

**PRELIMINARY ENVIRONMENTAL IMPACT ASSESSMENT
AND
ENVIRONMENTAL MANAGEMENT PLAN**

South West Highway, Waterloo SLK 142.75 to 146.05

Road widening and drainage improvement

Compiled by: EO Peter Swanson
Date: September 2010

Revision	TRIM Ref	Date		Amendments
1	B10#16454	August 2010		
2	B10#16811	September 2010		EMP: revised Topsoil & Weed/Vegetation Management Plan Appendix D: GHD Dieback Management Strategy DEC Dieback Management correspondence Appendix B: Botanist's report of Targeted Flora Survey DEC review of botanists report

CONTENTS

1. SUMMARY	3
2. BACKGROUND & SCOPE.....	3
3. ASSESSMENT METHODOLOGY	4
4. ASSESSMENT OF ASPECTS AND IMPACTS	5
5. DECISION TO REFER.....	6
6. ENVIRONMENTAL MANAGEMENT PLAN	7
APPENDIX A	10
LOW IMPACT ENVIRONMENTAL SCREENING CHECKLIST	
APPENDIX B	11
FLORA.....	
APPENDIX C	24
VEGETATION EXTENT	
APPENDIX D	27
DIEBACK	
APPENDIX E	32
WATER.....	
APPENDIX F.....	34
MRWA VEGETATION CLEARING ASSESSMENT REPORT	
APPENDIX G	38
SITE PHOTOS	

1. SUMMARY

- Proposal does not require referral to EPA or DEWHA.
- Clearing of native vegetation is not likely to be at variance to the Clearing Principles.
- Delivery should comply with all the requirements of the EMP

Main points:

- The replacement and extension of the culvert (SLK 145.7) will require a Permit to Disturb Beds & Banks from the Department of Water prior to construction commencing.
- Delivery should comply with GHD's Dieback Management Strategy and DEC comments (Appendix D) and the 'pre construction' section of the EMP.
- Manage Weeds / Vegetation and Topsoil as per the 'construction' section of the EMP.

2. BACKGROUND & SCOPE

Main Roads SWR proposes to undertake improvements to SW Hwy, Waterloo in the Shire of Dardanup (SLK 142.75-146.05) in the summer of 2010.

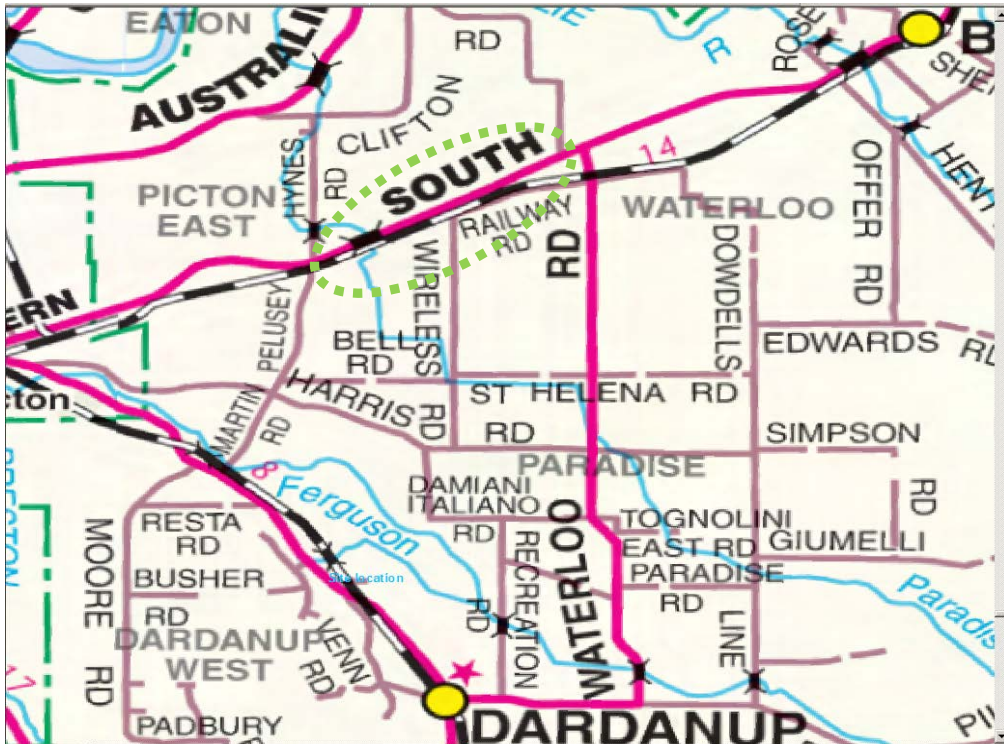
GHD undertook an EIA/EMP (*South Western Highway Reconstruction and Passing Lanes between Burekup and Picton: EIA and EMP July 2009: B09#16634*) for the overall project (SLK 139.37-146.05) and identified that there may be variance with Clearing Principles a, d and h if impacting the Waterloo Nature Reserve ESA/ TECs to the south of the highway between SLK 142.77 & 144.51. These matters are currently in the process of being referred to the EPA and works on the southern side in this section may proceed in the future with that approval.

Part of the overall project was delivered in summer 2009-10 for SLK 139.37 - 142.61 after Manager Environment (ME) endorsed the PMs decision not to refer this section (B09#19975).

However, due to the degraded condition of the highway for the remaining length, it is considered necessary to initiate improvements as soon as possible between Waterloo Road and Hines Road (SLK 142.75 & 146.05). Therefore, it is proposed to remove vegetation (approximately 2.0ha) on the northern side only to enable drainage works to be carried out, widen the sealed and unsealed shoulders and overlay the existing carriageway later this year.

A Low Impact Environmental Screening Checklist has been completed for the proposal (Appendix A). As the proposed works involves the clearing of native vegetation outside the maintenance zone as well as native vegetation older than ten years inside the maintenance zone; the preparation of a project specific Preliminary Environmental Assessment and Environmental Management Plan (EMP) are required. This report fulfils this requirement.

Because the overall project site was recently (2008) assessed by GHD, the references and qualifying statements included below, in relation to this particular section, are extracted from that report unless stated otherwise. Environmental mapping produced by GHD has been included in the Appendices. Additional environmental aspects that are not included in this report have previously been investigated by GHD with no impacts identified.



Project location

3. ASSESSMENT METHODOLOGY

Low Impact Environmental Screening Checklist

A Low Impact Environmental Screening Checklist was completed by the Project Manager and reviewed by the Environment Officer (Appendix A).

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 and consulting with the relevant government organisations where necessary. Additional surveys have also been undertaken to further investigate aspects that were identified as being potentially impacted.

Listed below are the sources of information utilised to compile this report.

Flora

- Threatened Flora Database (DEFL), the WA Herbarium database (WAHerb) and the Declared Rare and Priority Flora shape file and Species List
- Correspondence with DEC re: impact to TEC/ESA and Threatened Flora
- Flora survey: GHD 2008
- GHD Environmental Aspects Mapping

Appendix B

Vegetation Extent

Department of Agriculture & Food: NRM SLIP System
Appendix C

Dieback

GHD Environmental Aspects Dieback Mapping
Appendix D

Water

Department of Water correspondence
Appendix E

Commonwealth and State Referral

The decision to refer the project to the State's Environmental Protection Authority (EPA) is based on whether significant environmental impact, amendment to TPS or the project is of significant size and/or public interest. The decision to refer the project to the Commonwealth's Department of Environment, Water, Heritage and the Arts (DEWHA) is based upon whether the project would significantly impact upon matters of national environmental significance, e.g. World Heritage properties, protected wetlands and migratory species, Commonwealth marine areas, threatened species or communities or nuclear actions.

4. ASSESSMENT OF ASPECTS AND IMPACTS

Aspect	Evaluation of Potential Impacts
Air quality	<ul style="list-style-type: none">N/A
Dust	Likely to be a minor issue to adjacent residences during earthworks. Activities will need to be subject to dust suppression to control short-term dust generation. Likely to be easily managed by standard construction dust management techniques.
Fauna	No significant fauna issues associated with the proposed works. 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 Matters of National Environmental Significance as protected under EPBC Act (1999) will be impacted.
Vegetation – clearing	<ul style="list-style-type: none">Approximately 2.0ha of native vegetation is proposed to be cleared.The condition of the native vegetation to be cleared is Degraded to Completely Degraded (GHD 2008).The native vegetation proposed to be cleared is not well represented regionally (i.e. it possesses less than 30% of its pre-European extent).The native vegetation to be cleared does not occur within an ESA.The native vegetation to be cleared will be done so using the purpose permit. <p>It is considered though, that clearing within the project area does not constitute being at variance to Clearing Principle (e). The southern section is classified as Cleared Paddock comprising of scattered individual specimens of Melaleuca in completely degraded condition. The remaining portion is comprised of Open Woodland consisting of scattered trees over paddock weeds in a degraded condition.</p>
Vegetation – TECs/DRF	None present in the proposed works area however 2 TECs included in an ESA have been identified on the southern side of the highway between SLK 142.77 & 144.51. Areas outside the project area must not be disturbed as part of the proposed works. Consultation with DEC confirms that the proposal is not going to have a significant impact upon any DRF or TECs. Flora surveys have not identified the presence of any Threatened species. No Matters of National Environmental Significance as protected under EPBC Act (1999) will be impacted.
Vegetation – weeds	Numerous common weed species occur throughout the proposed works areas. These species are likely to be widespread within the reserve and general area. Additional weeds noted include bridal creeper, typha (north from SLK 144.11) and isolated specimens of watsonia.

Aspect	Evaluation of Potential Impacts
Vegetation – dieback	The instance of dieback was identified (GHD) in vegetation classified as Very Good on the southern side of the highway between SLK 143.87 and 144.65 and advised consulting with DEC prior to any activity in the vicinity. This advice has not been forthcoming at this stage; however the area will be clearly demarcated to prevent access as a management strategy.
Reserves / Conservation areas	There are 2 TECs included in an ESA on the southern side of the highway between SLK 142.77 & 144.51. Provided the works do not intrude into intact vegetation areas beyond the project area, there will be minimal impacts to this site.
Heritage (non-indigenous)	There are no heritage significance listed sites present in the currently proposed works areas. No Matters of National Environmental Significance will be impacted.
Aboriginal heritage	The area of TEC/ESA on the southern side of the highway between SLK 142.77 & 144.51 also includes an Aboriginal site which will not be impacted.
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. The works will not require dewatering or the abstraction of water. The culvert for a minor ephemeral drain (SLK 145.7) will be replaced and extended but as the works are to undertaken in the dry summer months there is not likely to be an impact to the water course. As this is proclaimed under the <i>Rights in Water and Irrigation Act</i> , a Permit to Disturb Beds & Banks will be required from the Department of Water prior to construction commencing
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	There are five residences and a community hall within 100m of the existing carriage way. Construction works are not expected to significantly contribute to noise levels at these receivers, provided works are limited to normal working hours.
Visual amenity	The proposed works will result in minor and short-term visual impacts during construction.
Public safety and risk	Provided traffic management and signage to Main Roads standards is employed, the proposed works do not present any significant hazards to public safety.
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, e.g. petrol station.
Salinity	Given the nature and scale of the project the impact is not relevant.
Acid Sulfate Soils	No further investigations are necessary as 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 further amendments would be required to the Local Government Planning Scheme or Region Scheme.

5. 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.

6. ENVIRONMENTAL MANAGEMENT PLAN

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.	<ul style="list-style-type: none"> a copy of the PEIA & EMP a map showing the location where the clearing occurred, recorded in an ESRI Shapefile; the size of the area cleared (in hectares); and the dates on which the clearing was done. 	Project Manager	DEC
Pre-Construction	Weed & pathogen management	Control of weeds, dieback and other pathogens:	<ul style="list-style-type: none"> Standard weed & pathogen hygiene measures should be applied for all earthworks in the area, including ensuring that plant and equipment brought on to the site is clean of soil Adjacent areas that have been identified as infested with dieback shall be clearly demarcated to prevent access Construction works to be undertaken in summer to reduce the potential for soil movement and pathogen spread Cleared vegetation and Topsoil to be disposed of / utilised in accordance with the Vegetation / Topsoil Management Plan (construction section EMP). 	Project Manager	Main Roads
	Vegetation - Clearing	Ensure 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	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 on site.	Contractor	Main Roads
	Surface Drainage	Maintain the hydrological regime that exists prior to the construction of the proposal.	<ul style="list-style-type: none"> New drainage systems should be designed and installed to facilitate the natural flow of surface water. Harvey Water should be contacted to discuss any proposed modifications to the irrigation channels existing in proximity to the highway. The replacement of the culvert for the minor ephemeral drain (SLK 145.7) will require a Permit to Disturb Beds & Banks prior to construction commencing as this is a proclaimed watercourse under the <i>Rights in Water and Irrigation Act</i>. 	Project Manager	DEC

ENVIRONMENTAL MANAGEMENT PLAN					
Timing	Topic	Objective	Action	Responsible Party	Advice
Construction	Weed / Vegetation & Topsoil Management	Prevent the spread and reintroduction of weeds	All vegetation to be removed and transported to an appropriate site to be mulched in preparation for composting. All topsoil is to be disposed of in an appropriate spoil site.	Project Manager / Contractor	Main Roads
	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
			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.	Contractor	Main Roads
			Any complaints regarding dust will be attended to as soon as possible.	Project Manager / Contractor	Main Roads
			Where it is found that trucks leaving the site are carrying excessive material onto sealed surfaces, these areas will be swept to reduce dust generation and maintain traffic safety.	Contractor	Main Roads
			Watering, the use of hydromulch or other forms of mulching to protect loose surfaces shall be used as mitigation measures.	Contractor	Main Roads
	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
			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
			Dumping or temporary storage of bitumen, asphalt, concrete or aggregate should only occur at designated depots or controlled hardstands.	Contractor	Main Roads
			The project areas, including hardstand areas, will be kept in a tidy manner at all times.	Contractor	Main Roads
	Fire	Ensure that the fire risk associated	No fires shall be lit within the project area.	Contractor	Main Roads

ENVIRONMENTAL MANAGEMENT PLAN					
Timing	Topic	Objective	Action	Responsible Party	Advice
		with the construction of the proposal is minimised.	Machinery will be fitted with approved spark arresting mufflers.	Contractor	Main Roads
			A water tanker will be on site at all times.	Contractor	Main Roads
	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
Post-Construction	Rehabilitation	Leave the project area free from debris	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.	Contractor	Main Roads

Appendix A

Low Impact Environmental Screening Checklist

Form No. 6707/001/01

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 SOUTH WESTERN HIGHWAY, WATERLOO SLK 142.25 to 146.05
Drainage improvement / seal widening / overlay.

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

Completed By: Signature Sy h Date 09/07/2010
Name S. Jayasekera Title PM

To be reviewed by a Main Roads Environment Officer Signature Peter Swanson Date 09/07/10
Name Peter Swanson Title PEO

Comments: PEIA required.

Appendix B

FLORA

Threatened Flora Database (DEFL), the WA Herbarium database (WAHerb) and the Declared Rare and Priority Flora shape file and Species List

Correspondence with DEC re: impact to TEC/ESA and Threatened Flora

Initial correspondence with botanist for additional targeted flora survey

Botanists report on Targeted Flora Survey

DEC review of botanists report comments

Flora survey list for overall project: GHD 2008

GHD Environmental Aspects Mapping

A Environmental Constraints

B Vegetation Units

C Vegetation Condition



Threatened Flora Database (DEFL), the WA Herbarium database (WAHerb) search result shape file display

**DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DECLARED RARE AND PRIORITY FLORA LIST**

25 March 2010

SPECIES / TAXON	CONS CODE	DEC REGION	DISTRIBUTION	FLOWER PERIOD
Acacia flagelliformis Busselton, Donnybrook	4	SR	Harvey, Eaton, Bunbury, Capel,	Jul-Sep
Caladenia speciosa Gingin, Capel	4	SR,SW	Myalup, Eaton, Yarloop, Ludlow,	Sep-Oct
Craspedia argillicola	2	SW,SR	Pinjarra, Meelon, Waterloo	Aug-Oct
Eleocharis keigheryi	R	SW,MW, SR,WB	Kenwick, Lesueur, Cataby, Wannamal, Ellenbrook, Boyanup, Waterloo, Julimar, Lesueur, Bolgart, Beverley, Woodanilling	-
Rhodanthe pyrethrum	3	SR,SW	Bullsbrook, Boyanup, Kenwick, Waterloo, Harvey, Eaton, Denmark, Pinjarra, Waroona, West Cape Howe NP, Youngs Siding, Mt Roe NP, Lake Muir, Ludlow, Capel, Forrestdale, Tone Perup NR, Barrabup Pool, Muja, Wandoo NP, Lake Pinjar	Sep-Oct
Schoenus capillifolius	3	SR,SW, WB	Upper Swan, Kenwick, Waterloo, Beauford River, Beverley, Goomalling, Carousel Swamp, Pearce, Waroona, Karnup, Baldivis	Sep-Nov

Department of Environment and Conservation Declared Rare and Priority Flora List



Table 15 Flora survey list for 139.37 – 149.06 SLK

FAMILY	* TAXA	PRESENCE/ABSENCE			
		CcMrEr	SCP03c	SCP08	MrvJMt
POACEAE	* <i>Briza maxima</i>	+			
	* <i>Pennisetum clandestinum</i>		+		+
CYPERACEAE	Cyperaceae sp.		+		
	<i>Gahnia trifida</i>			+	
	<i>Lepidosperma longitudinale</i>				+
	<i>Lepidosperma</i> sp.				+
	<i>Mesomelaena tetragona</i>				+
	<i>Schoenus</i> sp.		+		
	<i>Tetaria octandra</i>		+		
RESTIACEAE	<i>Lyginia barbata</i>		+	+	
ASPARAGACEAE	* <i>Asparagus asparagoides</i>		+		+
XANTHORRHOACEAE	<i>Xanthorrhoea pretsii</i>	+	+		+
ANTHERICACEAE	Anthericaceae sp.		+		
	<i>Caesia micrantha</i>			+	
HAEMODORACEAE	<i>Haemodorum</i> sp.		+		
IRIDACEAE	* <i>Gladiolus caryophyllaceus</i>		+	+	
ORCHIDACEAE	<i>Microtis media</i>	+			
PROTEACEAE	<i>Banksia indleyana</i>		+		
	<i>Hakea varia</i>	+	+		+
	<i>Grevillea bipinnatifida</i>		+		+
	<i>Synaphea</i> sp.				+
BRASSICACEAE	* <i>Brassica tournefortii</i>	+		+	
DROSERACEAE	<i>Drosera</i> sp.		+		+
MIMOSACEAE	* <i>Acacia</i> sp.	+			
	<i>Acacia saligna</i>	+			+
PAPILIONACEAE	<i>Kennedia prostrata</i>		+		
FAMILY	* TAXA	PRESENCE/ABSENCE			
		CcMrEr	SCP03c	SCP08	MrvJMt
	<i>Vimharfa juncea</i>	+		+	
OXALIDACEAE	* <i>Oxalis pes-caprae</i>	+	+		
	* <i>Oxalis purpurea</i>		+		
MYRTACEAE	<i>Corymbia calophylla</i>	+	+	+	+
	<i>Eucalyptus rudis</i>	+			
	* <i>Eucalyptus</i> sp.	+			
	<i>Eucalyptus wandoo</i>	+			
	<i>Melaleuca ?osullivanii</i>				+
	<i>Melaleuca raphiophylla</i>	+	+	+	+
	<i>Pentalymma ellipticum</i>				+
CONVOLVULACEAE	* <i>Ipomoea indica</i>	+			
SOLANACEAE	* <i>Solanum nigrum</i>	+			
ASTERACEAE	<i>Podolepis gracilis</i>			+	
	<i>Siloxerus humifusus</i>			+	

* Introduced species

? Identification to species was not completely certain due to lack of distinctive features

(Source: GHD field survey, May 2008)

Flora Survey List for Overall Project: GHD 2008

Peter,

As my original email stated "The locational information for the record is not precise"

Here are the two records I have extracted from Florabase. (<http://florabase.dec.wa.gov.au/>).
If you do not already have it/use it, you should consider applying for access to this resource.

You'll note that the 1981 report recorded the frequency as "locally abundant".
However if, as you advise MRD's consultants have undertaken a thorough survey at an appropriate time and have not detected this species, then I am prepared to accept that this is the most current information available for this site and the species has declined and is no longer "locally common".

Anthotium junciforme (de Vriese) D.A.Morrison
Goodeniaceae

Plant Description: Tufted perennial herb 40 cm. Flowers deep blue-purple.
Vegetation: Open low scrub.
Site Description: Red damp clay loam.
Frequency: locally common.
Locality: Waterloo **State:** WA
Lat: 33° 20' 0.0" S **Long:** 115° 45' 0.0" E (GDA94)
Collector: G.J. Keighery 3844
Collection Date: 13 March 1981
Conservation Status: P4

Determinavit: S. Curry * **Date:** 9 August 1993
Origin: KPBG

Anthotium junciforme (de Vriese) D.A.Morrison
Goodeniaceae

Plant Description: Flowers deep blue.
Locality: Waterloo **State:** WA
Lat: 33° 20' S **Long:** 115° 45' E (GDA94)
Collector: P.G. Wilson 12145
Collection Date: 20 December 1984
Conservation Status: P4

Origin: PERTH

Kim

From: SWANSON Peter (PEO/A) [mailto:peter.swanson@mainroads.wa.gov.au]
Sent: Tuesday, 17 August 2010 11:42 AM
To: Williams, Kim
Cc: JAYASEKERA Srikanthi (PM); DELLA BONA Jeanette (EO)
Subject: RE: SW Hwy between Waterloo Road and Hynes Road

Any additional information to offer on this Kim?

From: SWANSON Peter (PEO)
Sent: Monday, 9 August 2010 11:40 AM
To: 'Williams, Kim'
Cc: JAYASEKERA Srikanthi (PM); DELLA BONA Jeanette (EO)
Subject: RE: SW Hwy between Waterloo Road and Hynes Road

Kim

It would be appreciated if you could be a bit more explicate regarding the 'possible' location of these plants.
The project site is over three kilometres long and saying that it is on the north side leaves a lot of ground to cover.

I have examined the DEC Nature Map system (<http://naturemap.dec.wa.gov.au/default.aspx>) and there is no listing of this species (*Anthotium junciforme*) at any of the registered sites.
The floral survey undertaken by GHD in May 2008 for Main Roads as part of our assessment process did not identify this species.

The list of 'Significant Flora Species previously recorded within the general project locality' in their report did not include

this species.

My only other source would be to make a request for information through the Department's Species and Communities Branch, which perhaps you could do on our behalf in order to hasten the process. However, it seems highly unlikely that there are any specimens remaining given the disturbed nature of the road reserve and the nature and usage of the adjacent land.

Regards
Peter

From: Williams, Kim [mailto:Kim.Williams@dec.wa.gov.au]
Sent: Friday, 6 August 2010 3:04 PM
To: SWANSON Peter (PEO)
Cc: Flowers, Megan; SWRegion, Admin
Subject: RE: SW Hwy between Waterloo Road and Hynes Road

Peter,

The priority 4 species is *Anthotium junciforme*. The locational information for the record is not precise, though it does plot to the north side of the highway, thus my previous advice that it may occur.

I also remind you that as holder of a state-wide clearing permit from DEC, Main Roads WA are required to undertake self assessment of each of its projects that require removal of vegetation. If this has not already happened for the Waterloo proposal you should arrange for an environmental survey/assessment of the full extent of the area to be affected by the upgrade proposal. If values are identified which may be at variance with the 10 Clearing Principles please contact me again to discuss.

Thanks
Kim

Kim Williams
Regional Leader Nature Conservation
Dept Environment and Conservation
South West Region - Bunbury

Ph: 97254300
Email: Kim.Williams@dec.wa.gov.au

From: SWANSON Peter (PEO) [mailto:peter.swanson@mainroads.wa.gov.au]
Sent: Tuesday, 3 August 2010 10:24 AM
To: Williams, Kim
Cc: JAYASEKERA Srikanthi (PM); DELLA BONA Jeanette (EO)
Subject: RE: SW Hwy between Waterloo Road and Hynes Road

Kim
Please provide further details of species and location of the P4 flora that may be on the north side.
Thanks
peter

From: Williams, Kim [mailto:Kim.Williams@dec.wa.gov.au]
Sent: Monday, 2 August 2010 4:48 PM
To: SWANSON Peter (PEO)
Cc: SWRegion, Admin; Flowers, Megan
Subject: RE: SW Hwy between Waterloo Road and Hynes Road

Peter,

Further to our discussion last week re: this topic.

I can confirm with regard to any proposed road maintenance or upgrade works that may be undertaken on the northern/western side of SW Hwy between Waterloo Rd and Hynes Rd that **there are no recognised contemporary occurrences of the TECs SCP3c, SCP08 and SCP09 persisting in the remnant vegetation**. Thus for TEC values DEC through the local South West Regional Office has no objection to the proposed works on this side of the roadway.

However to the best of our knowledge, existence of non-TEC values have not been determined and DEC would expect that routine processes consistent with the conditions pertaining to the Native Vegetation Clearing "Purpose Permit" number 818/4 (valid 12/12/2005 to 12/12/2010) held by MRD would apply prior to undertaking disturbance works.

Specifically I direct your attention to Condition 5 (a) & (b) and the subsequent assessment processes which may need to be undertaken.

I also advise that a quick desktop data check reveals the likelihood of Priority 4 flora occurring on the northern side of the highway.

Regards

Kim

Kim Williams
Regional Leader Nature Conservation
Dept Environment and Conservation
South West Region - Bunbury
Ph: 97254300
Email: Kim.Williams@DEC.wa.gov.au

From: SWANSON Peter (PEO) [mailto:peter.swanson@mainroads.wa.gov.au]
Sent: Friday, 30 July 2010 4:30 PM
To: Williams, Kim
Cc: DELLA BONA Jeanette (EO); JAYASEKERA Srikanthi (PM)
Subject: FW: SW Hwy between Waterloo Road and Hynes Road

Kim

As discussed on the phone today, I look forward to receiving the information requested early next week.
Peter

From: SWANSON Peter (PEO)
Sent: Monday, 19 July 2010 9:51 AM
To: 'kim.williams@dec.wa.gov.au'
Cc: DELLA BONA Jeanette (EO); JAYASEKERA Srikanthi (PM)
Subject: RE: SW Hwy between Waterloo Road and Hynes Road

Kim

I should have mentioned on the phone last week that, in this instance a brief email would suffice, I think.
Thanks
Peter

From: SWANSON Peter (PEO)
Sent: Monday, 12 July 2010 11:29 AM
To: 'kim.williams@dec.wa.gov.au'
Cc: DELLA BONA Jeanette (EO); JAYASEKERA Srikanthi (PM)
Subject: SW Hwy between Waterloo Road and Hynes Road

Kim

As you are aware Main Roads proposes to undertake work on SW Hwy between Waterloo Road and Hynes Road in the Shire of Dardanup.
I am compiling a PEIA for the proposal.
I have an internal email from Jeanette Della Bona indicating that she has received a verbal communication from you through Andrew Webb that you have no concerns of these works, which involves clearing of vegetation from the western side only, causing an impact on the TEC / Priority Flora site on the eastern side of the road.

Could you please send me a brief statement to confirm that this is the case so that I can include it in the assessment?

Many thanks
Peter Swanson
Environment Officer
Wheat Belt South / South West Region

Correspondence with DEC re: impact to TEC/ESA and Threatened Flora

Thanks Eleanor
Please provide an estimate to check the area as indicated and your availability.
Note asap is preferred.
Regards
Peter

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

From: embennett [mailto:embennett@westnet.com.au]
Sent: Saturday, 28 August 2010 5:00 PM
To: SWANSON Peter (PEO/A)
Subject: Anthotium
Hi Peter

From the aerial you sent to me it appears that the north side of the road is predominantly cleared. Anthotium junciforme occurs in damp situations and would be visible at present in a vegetative state. The 2 collections were made in 80's so would be fairly unlikely to be there now with all the development etc that has gone on since then plus they were collected from Waterloo NOT Waterloo Road. I also see your quandry about the species list you received. If you require a

survey I could do it very soon as it would only be a matter of walking the road edge and looking for the Anthotium plus the other list of species you have received..
If you have any queries please contact me on 92932998 or 0429329980 as well as email.
Eleanor Bennett

Hi Eleanor

I work at Main Roads with Jeanette Della Bona who gave me your contact details.
We have a bit of a quandary regarding Threatened Flora potentially being at one of our proposed sites.

Main Roads SWR proposes to undertake works along South Western Highway between Waterloo Road and Hynes Road in the Shire of Dardanup (SLK 142.75 to 146.05).

We are aware of the TEC on the southern side of the road at this location and therefore the major extent of the proposed works is on the northern side and all within the road reserve.

We will not be impacting the TEC and clearing is to occur only on the north side.

We have been advised by regional DEC that the species Anthotium junciforme may be present on the north side of the highway in Waterloo through records from FloraBase. I actually cannot find this extent of information on Flora Base, but can see that it is herbaceous and flowers between November and March. I cannot find a photo at all on the web.

Have you any experience with this species and could you advise if it 'visible' in its vegetative form prior to flowering. If so, when would a survey be able to be confidently undertaken.

We are keen to commence clearing asap and are also a bit dubious that there are any plants there at all as the current veg is completely degraded and narrow along the roadside with cleared pasture land adjacent.

Please advise regarding the Anthotium junciforme species.

Many thanks in advance

Peter Swanson
Environment Officer
Wheat Belt South / South West Region

Initial correspondence with botanist for additional targeted flora survey



Bennett Environmental Consulting Pty Ltd

A.B.N. 18 091 826 765

PO Box 341, KALAMUNDA 6926

Tel: (08) 9293 2998 ~ Mobile 0429329980

Email: ebennett@cygnus.uwa.edu.au

Dr Eleanor Bennett undertook a survey for declared rare and priority flora along the northern side of the South Western Highway between Waterloo Road and Hynes Road on 1st September 2010. The taxa of concern as potentially occurring in the area (provided by Mains Road) were:

<i>Eleocharis keigheryi</i>	Declared Rare Flora
<i>Craspedia argillicola</i>	Priority 2
<i>Rhodanthe pyrethrum</i>	Priority 3
<i>Schoenus capillaris</i>	Priority 3
<i>Acacia flagelliformis</i>	Priority 4
<i>Caladenia speciosa</i>	Priority 4
<i>Anthotium junciforme</i>	Priority 4

A search was undertaken for the above taxa by walking a transect along the full length of the road verge. None of the above taxa were recorded. The area was degraded to very degraded with some small sections in good condition. The majority of weeds were grasses, especially **Cynodon dactylon* and **Pennisetum clandestinum* and the dominant broad leaved weeds were **Fumaria capreolata* and **Oxalis pes-caprae*. There were sections of good tree cover mainly *Melaleuca raphiophylla* and the understorey taxa were *Melaleuca viminea*, *M. incana* and *M. lateritia* over sedges.

In addition there were several trees of *Eucalyptus rudis* in sections along the verge. There are 2 subspecies recognised for this taxon. Both the typical *E. rudis* subsp. *rudis* and the priority 4, *E. rudis* subsp. *cratyantha* have been recorded from the Bunbury area. *Eucalyptus rudis* subsp. *cratyantha* is distinguished from *Eucalyptus rudis* subsp. *rudis* by 4 features¹;

1. buds up to 15 mm long;
2. fruit 14mm in diameter;
3. fruits with 5 or 6 valves; and
4. pedicels up to 7mm long.

The specimens collected recorded mature buds between 12 - 15mm long; fruit 10-12mm in diameter, but with 4 valves and pedicels 6-8mm long. Three of the four features the *Eucalyptus rudis* trees along the area surveyed are consistent with the characteristics for the P4 taxon, *Eucalyptus rudis* subsp. *cratyantha*. It should be noted that this taxon was not included in the declared rare and priority flora list provided to Main Roads. Many more of the same trees were also observed on the south side of the road, the location of the Threatened Ecological Community, which will not be disturbed by any road works.

Locations where *Eucalyptus rudis* recorded during current survey (WGS84):

Between 383612E; 6311051N and 383639E; 6311067N Trees 2-10m tall, mostly 8m or less – 32 trees

At 383953E; 6311246N Trees to 8m – 3 trees and 14 juveniles

At 383980E; 6311258N 1 tree 10m

Between 384390E; 6311476N and 384432E; 6311503N Trees to 4m – 72 trees

At 384504E; 6311546N 1x tree ca 12m

Between 384700E; 6311671N and 384768E; 6311713N Trees 10-12m – 16 trees

Between 384385E; 6311755N and 385026E; 6311874N Trees up to 12m – 69 trees and 19 juveniles

Between 385368E; 6312051N and 385475E; 6312109N Trees to 10m – 21 trees and 7 juveniles

Growing in conjunction with *Eucalyptus rudis* were *Corymbia calophylla*, *Eucalyptus wandoo* and some planted Eastern Australian Eucalypts.

There are a few grey areas in determining the difference between the two subspecies of *Eucalyptus rudis*, but it would appear that those growing on both sides of South Western Highway between Waterloo and Hynes Road are the Priority 4, *Eucalyptus rudis* subsp. *cratyantha*. There were variations noted in the size of the buds and fruits within the populations but typically they were of the larger size. A botanist at the Western Australian Herbarium was contacted and agreed that the larger buds and fruits are the main character for this taxon. The collections made during this survey will be forwarded to the Western Australian Herbarium when they are again able to receive collections after their move to a new building.

¹ Brooker, M.I.H and Hopper, S.D. (1993). New series, subspecies, species and subspecies of *Eucalyptus* (Myrtaceae) from Western Australia and from South Australia. *Nuytsia* 9: 1-68

Although this tree is a Priority 4, the removal of some or even all plants should not impact on the conservation value of this taxon as there were many observed on the opposite, southern side of the South Western Highway in an area that is not to be developed. The previous Bunbury collection of *Eucalyptus rudis* subsp. *cratyantha* was made on the South Western Highway where it crosses the Preston River. In addition it has been collected from north of the Brunswick River Bridge so it is possible it could be more widely distributed than is currently known. The reasons why this taxon has not been recorded in the area previously could be because *E. rudis* subsp. *cratyantha* was not described until 1993 and since then no detailed surveys have been undertaken of remnant bushland within the area.

Eleanor Bennett
1st September 2010

Botanists report on Targeted Flora Survey

From: Webb, Andrew [mailto:Andrew.Webb@dec.wa.gov.au]
Sent: Friday, 3 September 2010 4:54 PM
To: SWANSON Peter (PEO/A)
Cc: Flowers, Megan
Subject: RE: SW Hwy Waterloo - *Euc rudis* subsp. *cratyantha*

Peter,

As mentioned on the phone we have recorded this same Priority 4 listed species on the south side of the road and the DEC SW Region agrees with the comments as made by Eleanor that the **removal of the few plants on the north side of the road as you are proposing will not adversely affect the species survival within the Waterloo Reserves.**

Unfortunately I have not been able to catch Megan Flowers (who is our local Native vegetation clearing person) to clarify if there is any applications required under the vegetation clearing legislation for Priority listed flora, but I can let you know that there is no requirement for an Application to Take Declared Rare Flora under the Wildlife Conservation Act for priority listed species.

I would recommend that you clarify with the Native Vegetation branch any requirements you may need in relation to clearing priority listed flora.

Thanks
Andrew Web
b

From: SWANSON Peter (PEO/A) [mailto:peter.swanson@mainroads.wa.gov.au]
Sent: Thursday, 2 September 2010 4:07 PM
To: Webb, Andrew
Subject: SW Hwy Waterloo - *Euc rudis* subsp. *cratyantha*

Andrew
Thanks for calling back today so promptly.

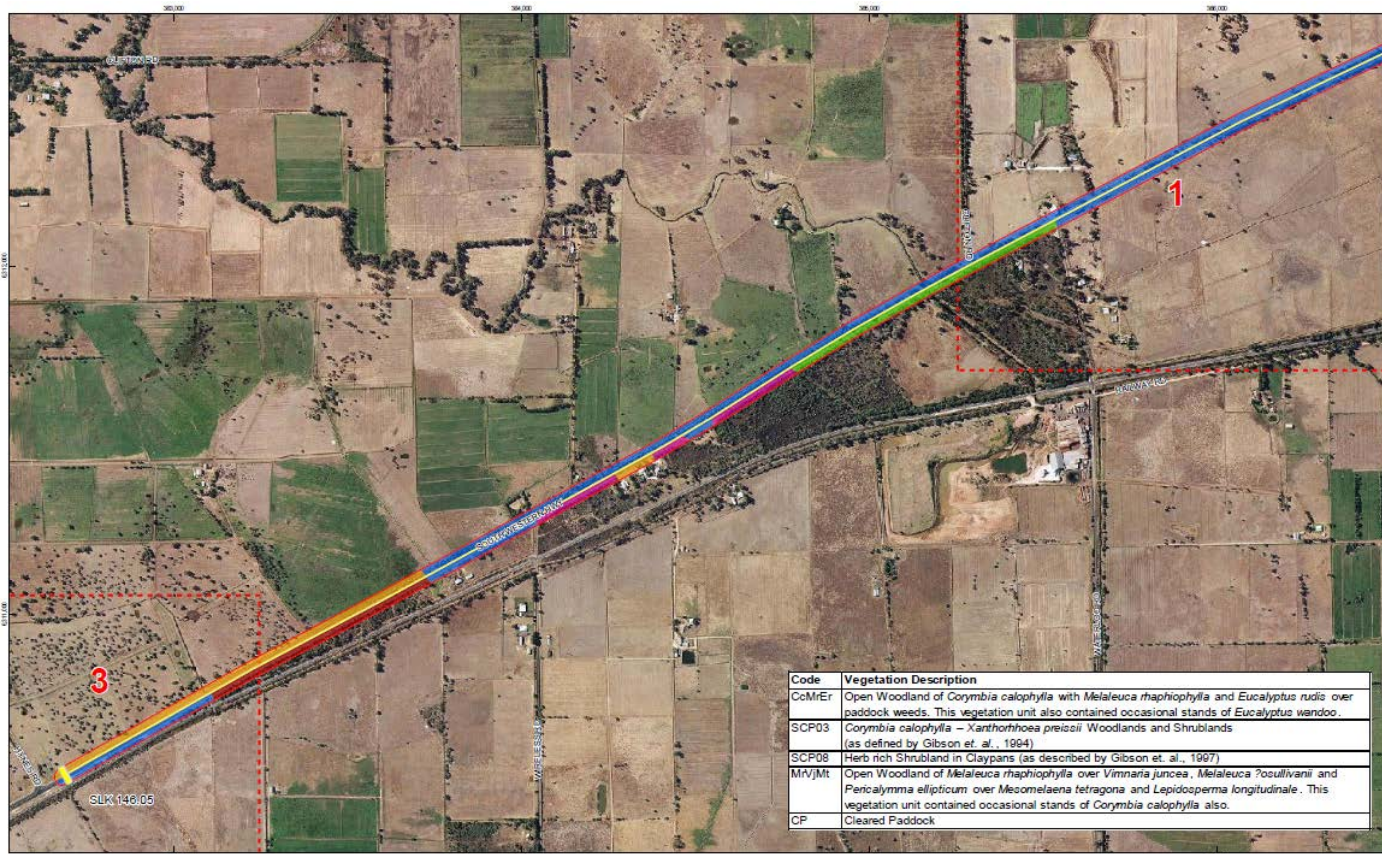
As discussed, please see the attached report from Botanist Eleanor Bennett. It would be appreciated if you could respond as to if there are any issues of clearing the specimens of *Eucalyptus rudis* subsp. *cratyantha* that have been identified on the northern side of SW Hwy. Waterloo while undertaking a targeted flora survey for listed Priority flora. No other threatened species were recorded by the survey.

Could you also inform us of our requirements in regard the need to make an application to Take Protected (Native) Flora in this instance.

Please note, we would appreciate your earliest response as the works are scheduled for commencement next week.

Regards
Peter Swanson
Environment Officer
Wheat Belt South / South West Region
Main Roads Western Australia
www.mainroads.wa.gov.au

DEC review of botanists report comments



1:10,000 (A3)
 0 50 100 200 300 400
 Metres

Map Projection: Transverse Mercator
 Horizontal Datum: Geocentric Datum of Australia 1994
 GDA: Map Grid of Australia, Zone 50

LEGEND
 Road Section SLK 139.37-149.06 - MRWA - 2007
 Study Area - GHD - 20080704
 Map Extents - GHD - 20080526

Vegetation Type - GHD - 200807
 CcMfEr
 SCP03

SCP08
 MRV/JMt
 CP

GHD mainroads WESTERN AUSTRALIA
 MRWA South Western Hwy, Burekup-Piçon
 139.37 - 146.05 SLK and
 147.78 - 149.06 SLK
 Vegetation Units - Map 2

Job Number 6122448
 Revision 0
 Date 25 September 2008

239 Adelaide Terrace Perth WA 6004 Australia T 61 8 9222 8222 F 61 8 9222 8555 E permail@ghd.com.au W www.ghd.com.au

Map B: Vegetation Units: GHD 2008



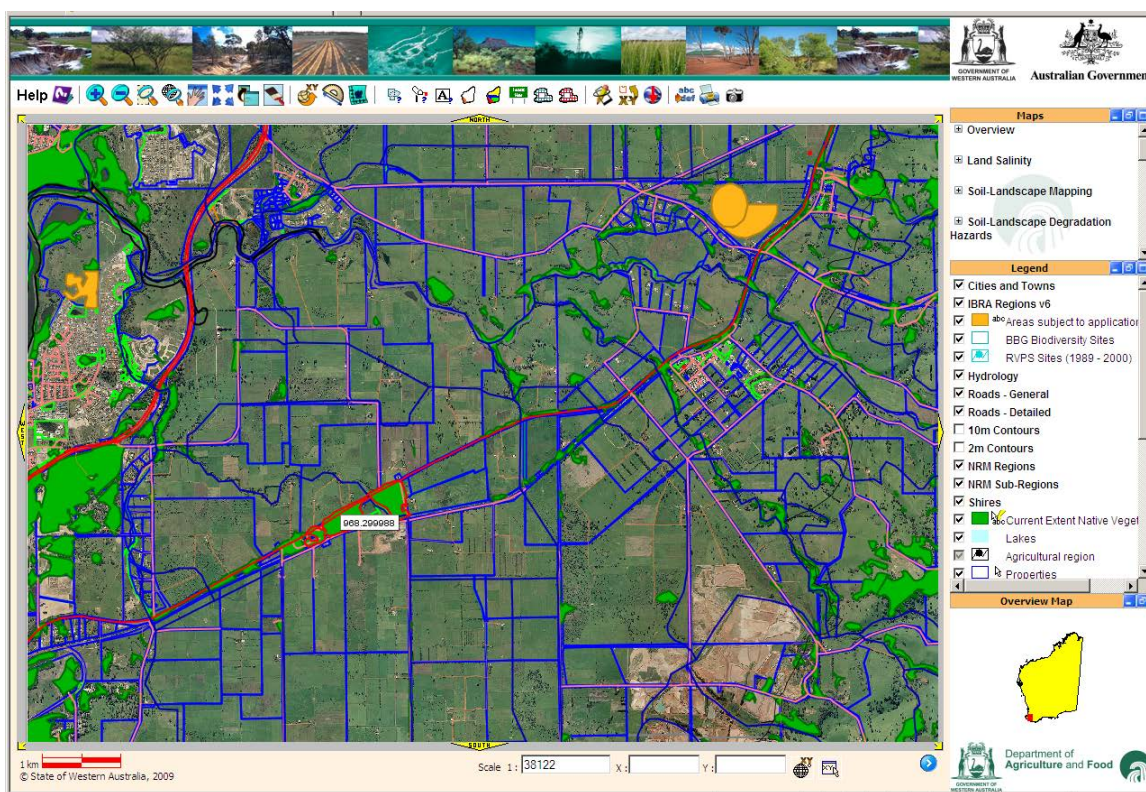
<p>1:10,000 (A3)</p> <p>0 100 200 300 400 Metres</p> <p>Map Projection: Transverse Mercator Horizontal Datum: Geocentric Datum of Australia 1994 GDA Map Grid of Australia, Zone 50</p> <p>© 2006. While GHD has taken care to ensure the accuracy of this product, GHD and DATA SUPPLIER(S) make no representations or warranties about its accuracy, completeness or suitability for any particular purpose. GHD and DATA SUPPLIER(S) accept overall liability of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential) damages which are or may be incurred as a result of the product being furnished, irrespective of whether or not any such damages are caused in any way and for any reason. Dataset names include published date where available. Background imagery sourced from Landsat, Satorby 2000 Mosaic. Created by: M.Lalovic, C.Housman</p>	<p>LEGEND</p> <p> Road Section SLK 139.37-149.05 - MRWA - 2007</p> <p> Study Area - GHD - 20080704</p> <p> Map Extents - GHD - 20080525</p> <p> Very Good</p> <p> Good</p> <p> Degraded</p> <p> Completely Degraded</p>	<p> </p> <p>MRWA South Western Hwy, Burekup-Picton 139.37 - 146.05 SLK and 147.78 - 149.06 SLK Vegetation Condition - Map 2</p> <p>Job Number 6122448 Revision 0 Date 25 September 2008</p> <p>239 Adelaide Terrace Perth WA 6004 Australia T 61 8 6222 8222 F 61 8 6222 8555 E permail@ghd.com.au W www.ghd.com.au</p>
--	--	---

Map C: Vegetation Condition: GHD 2008

Figure 9

Appendix C

Vegetation Extent



Department of Agriculture & Food: NRM SLIP System search of vegetation type and extent

Type	Type Description Number	Description	Environmental Descriptor	NVIS Lv2 Structural Formation	NVIS Lv3 - Broad Floristic Formation
2158	1	Medium woodland; jarrah, marri & wandoo	Darling Scarp	Woodland	Eucalyptus woodland

Table 2: Vegetation association (type) 968

Vegetation Map Unit - Dominant Species Information
Map Unit Number: 80101301 Vegetation Type No: 2158
Species List

Stratum	Minimum % Crown Cover	Maximum % Crown Cover	Maximum Height (m)	Species	Dominance	Growth Form
Upper 1	10	30	30	<i>Eucalyptus marginata</i>	co-dominant	Tree
Upper 1	10	30	30	<i>Corymbia calophylla</i>	co-dominant	Tree
Upper 1	10	30	30	<i>Eucalyptus subangusta</i>	co-dominant	Tree
Upper 2	10	30	10	<i>Allocasuarina fraseriana</i>	sub-dominant	Tree
Upper 2	10	30	10	<i>Banksia grandis</i>	sub-dominant	Tree
Upper 2	10	30	10	<i>Persoonia longifolia</i>	sub-dominant	Tree
Upper 2	10	30	10	<i>Persoonia elliptica</i>	sub-dominant	Tree
Upper 2	10	30	10	<i>Nuytsia floribunda</i>	sub-dominant	Tree
Upper 2	10	30	10	<i>Xylomelum occidentale</i>	sub-dominant	Tree
Upper 2	10	30	10	<i>Banksia littoralis</i>	sub-dominant	Tree
Upper 2	10	30	10	<i>Eucalyptus haematoxylon</i>	sub-dominant	Tree
Mid 1	10	30	2.5	<i>Acacia</i> sp.	sub-dominant	Shrub
Mid 1	10	30	2.5	<i>Adenanthos</i> sp.	sub-dominant	Shrub
Mid 1	10	30	2.5	<i>Agonis parviceps</i>	sub-dominant	Shrub
Mid 1	10	30	2.5	<i>Baeckea</i> sp.	sub-dominant	Shrub
Mid 1	10	30	2.5	<i>Bossiaea</i> sp.	sub-dominant	Shrub
Mid 1	10	30	2.5	<i>Daviesia</i> sp.	sub-dominant	Shrub
Mid 1	10	30	2.5	<i>Grevillea</i> sp.	sub-dominant	Shrub
Mid 1	10	30	2.5	<i>Hovea</i> sp.	sub-dominant	Shrub
Mid 1	10	30	2.5	<i>Leptomeria</i> sp.	sub-dominant	Shrub
Mid 1	10	30	2.5	<i>Xanthorrhoea preissii</i>	sub-dominant	Grass tree
Ground 1	10	30	1	<i>Astroloma</i> sp.	sub-dominant	Shrub
Ground 1	10	30	1	<i>Leucopogon</i> sp.	sub-dominant	Shrub
Ground 1	10	30	1	<i>Macrozamia riedlei</i>	sub-dominant	Cycad

Table 3: Dominant Species List of Vegetation Type 968

Vegetation Association	Pre-European Extent	Current Extent	% Remaining (State)
968	296,877.82	98,987.58	33.34

IBRA Region Code	IBRA Region Name	IBRA Region Extent	Vegetation Association	Pre-European Extent	Current Extent	% Remaining
SWA	Swan Coastal Plain	1,525,635.14	968	136188.61	8637.93	6.34
IBRA Sub Region Code	IBRA Sub Region Name	IBRA Sub Region Extent	Vegetation Association	Pre-European Extent	Current Extent	% Remaining
SWA2	Perth	1,142,170.26	968	136,188.62	8,637.93	6.34

Local Govt. Authority Name	Local Govt Authority Extent	Vegetation Association	Pre-European Extent	Current Extent	% Remaining
DARDANUP, SHIRE OF	52,843.67	968	9,654.99	468.34	4.85

Table 4: Extent Remaining of Vegetation Type 968

Appendix D

Dieback

GHD Environmental Aspects Dieback Mapping
GHD Dieback Management Strategy
DEC Dieback Management correspondence



1:10,000 (3EA3)
0 50 100 200 300 400
Metres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia 1994
GDA - Map Grid of Australia, Zone 50

LEGEND

- Road Section SLK139.37-SLK140.06 - MRWA-2007
- Study Area - GHD - 2008/04
- Map Extents - GHD - 2008/02
- Infected Areas with plant disease symptoms consistent with the presence of *Phytophthora*
- Uninfected (Protectable) Areas without plant disease symptoms associated with the presence of *Phytophthora*
- Uninspectable (Protectable) Areas where the susceptible plants are absent or too few to enable inspection of *Phytophthora*
- Map Grid Limits: The map grid covers an area of 100m by 100m. The map grid is overlaid on the aerial imagery. The map grid is used to identify the location of the road section and the study area.

MRWA
South Western Hwy, Burekup-Picton
139.37 - 146.05 SLK and
147.78 - 149.06 SLK
Phytophthora cinnamomi
Occurrence Map 2

Job Number: 6122448
Revision: 0
Date: 25 September 2008

239 Adelaide Terrace Perth WA 6004 Australia T 61 8 6222 8222 F 61 8 6222 8555 E perma@ghd.com.au W www.ghd.com.au

Figure 12

Map D: GHD Environmental Aspects Dieback Mapping

SUMMARY of RESULTS, DISCUSSION & MANAGEMENT STRATEGY from GHD EIA REPORT 2008

Two Infested sections have been determined within the (overall) study area. Both Infested sections are surrounded by cleared land and are not upslope of, or draining into vulnerable areas. As such, both infested areas are not considered as being protectable. The Uninterpretable category was allocated over all remaining parts within the study area (other than the two aforementioned Infested areas). The Uninterpretable category covers the entire western side of the highway study area buffer, most of its eastern side, and the TECs (where recent fire damage limited their interpretation). Other reasons for allocating this category included a lack of indicator plants and their total absence in parts along the highway. Notably the TECs were burnt in early 2008 that limited this interpretation. It could take a few years before these areas could be properly interpreted for dieback. Nevertheless, in consideration of biodiversity conservation, it is recommended that the TECs are considered as "Protectable" and as warranting precautionary dieback hygiene measures during the projects development.

- Schedule project activities in dry-soil conditions;
- Restrict the movement of machines and other vehicles to the limits of the areas to be cleared.
- Induct the workforce on dieback hygiene management requirements;
- Clean earth-moving machinery, vehicles, equipment and footwear prior to entering and leaving the site;
- Clean on entry applies to any activities within "Protectable" areas;
- Utilise soil in-situ as far as practicable and do not import dieback-affected material, much or fill into any "Protectable" areas.
- If movement of soil in wet-soil conditions is necessary, Main Roads must prepare, implement and adhere to a dieback hygiene management plan, developed in consultation with the DEC.

GHD Dieback Management Strategy

Mon 6/09/2010 10:15 AM
Peter,

I refer to your recent discussions and email exchanges with Peter Blankendaal from DEC's Forest Management Branch seeking advice on dieback management requirements for the proposed improvements to SW Hwy, Waterloo in the Shire of Dardanup between Waterloo Road and Hynes Road. I note that MRWA has commissioned a report from GHD (*South Western Highway Reconstruction and Passing Lanes between Burekup and Picton: EIA and EMP July 2009*) which contained an assessment of the disease management status and project management strategies/recommendations in relation to dieback management. Having read the report and discussed its technical merits with Peter Blankendaal, DEC is satisfied that the report is of the required standard and contains technically sound, appropriate and unambiguous recommendations.

(i.e.) Report Extract.

"The Uninterpretable category was allocated over all remaining parts within the study area (other than the two aforementioned Infested areas). The Uninterpretable category covers the entire western side of the highway study area buffer, most of its eastern side, and the TECs (where recent fire damage limited their interpretation). Other reasons for allocating this category included a lack of indicator plants and their total absence in parts along the highway.

If Phytophthora dieback was to develop within the TECs, its negative impacts could be significant and cause deaths of susceptible plants and changes to species composition over time. Notably the TECs were burnt in early 2008 that limited this interpretation. It could take a few years before these areas could be

properly interpreted for dieback. Nevertheless, in consideration of biodiversity conservation, it is **recommended that the TECs are considered as “Protectable”** and as warranting precautionary dieback hygiene measures during the projects development. This would minimise the risk of introducing and/or spreading dieback (and weeds) within them, plus it could support the DEC’s proposed actions to protect these plant communities over the longer term. No other Uninterpretable areas are considered as being “Protectable”, particularly due to their likely ongoing exposure to potential vectors of dieback."

Whilst it is acknowledged that the combination of absence of indicator species and the impact of the (then) recent bushfire were not advantageous to determining the distribution of the disease, the decision to class most of the site as Uninterpretable was correct. Thus there is by definition insufficient information to say with surety that Pc is either present or absent from the majority of the proposed project site. Given that the project runs (at least for part way) along a Critically Endangered TEC, having both state and federal threatened species listing, the only logical and appropriate management principle to apply in these settings is that the of the Precautionary Principle. **In this context the entire project area (excluding any identified Infected areas) should be regarded as disease free and Protectable.**

I note that this is the approach recommended in the GHD report and embodied in section 1.1 Dieback Management and the associated strategies.

1.1 Dieback Management

The most significant risk associated with this aspect is the potential for construction activities to accidentally spread and/or introduce dieback to an area deemed to be “Protectable” (in consultation wioth the DEC). For this project, vectoring (movement) of “dieback-infected” soil/plant material could occur via unclean machinery, vehicles, equipment and footwear – particularly as P. cinnamomi was identified in the project area.

Notwithstanding any legislative requirements or dieback hygiene management advice given by the DEC, it is considered that the risk of introducing or spreading dieback as a result of project activities can be adequately minimised – by implementing the following strategies.

Management Strategy

- Liaise with the DEC to determine “Protectable Areas” and any specific DEC hygiene management plan requirements;
- Schedule project activities in dry-soil conditions;
- Restrict the movement of machines and other vehicles to the limits of the areas to be cleared.
- Induct the workforce on dieback hygiene management requirements;
- Clean earth-moving machinery, vehicles, equipment and footwear prior to entering and leaving the site;
- Clean on entry applies to any activities within “Protectable” areas;
- Utilise soil in-situ as far as practicable and do not import dieback-affected material, much or fill into any “Protectable” areas.
- If movement of soil in wet-soil conditions is necessary, Main Roads must prepare, implement and adhere to a dieback hygiene management plan, developed in consultation with the DEC;
- If revegetation areas with native plants, select plants with known tolerance to *Phytophthora cinnamomi*.
Note: this can assist, but not guarantee ongoing plant survival.

You will be aware that DEC has over the last two years significantly increased its management of the Waterloo TEC site with regard to managing the potential threat from Pc. On ground actions having included controlling access via locked gates on all entry points, progressively fencing the boundary to control unauthorised access, undertaken two aerial phosphite applications and associated monitoring programs. You will also be aware that Pc has been identified as a major threatening process for many of the remnant TEC occurrences on the Swan Coastal Plain. You may not be aware that Pc is also **recognised nationally as a major threat to biodiversity conservation** and that a National Threat Abatement Plan " Threat abatement plan for dieback caused by the root-rot fungus *Phytophthora cinnamomi*, 2001" has been produced and is available from the federal DEWHA.

The value of the DEC actions will potentially be jeopardised if MRWA do not apply a similar precautionary approach. DEC regards the successful application in the field of the strategies contained in the GHD report to prevent the introduction and/or spread of Pc as not only Highly Desirable but Essential if the integrity of the conservation values are to be maintained.

Thankyou for seeking DEC's advice in this matter, if you have other enquiries or consultants reports you require assistance with interpreting, particularly in the Waterloo area please contact the Bunbury DEC office again. Equally if you would like to avail yourself of further training opportunities associated with the various elements of environmental impact assessments I would be happy to put you in contact with the appropriate DEC staff.

Thankyou

Kim
Kim Williams
Regional Leader Nature Conservation
Dept Environment and Conservation
South West Region - Bunbury

Ph: 97254300
Email: Kim.Williams@dec.wa.gov.au

DEC Dieback Management correspondence

Appendix E

Water

Department of Water correspondence

Hi Jeanetta

No, the stretch is not within an existing or proposed UWSPC area.

Regards
Carol

From: DELLA BONA Jeanette (EO) [mailto:jeanette.dellabona@mainroads.wa.gov.au]
Sent: Thursday, 4 March 2010 12:55 PM
To: ANDERSON Carol
Subject: RE: South Western Highway upgrade between Waterloo Road and Wireless Road, Waterloo

By the way, Carol can you provide me with the answer to the question below?

Are you in an existing or proposed Underground Water Supply and Pollution Control area?

Cheers

Jeanette Della-Bona
Main Roads South West Region
Environment Officer

Ph (08) 9725 5661 Fax (08) 9725 5666
Robertson Drive
PO Box 5010 Bunbury WA 6231

From: ANDERSON Carol [mailto:Carol.ANDERSON@water.wa.gov.au]
Sent: Wednesday, 3 March 2010 12:24 PM
To: DELLA BONA Jeanette (EO)
Cc: 'Ennis, Aminya'
Subject: RE: South Western Highway upgrade between Waterloo Road and Wireless Road, Waterloo

Hi Jeanette

The tributary that runs through the proposed stretch to be upgraded is proclaimed under the *Rights in Water and Irrigation Act*. Unless authorised by another Act, a Permit will be required from the Department of Water to interfere with the bed and/or banks.

The stretch fall within an area identified as Multiple Use which could mean a high water table or

perched water. Should any dewatering be required (outside exemption rates and conditions) within this proclaimed Groundwater Area (*Rights in Water and Irrigation Act*) a permit will be required from the Department of Water (again, unless authorised to take water by another Act).

Within this upgrade stretch there is a Conservation Category wetland and a Resourcement Enhancement wetland. These wetlands and their buffers that incorporate an area identified as Environmentally Sensitive Areas (clearing restrictions). Your proposal should be referred to the Department of Environment and Conservation in Bunbury, if not already done. There is also identified Threatened Ecological Communities plus Declared and Rare Flora. This falls under the jurisdiction of DEC and again, comments should be sought from that agency. You may also find that the area falls within a Regionally Significant Ecological Linkage.

The area is not with a proclaimed (or proposed) Public Drinking Water Source Protection Area or Protection Zone under the *Country Area Water Supply Act*.

Regards

Carol Anderson
S W Region
Dept of Planning

From: DELLA BONA Jeanette (EO) [mailto:jeanette.dellabona@mainroads.wa.gov.au]
Sent: Tuesday, 2 March 2010 6:16 PM
To: ANDERSON Carol
Subject: South Western Highway upgrade between Waterloo Road and Wireless Road, Waterloo

Hi Carol

For the above mentioned area, are you able to confirm the answer to the following:

Water Supply and Drainage Catchments

- Are you in a proclaimed or proposed groundwater or surface water protection area?

(You may need to contact the Department of Water (DoW) for more information on the requirements for your location, including the requirement for licences for water abstraction. Also, refer to the DoW website)

Yes No **If yes,** please describe what category of area.

- Are you in an existing or proposed Underground Water Supply and Pollution Control area?

(You may need to contact the DoW for more information on the requirements for your location, including the requirement for licences for water abstraction. Also, refer to the DoW website)

Yes No **If yes,** please describe what category of area.

We are planning to upgrade this section of the highway with (overlay) and some widening.

Thanks, kind regards

Jeanette Della-Bona
Environment Officer South West

Appendix F

MRWA Vegetation Clearing Assessment Report

This guideline has been prepared to assist MRWA in addressing condition 7 "Assessment of Clearing Impacts" under Clearing Permit CPS 818/4.

1.1. Proponent details

Proponent's name: Main Roads Western Australia – South West Region

Contacts Name: Peter Swanson

Phone: 08 9725 569277

Fax: 08 9725 5666

Email: peter.swanson@mainroads.wa.gov.au

1.2. Property details

Property: Main Roads WA Road Reserve – South Western Highway

Colloquial name: South Western Highway – Northern side between Hines Road and Waterloo Road

1.3. Area under assessment

A width of between 3 to 7 meters along the northern side of South Western Highway between SLK 142.75 & 146.05.

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:	Site Plan Attached
2.0	n/a	chainsaw / excavator	Road widening and shoulder improvements	Yes

1.4. Avoidance/Minimise clearing

How have the clearing impacts been minimised?

- The road upgrade has been designed to retain as many mature remnant trees as possible within Main Roads clear zone safety requirements. Any trees for retention shall be pre-marked in the field and the workforce advised of EMP requirements as part of their pre-work site induction.
- TECs will be marked on all design drawings and construction plans as 'environmental no go areas'.
- Prior to commencing clearing operations, the limits of clearing shall be marked on site and checked by the Construction Manager to ensure they are correctly defined. All construction activities shall be contained to within the pre-marked limits of clearing.
- Machinery, vehicles and equipment will not be parked or driven over tree roots or beyond the clearing limits. This requirement shall also be addressed in workforce site induction.
- Any trees to be removed will be felled in a manner that ensures they fall within the approved clearing envelope.
- Cleared vegetation (that is weed free) will be recycled as mulch to stabilise areas from erosion.
- Pruning of tree limbs shall be done with consideration to public safety and improving their stability and form in the longer term.
- Any damage caused by the Construction Contractor to the vegetation, landforms or fauna habitat outside of the clearing line will be rehabilitated at the contractor's cost.
- Any native fauna disturbed during clearing operations shall be allowed to make its own way to adjacent vegetated areas and if necessary, the DEC shall be contacted for advice.

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

The southern section of the north side of the highway in the project area (SLK 145-146.05) is classified as Cleared Paddock and comprises of scattered individual specimens of *Melaleuca raphiophylla*. The remaining section to the north is comprised of an Open Woodland of *Corymbia calophylla*, *Melaleuca*

rhaphiophylla and *Eucalyptus rudis* over paddock weeds. *Eucalyptus wandoo* and *Acacia saligna* also occur (GHD, 2008).

Site Visit Undertaken Yes
Site Report Attached Yes
Site Photos Attached Yes

Fauna / Flora Survey Undertaken Yes
Fauna / Flora Survey Report Attached Yes
Other Relevant References Attached No

Vegetation Association/No#

#968: Medium woodland; jarrah, marri & wandoo

Vegetation Condition

Refer to item 2.1 above. Vegetation Condition within the study area ranged from Degraded to Completely Degraded. The main disturbance factors were land clearing, grazing and significant weed invasion. Land surrounding the study area is predominantly used for general farming and rural purposes.

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

Comments Proposal not likely to be at variance to this Principle

Land surrounding the project area is predominantly used for general farming and rural purposes. There are two Threatened Ecological Communities (TECs) on the opposite side of the highway where no clearing is proposed that are also surrounded by rural land. The vegetation proposed to be cleared consists of a narrow band of roadside fringing vegetation in a degraded to completely degraded condition that would be highly unlikely to contain threatened flora or be a favourable habitat to support fauna.

Methodology

EPBC Act Protected Matters Search Tool
DEC database enquiries
WA Museum database records
GHD EIA 2008: Threatened fauna and habitat assessment and survey (opportunistic)
Site assessment of flora/vegetation

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

Comments Proposal is not likely to be at variance to this Principle

No significant habitat for indigenous fauna was identified within or adjoining the project study area. It is considered that clearing adjacent to the highway will not significantly impact resident individual species, their distribution levels or fragment any vegetated corridors that could sustain fauna movements. Given the clearing will be linear along an existing highway corridor that is largely degraded and opposite vegetation in a better condition, it is unlikely to be at variance to this principle.

Methodology

EPBC Act Protected Matters Search Tool
DEC database enquiry
GHD EIA 2008: Threatened fauna and habitat assessment and survey (opportunistic)
Site assessment of flora/vegetation

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

Comments Proposal is not likely to be at variance to this Principle

A search of rare flora database records, the DEC and WA Herbarium, indicated that a number of Priority flora occurs in proximity to the project. Most of these occur within the southern side of the Waterloo Nature Reserve which will not be impacted as part of the project. The database search and field survey undertaken by GHD (2008) identified no Declared Rare Flora (DRF) within the study area. As the clearing is proposed in areas that have been classified as degraded to completely degraded consisting of Cleared Paddock and Open Woodland made up of scattered trees over paddock weeds, it is highly unlikely that it would be a favourable environment for rare flora.

Methodology

GHD EIA 2008: Threatened flora survey
DEC database enquiry
Site assessment of flora/vegetation

(d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.

Comments Proposal is not likely to be at variance to this Principle

None present in the proposed works area however 2 TECs included in an ESA have been identified on the southern side of the highway between SLK 142.77 & 144.51. Areas outside the project area will not be disturbed as part of the proposed works.

Methodology

EPBC Act Protected Matters Search Tool
DEC TEC database
GHD EIA 2008: Threatened flora survey

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

Comments Proposal is not likely to be at variance to this Principle

Vegetation association 968 is classed as *Endangered* as <10% of pre-European extent remains. It is considered though, that clearing within the project area does not constitute being at variance to this principle. The southern section is classified as Cleared Paddock comprising of scattered individual specimens of *Melaleuca* in a completely degraded condition. The remaining portion is comprised of Open Woodland consisting of scattered trees over paddock weeds in a degraded condition.

Methodology

Department of Agriculture and Food database search
Desktop and site vegetation assessments
GHD EIA 2008: Threatened flora survey

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

Comments Proposal is not likely to be at variance to this Principle

No riparian vegetation clearing will be necessary to develop the project. There is a minor ephemeral drain (SLK 145.7) crossing the highway in the project area that is proclaimed under the *Rights in Water and Irrigation Act*. However no clearing is required in the vicinity of this water course as the surrounding vegetation is limited to just weeds and paddock grasses. The replacement and extension of the culvert however will require a Permit to Disturb Beds & Banks prior to construction commencing.

Methodology

Department of Water consultation
Examination of aerial photography
Desktop and site assessments

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

Comments Proposal is not likely to be at variance to this Principle

Clearing within the study area to develop the project is not likely to be of a scale that could cause appreciable land degradation. Roadside native vegetation is generally sparse or absent, hence any clearing will not significantly change the existing site conditions. Native vegetation will be retained wherever possible within Main Roads clear zone safety requirements to add stability to the soil and protect against erosion. Potential land degradation can be adequately avoided and managed by implementing the project Environmental Management Plan.

Methodology

Examination of aerial photography
Desktop and site assessment

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

Comments Proposal is not likely to be at variance to this Principle

Waterloo Nature Reserve is an ESA that occurs adjacent to the highway and supports two TECs and Priority flora. Clearing of vegetation outside of the ESA is not considered at variance with this clearing principle.

Avoiding the TECs would allow the project clearing to be undertaken under Main Roads State wide clearing permit CPS 818/4 – without the potential requirement to refer the project to the Commonwealth Minister of Environment and/or the State Environmental Protection Authority.

Methodology

EPBC Act Protected Matters Search Tool
DEC TEC database
Desktop land tenure checks using Landgate
Desktop assessment using the online DEC Native Vegetation Map Viewer

(i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.

Comments Proposal is not likely to be at variance to this Principle

Vegetation clearing within the study area is not likely to be of sufficient scale to cause the deterioration in the quality of surface or underground water. Consultation with Department of Water has confirmed that the proposed works will not disturb or interrupt any natural drainage and surface run-off patterns. The works will not require dewatering or the abstraction of water.

The greatest project risk considered to potentially affect water quality is during its construction phase, namely via accidental hydrocarbon or chemical spills entering roadside drainage. Employing measures within the EMP to prevent and manage this risk is considered adequate for this project.

Methodology

Department of Water consultation

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

Comments Proposal is not likely to be at variance to this Principle

It is understood that the proposed design will not obstruct existing drainage flows. As the proposed clearing will occur along an existing highway corridor (with numerous parts containing degraded vegetation), it is not considered as having the potential to cause, or exacerbate the incidence or intensity of flooding. It is understood that Main Roads drainage design for the project will retain existing water flows and consider existing drainage channels in the immediate area.

Methodology

Site assessment
Desktop information/aerial photography

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

Comments

One registered Aboriginal Heritage Site (ID 17775) is located on the southern side of the highway and extends between Wireless Road and Waterloo Road. The proposed works will not impact this side of the highway.

Methodology

Department of Indigenous Affairs Heritage Inquiry System

List of Principles seriously at variance, at variance or maybe at variance

The proposed clearing is considered not likely to be at variance to any of the Clearing Principles.

Recommendations

- ▶ Adhere to the EMP for all clearing and project activities.

Reference:

GHD Pty Ltd Bunbury, WA.: *South Western Highway Reconstruction and Passing Lanes between Burekup and Picton: EIA and EMP* July 2009. Unpublished report prepared for Main Roads Western Australia.

Prepared by:

Peter Swanson
August 2010

Appendix G

Site Photos



Photo 1: SLK 146.1 View north east from Hynes Road – clearing on left side



Photo 2: View north east from the extent of Photo 1 – clearing on left side



Photo 3: View north east from the extent of Photo 2 – clearing on left side



Photo 4: SLK 145.1 View north east from the extent of Photo 3 – clearing on left side



Photo 5: SLK 144.5 View north east from the Wireless Road intersection – clearing on left side



Photo 6: View north east showing proximity of the closet residence at 144.10 SLK – clearing on left side



Photo 7: View north east showing proximity of the Waterloo Community Centre (est.1992) at 144.15 SLK.



Photo 8: View north east showing irrigation drain to the left and road drainage to the right – clearing on left side



Photo 9: SLK 143.0 View north east showing culvert and irrigation drain crossing under the road – clearing on left side



Photo 10: View north east showing narrowness of the road reserve at 143.4 SLK – clearing on left side



Photo 11: View north east from the extent of Photo 10 – clearing on left side



Photo 12: View north east from the extent of Photo 11 showing Clifton Road intersection – clearing on left side