SAVE DATA





WHAT IS THE STATE REGISTER  
OTHER HERITAGE LISTS


HELP

hide selected | hide unselected

Navigate: [1-50][51-95]

<input type="checkbox"/> ANZ Bank Building (465)	18 Robinson St, Carnarvon  [REG]  [ASSESS]
<input type="checkbox"/> Afghan Camp Sites (6842)	Nr Chinamans Pool, along Gascoyne River, Carnarvon
<input type="checkbox"/> Aircraft Hangar (4596)	Carnarvon Airport, Carnarvon
<input type="checkbox"/> Babbage Island Causeway Bridge (4590)	Babbage Island Rd, Carnarvon
<input type="checkbox"/> Blacksmith's Shop and Coach Factory Shop (6834)	Robinson St, Carnarvon
<input type="checkbox"/> Brickhouse Station Homestead (6811)	on the Gascoyne River, Carnarvon
<input type="checkbox"/> Carnarvon Aboriginal Reserve Site (6838)	Lewers St, Carnarvon
<input type="checkbox"/> Carnarvon Aerodrome (6817)	Morgantown
<input type="checkbox"/> Carnarvon Cemetery (6821)	North West Coastal Hwy, Carnarvon
<input type="checkbox"/> Carnarvon Club (458)	Francis St, Carnarvon
<input type="checkbox"/> Carnarvon Courthouse (10942)	Cnr Robinson St & Olivia Tce, Carnarvon
<input type="checkbox"/> Carnarvon Fire Station (fmr) (14476)	Carnarvon
<input type="checkbox"/> Carnarvon Hotel (464)	28 Olivia Tce, Carnarvon
<input type="checkbox"/> Carnarvon Lighthouse Keeper's Cottage (fmr) (462)	Annear Pl, off Binning Rd, Babbage Island  [REG]  [ASSESS]
<input type="checkbox"/> Carnarvon Pioneer Cemetery (4598)	Crowther St, Carnarvon  [REG]  [ASSESS]
<input type="checkbox"/> Carnarvon Police Station & Cell Block (6245)	Robinson St, Carnarvon
<input type="checkbox"/> Carnarvon Police Station, Quarters & CIB (17445)	Camel Street, Carnarvon

<input type="checkbox"/> Carnarvon Post & Telegraph Office (fmr) (3492)	10 Robinson St, Carnarvon	
<input type="checkbox"/> Carnarvon Racecourse site (6800)	off James St, Carnarvon	
<input type="checkbox"/> Carnarvon Senior High School (6803)	Cleaver St, Carnarvon	
<input type="checkbox"/> Carnarvon War Memorial (459)	Cnr Francis & Stuart Sts, Carnarvon	
<input type="checkbox"/> Carnarvon Fire Station (14477)	Stuart St, Carnarvon	
<input type="checkbox"/> Charles Haynes' Grave nr Stone Tank (4603)	Doorawarra Stn 75 k from, Carnarvon	
<input type="checkbox"/> Church of St Mary Star of the Sea Group (461)	Cnr Rushton & Johnstone Sts, Carnarvon	 [REG]  [ASSESS]
<input type="checkbox"/> Civic Centre (469)	Robinson St., Carnarvon	
<input type="checkbox"/> Coolkilya Pool (4422)	13 K Wandagee Stn 125 k NE from, Carnarvon	
<input type="checkbox"/> Cyclone Shelters, rear of house (6843)	Cnr Crowther & Cleaver Sts, Carnarvon	
<input type="checkbox"/> Dragon Pearl Chinese Restaurant (6808)	Francis St, Carnarvon	
<input type="checkbox"/> Dwelling (6802)	4 Cleaver St, Carnarvon	
<input type="checkbox"/> Dwelling (6804)	6 Crowther St, Carnarvon	
<input type="checkbox"/> Dwelling (6809)	15 Francis St, Carnarvon	
<input type="checkbox"/> Dwelling (6810)	31 Francis St, Carnarvon	
<input type="checkbox"/> Dwelling (6812)	12 Hill St, Carnarvon	
<input type="checkbox"/> Dwelling (6813)	14 Hill St, Carnarvon	
<input type="checkbox"/> Dwelling (6814)	3 James St, Carnarvon	
<input type="checkbox"/> Dwelling (6825)	34 Olivia Tce, Carnarvon	
<input type="checkbox"/> Dwelling (6826)	38 Olivia Tce, Carnarvon	
<input type="checkbox"/> Dwelling (6827)	40 Olivia Tce, Carnarvon	
<input type="checkbox"/> Dwelling (6828)	44 Olivia Tce, Carnarvon	
<input type="checkbox"/> Dwelling (6829)	46 Olivia Tce, Carnarvon	
<input type="checkbox"/> Dwelling (6830)	50 Olivia Tce, Carnarvon	
<input type="checkbox"/> Galilie Baba Aboriginal Mission Site (6819)	N bank Gascoyne River opposite, Yankee Town	
<input type="checkbox"/> Gascoyne Hotel (456)	88 Olivia Tce, Carnarvon	
<input type="checkbox"/> Gascoyne Memorial Centre (6835)	12-16 Robinson St, Carnarvon	
<input type="checkbox"/> Gascoyne Research Station (6839)	South River Rd cnr Research Rd, Carnarvon	 [REG]  [ASSESS]

- Gascoyne River Bridge (463) *North West Coastal Hwy over Gascoyne River, Carnarvon*  [REG]  [ASSESS]
  - Gascoyne Trading Co. Shed (fmr) (466) *Robinson St., Carnarvon*
  - Gladstone Jetty (4229) *Gladstone Bay, Gladstone*
  - Gneudna Paddock (4421) *9 k from Williambury Station, Carnarvon*
  - HMAS Sydney Memorial Site (6832) *17 Mile Beach, Quobba Stn, Quobba*
- hide selected | hide unselected**
- Navigate: [1-50][51-95]

**HELP**

## **Appendix E**

### **Department of Indigenous Affairs Database Search And Archaeological and Ethnographic Surveys**



### Search Criteria

2 sites in a search polygon. The polygon is formed by these points (in order):

MGA Zone 49	
Northing	Easting
7239837	775601
7242724	773973
7242893	774369
7240245	775961

### Disclaimer

Aboriginal sites exist that are not recorded on the Register of Aboriginal Sites, and some registered sites may no longer exist. Consultation with Aboriginal communities is on-going to identify additional sites. The AHA protects all Aboriginal sites in Western Australia whether or not they are registered.

### Copyright

Copyright in the information contained herein is and shall remain the property of the State of Western Australia. All rights reserved. This includes, but is not limited to, information from the Register of Aboriginal Sites established and maintained under the Aboriginal Heritage Act 1972 (AHA).

### Legend

Restriction	Access	Status	Coordinate Accuracy
N No restriction	C Closed	I Interim register	Accuracy is shown as a code in brackets following the site coordinates.
M Male access only	O Open	P Permanent register	[Reliable] The spatial information recorded in the site file is deemed to be reliable, due to methods of capture.
F Female access	V Vulnerable	S Stored data	[Unreliable] The spatial information recorded in the site file is deemed to be unreliable due to errors of spatial data capture and/or quality of spatial information reported.

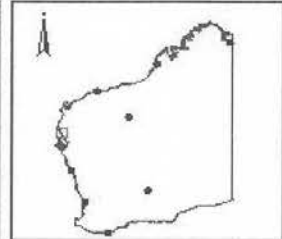
### Spatial Accuracy

Index coordinates are indicative locations and may not necessarily represent the centre of sites, especially for sites with an access code "closed" or "vulnerable". Map coordinates (Lat/Long) and (Easting/Northing) are based on the GDA 94 datum. The Easting / Northing map grid can be across one or more zones. The zone is indicated for each Easting on the map, i.e. '5000000:Z50' means Easting=5000000, Zone=50.



Site ID	Status	Access	Restriction	Site Name	Site Type	Additional Info	Informants	Coordinates	Site No.
10355	P	O	N	Chinaman'S Pool	Mythological			775144mE 7245148mN Zone 49 [Unreliable]	P01827
7234	P	C	N	Kuwinwardu Soak.	Mythological	Camp, Water Source		Not available for closed sites	P05686





**Legend**

- Highlighted Area
- Town
- Search Area

Copyright for base map information shall at all times remain the property of the Commonwealth of Australia, Geoscience Australia - National Mapping Division. All rights reserved.

Copyright for Native Title Land Claim, Local Government Authority, Mining Tenement boundaries shall at all times remain the property of the State of Western Australia, All rights reserved.

For further important information on using this information please see the Department of Indigenous Affairs' Terms of Use statement at <http://www.dia.wa.gov.au/terms.aspx>

Yamatji Marlpa Barna Baba Maaja Aboriginal Corporation.  
Yamatji Land and Sea Council.

AN ETHNOGRAPHIC HERITAGE  
SURVEY FOR THE PROPOSED  
CARNARVON FLOOD MITIGATION  
WORKS CARNARVON

---

A REPORT FOR  
MAIN ROADS WESTERN AUSTRALIA

---

TONY FARNHAM  
JUNE 2004

Yamatji Marlpa Barna Baba Maaja  
Aboriginal Corporation.

Head Office  
171 Marine Terraces  
Geraldton WA 6530

Perth Office  
14th Floor  
256 Adelaide Terrace  
Perth WA 6000

survey team and any questions from the survey team regarding the proposed work programme were answered and discussed.

Ms Clements then guided the survey team to the proposed MRWA project area and then described the project. Upon completion of this outline Ms Clements left the survey team to assess the project area. On 24 and 25 March the Gnulli survey team together with Mr Ryan and Mr Farnham examined these areas extensively on foot assessing the areas for both archaeological and ethnographic importance.

## 5.2 HERITAGE SURVEY RESULTS

- “Drag Strip” SLK 462.73 - 464.90 on the North West Coastal Highway; 200 metres out from the seal on the right hand side and 400 metres on the left hand side.
- “6 Mile Creek” SLK 467.00 – 468.53 on the North West Coastal Highway; 600 metres from the seal on the right hand side and 400 metres on the left hand side.
- “Santa Rosa Floodway” SLK 480.28 – 482.00 on the North West Coastal Highway; 400 metres from the seal on the right hand side and 80 metres on the left hand side.
- Borrow pit (Flood works) 200 metres west of the North West Coastal highway at SLK 466.10. Existing it to be extended to cover a nominal area of 200 metres E-W x 300 metres N – S, adjacent to the claypan.

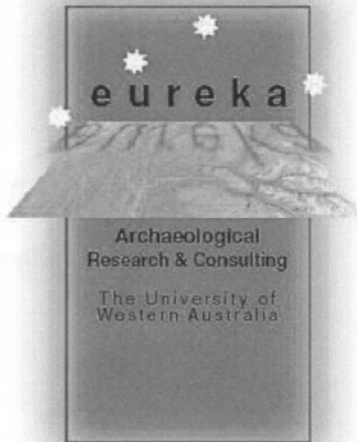
The survey team advised there were no known sites of cultural significance within the project area and cleared the area for the proposed work program to proceed.

---

## 6. CONCLUSIONS AND RECOMMENDATIONS

---

1. The proposed MRWA work programs of the Carnarvon Flood Mitigation Works, has been given an ethnographic clearance by the Gnulli survey team.
2. It is recommended that Main Roads Western Australia maintain discussions with the Gnulli claimant group regarding any further matters that may arise in relation to these areas.



---

**Report**  
**on the Results of an**  
**Archaeological Survey of the**

**Carnarvon Flood Mitigation Works,**  
**Carnarvon, Western Australia**

for

**Main Roads Western Australia**

---

March 2004

Ian Ryan – Kate Morse – Ben Marwick



THE UNIVERSITY OF WESTERN AUSTRALIA

## EXECUTIVE SUMMARY

### *Background information about the place and the study*

This report details the results of an Aboriginal archaeological survey of three stretches of land identified here as the Drag Strip, 6 Mile Creek and the Santa Rosa Floodway, on the North West Coastal Highway near Carnarvon, Western Australia, and the extension of the existing borrow pit that is to be used for road works. The survey described here was carried out for Main Roads Western Australia (MRWA) by Eureka Archaeological Research and Consulting UWA (Eureka) with representatives of the Gnulli Native Title group.

### *Outline of implications arising from previous Aboriginal heritage investigations*

Results of the desktop review indicate that no previously recorded sites appear to be located in the survey areas identified by MRWA (Morse and Marwick 2004).

### *Results of the archaeological survey*

A single isolated stone artefact was recorded *in situ* on the western side of the 'Drag Strip'. No other artefacts were recorded at any of the survey areas.

### *Summary of recommendations for further action*

It is **recommended** that

1. There is no archaeological reason why MRWA's proposed works in the nominated areas listed below may not proceed as planned.
  - i. Drag Strip - North West Coastal Highway SLK 462.73 – SLK 464.90.
  - ii. 6 Mile Creek - North West Coastal Highway SLK 467.00 - SLK 468.53
  - iii. Santa Rosa Flood Way - North West Coastal Highway SLK 480.28 - SLK482.00
  - iv. Borrow pit - 200m west of the North West Coastal Highway SLK 466.10.
  
2. If any archaeological material, particularly human skeletal remains, is encountered during any development activity, all work should be stopped and the Gnulli Native Title Claimant Group and Yamatji Land and Sea Council be notified immediately. If burial material is uncovered the Police and Department of Indigenous Affairs should also be notified, as required by law<sup>1</sup>.

---

<sup>1</sup> Department of Indigenous Affairs 2002 Aboriginal Heritage Procedures Manual.

## **Appendix F**

### **DoE's Sensitive Water Resources Database Search**

Hi Matt,

Please find attached a listing of proclaimed groundwater and surfacewater areas FYI. The proposed re-alignment of North West Coastal Hwy at Six Mile Creek is not within a proclaimed surface water area and therefore has no provisions under the Act in regards to Disturbance of bed and banks. The Department asks that work is taken with due care to the environment in relation to rehabilitation of the works area.

\*Your previous comment in regards to whether Main Roads requires a Surface water permit to draw water from a standing body of water depends on how the body of water came to be there and if Main Roads has legal access to this property. Basically if it is not a 'spring' or linked to a groundwater source or not in a proclaimed area then a application is not required.

**Surface water applications are required:**

When the surface water is in a proclaimed area/ river

If the area is defined by an Irrigation district

The applicant wishes to use the surface water on a area greater than 0.2ha for uses defined other than domestic

Matt I hope this helps in your day to day application processes. Providing you with the above information the Department still encourages Main Roads to make contact with our Carnarvon office at any time to define whether a water related application is or is not required.

Cheers

Kylie Chaplin  
Natural Resource Management Officer  
Carnarvon Office  
(08)99414921

p.s We also assume that you will make contact with the relevant parties in regards to Native Vegetation Clearing for the above proposal.

p.p.s How are you going with the Veg book that I gave you? Has MRD's opted to buy you a copy?

-----Original Message-----

**From:** OSWALD Matt (GEnv) [mailto:matthew.oswald@mainroads.wa.gov.au]

**Sent:** Wednesday, 17 May 2006 14:57

**To:** CHAPLIN Kylie

**Subject:** Six Mile Creek

Kylie,

Main Roads Western Australia is proposing to re-align a part of North West Coastal Highway at Six Mile Creek. The purpose of the project is to improve the safety of the highway in times of flooding. A project area map has been attached for your viewing.

To undertake the work, a side access track needs to be constructed on the eastern side of the highway, crossing part of the creek. Please can you advise whether a permit to disturb bed and bank is required? The creek is not a proclaimed watercourse and all necessary process will be followed to make sure that all work will have minimal impact upon the creek bed (as per Main Roads Western Australia's policies).

Kind Regards,

Matthew Oswald  
Environment Officer  
Main Roads Western Australia  
Gascoyne Region  
Phone (08) 9941 0713  
Fax (08) 9941 0701

## OSWALD Matt (GEnv)

**From:** BURTON Katrina [Katrina.Burton@water.wa.gov.au]  
**Sent:** Thursday, 14 September 2006 3:25 PM  
**To:** OSWALD Matt (GEnv)  
**Cc:** MASKEW Adam; GILDERS Tanya  
**Subject:** RE: Nth West Coastal Highway Realignment- 6 mile creek-Water Resources  
**Attachments:** InterScan\_Disclaimer.txt

Matt,

Thank you for contacting the Department of Water in relation to the proposed realignment of North West Coastal Highway, in the vicinity of Six Mile Creek. This project involves realigning the highway by lowering the pavement and installing a culvert under North West Coastal Highway. The Department of Water provides the following comments:

- The proposed works are located at Six Mile Creek. This creek is considered a minor creekline and is an unproclaimed surface water area under the *Rights in Water and Irrigation Act 1914*. The proposed works are adjacent to the Nicol Bay Flats (McNeills Claypan), a regionally significant wetland in the Register of the National Estate (indicative place classification), as well as being in close proximity to the Shark Bay World Heritage Area, with the northern boundary approximately 5km south of Carnarvon. It is also identified as a floodway zone in the *Lower Gascoyne River Carnarvon Floodplain Management Study*.

- The proposed works are therefore not on a significant watercourse or wetland, and are not located in a proclaimed surface water area. However, due to its proximity to the Nicol Bay Flats and the Shark Bay WHA, the Department of Water recommends the use of best management practices in the design and implementation of the project. This includes minimising disturbance, erosion control, management of runoff and revegetating the area as applicable. The Department can provide additional input and guidance on best management practices once the project has been further developed.

Regarding whether the project is at variance with the DEC's 10 Clearing principles, I have forwarded your email to Tanya Gilders at the Geraldton Office for comment and advice. Please liaise with her directly for this advice on 9964-5978.

If you have any questions, please give me a call on 9941-6109.

Best regards,

**Katrina Burton**  
Department of Water  
Natural Resource Management Officer  
Carnarvon Office  
(08) 9941-6109

-----Original Message-----

**From:** OSWALD Matt (GEnv) [mailto:matthew.oswald@mainroads.wa.gov.au]  
**Sent:** Monday, 4 September 2006 8:40  
**To:** BURTON Katrina  
**Subject:** Nth West Coastal Highway Realignment- 6 mile creek-Water Resources

Katrina,

As we discussed over the phone, the project works at 6-Mile we be separated from the Flood Mitigation Project.

The project description for this years financial works at 6-Mile will be a road realignment with a culvert being placed at the creek site in order to relieve drainage pressure during large flood events and provide a safer road network.

The construction of the levees is expected to take place in 2008 once the referrals to the EPA and DEH are approved. Further consultation and studies will take place with the Department of Water, Department of Environment and Conservation, Department of Fisheries and Department of Agriculture during this time.

At this stage I am constructing a Preliminary Environmental Impact Assessment (PEIA) report for the road realignment and culvert placement. Consultation is required with the Department of Water for two areas of the

18/09/2006



## **Appendix G**

### **WAPC's Acid Sulfate Soils Mapping**



# ACID SULFATE SOILS

## APPLICANT SELF - ASSESSMENT FORM

**PLEASE COMPLETE THIS SELF-ASSESSMENT FORM AND ANSWER THE FOLLOWING:**

### **STEP 1:** **IS THERE EVIDENCE OF A SIGNIFICANT RISK OF DISTURBING ACID SULFATE SOILS AT THIS LOCATION?**

#### **Question 1:**

Is the land depicted in Figures 1 - 11 of the Western Australian Planning Commission's Planning Bulletin No. 64: Acid Sulfate Soils as having a 'high risk of Actual Acid Sulfate Soil (AASS) & Potential Acid Sulfate Soil (PASS) < 3m from surface'?

Note: Planning Bulletin No. 64: Acid Sulfate Soils can be downloaded from:  
<http://www.wapc.wa.gov.au/publications/policies/bulletins/PB64/64Nov03.html>

**TICK BOX AS APPROPRIATE:** YES  NO

#### **Question 2:**

Is the land located in an area, whether depicted in Figures 1 - 10 or not, where site characteristics and local knowledge lead you to form the view that there is a significant risk of disturbing acid sulfate soils at this location?

**TICK BOX AS APPROPRIATE:** YES  NO

If YES to either of these two questions go to Step 2.

If NO to both of these questions no further investigation is required.  
Sign this form and submit it with your application.

## STEP 4:

### CARRY OUT DETAILED SITE ASSESSMENT IN ACCORDANCE WITH DEPARTMENT OF ENVIRONMENT GUIDELINES.

#### Question 7:

Did the Detailed Site Assessment reveal the presence of acid sulfate soils?

TICK BOX AS APPROPRIATE:

YES

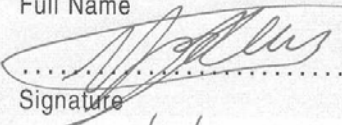
NO

If YES to this question you should consider modifying the design of the proposal to ensure that there is no disturbance to acid sulfate soils at this location. Regardless of whether you modify the design or not, sign this form and submit it with your application together with the written results of the Preliminary and Detailed Site Assessments.

If NO to this question then no further investigation or work is required. Sign this form and submit it with your application together with the written results of the Preliminary and Detailed Site Assessments.

#### APPLICANT SIGNATURE:

Matthew Oswald  
Full Name

  
Signature

4/9/00  
Date

#### TICK BOX FOR ATTACHMENTS AS APPROPRIATE:

Preliminary site Assessment Results

Detailed site Assessment Results

The proposal has been designed to avoid disturbance of Acid Sulfate Soils at this location

## **Appendix H**

# **Department of Agriculture Advice on Declared Weeds And On-Site Flora Search**

## OSWALD Matt (GEnv)

---

**From:** Stretch, John [jstretch@agric.wa.gov.au]  
**Sent:** Friday, 1 September 2006 5:52 PM  
**To:** OSWALD Matt (GEnv)  
**Subject:** RE: Site visit - Six Mile Creek. Perennial plants seen by us during site visit:

Matt  
We saw no weeds that are of a high priority.  
I mentioned that to the north north west of the area where you plan to carry out the work, along the east edge of the first prominent sand dune, a few mesquite trees have established in the past 15 years. (This is in the area just over the dune from and to the south of the rifle range.) I am confident that there are no large mesquite trees in your proposed work area as we would have noticed these. Mesquite does not easily establish in areas that are heavily vegetated - its seedlings do not like competition. Hence the Telstra co-ax cable route would be the most likely host area.

I guess African boxthorn is also a potential weed in the area.

John

*John Stretch*  
Department of Agriculture & Food WA  
Carnarvon District Office  
Ph: 0899563324  
Fax: 0899418334

-----Original Message-----

**From:** OSWALD Matt (GEnv) [mailto:matthew.oswald@mainroads.wa.gov.au]  
**Sent:** Thursday, 31 August 2006 8:06 AM  
**To:** Stretch, John  
**Subject:** RE: Site visit - Six Mile Creek. Perennial plants seen by us during site visit:

John,

Thankyou for meeting with us last week and undertaking a species list at 6 Mile Creek.

Apart from the native plant species observed, can you please also indicate any weeds of concern in the area.

Kind Regards,

Matthew Oswald  
Environment Officer  
Main Roads Western Australia  
Gascoyne Region  
Phone (08) 9941 0713  
Fax (08) 9941 0701

---

**From:** Stretch, John [mailto:jstretch@agric.wa.gov.au]  
**Sent:** Tuesday, 29 August 2006 6:28 PM  
**To:** OSWALD Matt (GEnv)  
**Cc:** Wauchope, Scott; 'Collier@wn.com.au'; Brad Warren  
**Subject:** RE: Site visit - Six Mile Creek. Perennial plants seen by us during site visit:

Matt  
The following perennial plants are present in the area that is to be dedicated to the re-aligned NWCH, at the southern end of Browns Range:

SESCAN - Sesbania cannabina. Common short lived species in West Gascoyne - name not 100% sure.  
EUCVIT - Eucalyptus vitrix. Coolabah. Renamed perhaps 8 years ago. This plant sometimes hybridizes but the plants in the Browns Range area all appear to be true to the local "unmixed" type.  
ERASET - neverfail grass. Eragrostis setifolia  
CENCIL - buffel grass. Cenchrus ciliaris  
SCVSP1 - currant bush. Scaevola spinescens. (The relatively non spiny coastal variety.)

4/09/2006

## OSWALD Matt (GEnv)

**From:** Stretch, John [jstretch@agric.wa.gov.au]  
**Sent:** Tuesday, 29 August 2006 6:28 PM  
**To:** OSWALD Matt (GEnv)  
**Cc:** Wauchope, Scott; 'Collier@wn.com.au'; Brad Warren  
**Subject:** RE: Site visit - Six Mile Creek. Perennial plants seen by us during site visit:  
**Follow Up Flag:** Follow up  
**Flag Status:** Red

Matt

The following perennial plants are present in the area that is to be dedicated to the re-aligned NWCH, at the southern end of Browns Range:

SESCAN - *Sesbania cannabina*. Common short lived species in West Gascoyne - name not 100% sure.  
EUCVIT - *Eucalyptus vitrix*. Coolabah. Renamed perhaps 8 years ago. This plant sometimes hybridizes but the plants in the Browns Range area all appear to be true to the local "unmixed" type.  
ERASET - neverfail grass. *Eragrostis setifolia*  
CENCIL - buffel grass. *Cenchrus ciliaris*  
SCVSP1 - currant bush. *Scaevola spinescens*. (The relatively non spiny coastal variety.)  
RHAERE - "tall salt bush". *Rhagodia eremaea*  
ACATET - curare. *Acacia tetragonophylla*  
ACASCL - limestone wattle. *Acacia sclerosperma*  
MUECUN - lignin. *Muehlenbeckia cunninghamii*. "swamp bush"  
EULFUL - silky brown top. *Eulalia fulva*  
ACAVIC - bardie bush. *Acacia victoriae*  
Streptoglossa spp - a short lived very aromatic and unpalatable weedy shrub. Actual species particulars not clear. Very common/widespread on road verges.  
HAKPRE - needle bush. *Hakea preisii*  
ATRBUN - silver saltbush. *Atriplex bunburyana*  
CRASUB - sage. *Cratystylis subspinescens*  
ABUOTO - lantern bush. *Abutilon otocarpum*  
*Brachyscome latisquamea* - Perennial Coast Daisy.  
PIMMIC - mallee rice flower. *Pimelia microcephala*  
SOLOBR - tomato bush. We generically refer to this plant as *Solanum orbiculatum*. In fact there are several separate species & I do not know the current correct latin name for this one. A weedy increaser, common close to heavily grazed mills.  
EXOAPH - broom bush/naked lady. *Exocarpos aphyllus*  
ENCTOM - ruby saltbush. *Enchylaena tomentosa*  
ERMFOR - wilcox bush. *Eremophila forrestii*. There are listed sub species for this plant but in Ag we use only the straight "species name."  
ALEOLE - minga/ant bush. *Alectryon oleifolius*  
PTIOBO - cotton bush. *Ptilotus obovatus*. There are listed sub species for this plant but in Ag we use only the straight "species name."  
CHEGAU - ear lobe saltbush. *Chenopodium gaudichaudianum*.  
ERMMAC - travel bush. *Eremophila maculata*

You have confirmed that the planned Main Roads re-alignment and alteration to the southern Brown's Range floodway are being carried out with guidance from and to achieve the increased relief floodway capability that has been recommended by Sinclair Knight Merz.

You understand that the changes to the floodway capacity will potentially impact on the environment of the extensive claypans and swamps to the east of Browns Range. Hence you will be seeking expert ecological guidance from the Department of CALM. The "swamps" and Browns Range floodout are an extensive and important ephemeral wildlife habitat. (Notably for water birds.) If care is not taken, the future integrity of this habitat could be badly compromised.

I have also drawn your attention to the population of freshwater tortoise that frequents the two substantial ephemeral pools in the floodway. I have explained that

- provided the sand dune habitat that the tortoise take refuge in when the pools are dry, can be left intact &
- provided sufficient "pool structure" can be secured into the future, within the floodway &
- provided any excavation work that you plan to conduct within the floodways, is carried out whilst the pools are dry; then the tortoise population ought to be able to survive the disturbance associated with your proposals. However you will remind the "expert CALM ecological personnel" about the presence of the tortoise (&

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yabbies), to ensure that the conservation needs of these animals is addressed. (If wanted, I can take people to South Common and North Common pools that carry very similar animals.)

John

(My concern is due in part to the fact that I am currently the Carnarvon LCDC joint Chairman. I will table this email at our next LCDC meeting. Keith Collier and Brad Warren also sit on the LCDC.)

John Stretch

Department of Agriculture & Food WA

Carnarvon District Office

Ph: 0899563324

Fax: 0899418334

-----Original Message-----

**From:** OSWALD Matt (GEnv) [mailto:matthew.oswald@mainroads.wa.gov.au]

**Sent:** Wednesday, 23 August 2006 3:55 PM

**To:** Stretch, John

**Subject:** Site visit - Six Mile Creek

John,

Unfortunately a last minute meeting has been scheduled by our Region Manager for Monday morning.

Would it be possible to push the meeting back a little later in the morning? Say 10.30 am?

Truly sorry for the inconvenience.

Regards,

Matthew Oswald

Environment Officer

Main Roads Western Australia

Gascoyne Region

Phone (08) 9941 0713

Fax (08) 9941 0701

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*(c) please delete the original e-mail.*

4/09/2006

## **Appendix I**

### **Department of Environment and Heritage Database Search**





## Protected Matters Search Tool

You are here: DEH Home > EPBC Act > Search

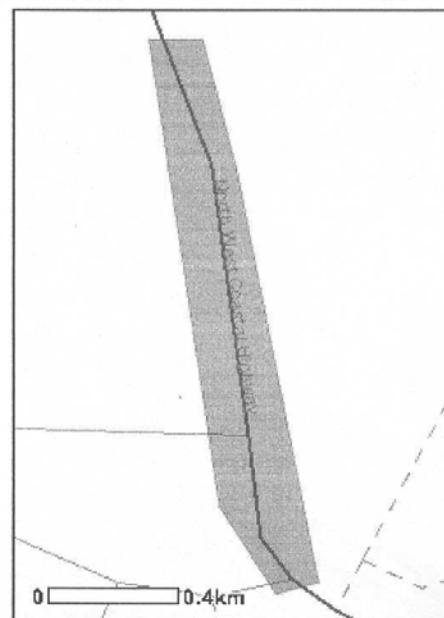
11 September 2006 12:58

# EPBC Act Protected Matters Report

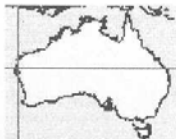
This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

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

The Australian Natural Resources Atlas at <http://www.environment.gov.au/atlas> may provide further environmental information relevant to your selected area. Information about the EPBC Act including significance guidelines, forms and application process details can be found at <http://www.deh.gov.au/epbc/assessmentsapprovals/index.html>



**Search Type:** Area  
**Buffer:** 0 km  
**Coordinates:** -24.903892,113.709999, -24.901130,113.708217, -24.886161,113.705990, -24.886161,113.707682, -24.890349,113.708752, -24.90353,113.711336



**Report Contents:** Summary  
Details  
• Matters of NES  
• Other matters protected by the EPBC Act

## 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.deh.gov.au/epbc/assessmentsapprovals/guidelines/index.html>.

<b>World Heritage Properties:</b>	None
<b>National Heritage Places:</b>	None
<b>Wetlands of International Significance: (Ramsar Sites)</b>	None
<b>Commonwealth Marine Areas:</b>	None
<b>Threatened Ecological Communities:</b>	None
<b>Threatened Species:</b>	2
<b>Migratory Species:</b>	4

### 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.deh.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.deh.gov.au/epbc/permits/index.html>.

<b>Commonwealth Lands:</b>	None
<b>Commonwealth Heritage Places:</b>	None
<b>Places on the RNE:</b>	None
<b>Listed Marine Species:</b>	8
<b>Whales and Other Cetaceans:</b>	None
<b>Critical Habitats:</b>	None
<b>Commonwealth Reserves:</b>	None

### Extra Information

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

<b>State and Territory Reserves:</b>	None
<b>Other Commonwealth Reserves:</b>	None
<b>Regional Forest Agreements:</b>	None

## Details

### Matters of National Environmental Significance

Threatened Species [ Dataset Information ]	Status	Type of Presence
<b>Birds</b>		
<i>Acanthiza iredalei iredalei*</i> Slender-billed Thornbill (western)	Vulnerable	Species or species habitat likely to occur within area
<b>Reptiles</b>		
<i>Egernia stokesii badia*</i> Western Spiny-tailed Skink	Endangered	Species or species habitat likely to occur within area
Migratory Species [ Dataset Information ]		
<b>Migratory Terrestrial Species</b>		
<b>Birds</b>		
<i>Haliaeetus leucogaster</i> White-bellied Sea-Eagle	Migratory	Species or species habitat likely to occur within area
<i>Hirundo rustica</i> Barn Swallow	Migratory	Species or species habitat may occur within area
<b>Migratory Wetland Species</b>		
<b>Birds</b>		
<i>Charadrius veredus</i> Oriental Plover, Oriental Dotterel	Migratory	Species or species habitat may occur within area
<i>Numenius minutus</i> Little Curlew, Little Whimbrel	Migratory	Species or species habitat may occur within area

### Other Matters Protected by the EPBC Act

Listed Marine Species [ Dataset Information ]	Status	Type of Presence
<b>Birds</b>		
<i>Apus pacificus</i> Fork-tailed Swift	Listed - overfly marine area	Species or species habitat may occur within area
<i>Ardea alba</i> Great Egret, White Egret	Listed - overfly marine area	Species or species habitat may occur within area
<i>Ardea ibis</i> Cattle Egret	Listed - overfly marine area	Species or species habitat may occur within area
<i>Charadrius veredus</i> Oriental Plover, Oriental Dotterel	Listed - overfly marine area	Species or species habitat may occur within area
<i>Haliaeetus leucogaster</i> White-bellied Sea-Eagle	Listed	Species or species habitat likely to occur within area

*Hirundo rustica*  
Barn Swallow

Listed -  
overfly  
marine  
area      Species or species habitat may occur  
within area

*Merops ornatus*  
Rainbow Bee-eater

Listed -  
overfly  
marine  
area      Species or species habitat may occur  
within area

*Numenius minutus*  
Little Curlew, Little Whimbrel

Listed -  
overfly  
marine  
area      Species or species habitat may occur  
within area

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## Caveat

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

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

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

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

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

Only selected species covered by the migratory and marine provisions of the Act have been mapped.

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

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers.

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

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

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

## Acknowledgments

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

- New South Wales National Parks and Wildlife Service
- Department of Sustainability and Environment, Victoria
- Department of Primary Industries, Water and Environment, Tasmania
- Department of Environment and Heritage, South Australia Planning SA
- Parks and Wildlife Commission of the Northern Territory
- Environmental Protection Agency, Queensland
- Birds Australia
- Australian Bird and Bat Banding Scheme
- Australian National Wildlife Collection
- Natural history museums of Australia
- Queensland Herbarium
- National Herbarium of NSW
- Royal Botanic Gardens and National Herbarium of Victoria
- Tasmanian Herbarium
- State Herbarium of South Australia
- Northern Territory Herbarium
- Western Australian Herbarium
- Australian National Herbarium, Atherton and Canberra
- University of New England
- Other groups and individuals

ANUCLIM Version 1.8, Centre for Resource and Environmental Studies, Australian National University was used extensively for the production of draft maps of species distribution. Environment Australia is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Last updated:

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GPO Box 787 Canberra ACT 2601 Australia  
Telephone: +61 (0)2 6274 1111

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