Department of Environment
Government of Western Australia

Clearing Permit Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 848/1
Permit type: Area Permit

1.2. Proponent details

Proponent's name: **Main Roads Western Australia (Main Roads)**
Postal address: Po Box 2256 South Hedland WA 6722
Contacts: Phone: 9172 8809
Fax:
Email: bruno.rikli@mainroads.wa.gov.au

1.3. Property details

Property:
Colloquial name: Dampier Highway Dual Carriageway Project

1.4. Application

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:
22		Mechanical Removal	Road construction or maintenance

2. Site Information

2.1. Existing environment and information

2.1.1. Description of the native vegetation under application

Vegetation Description	Clearing Description	Vegetation Condition	Comment
Beard Vegetation Association 117: Hummock grasslands, grass steppe; soft spinifex.	The area under application between Cinders Road and Parker Point Road is dominated by spinifex species (Triodia wiseana) on the very rocky areas with scattered mixed shrubs or low trees in deeper soil pockets (Main Roads WA, 2003; DoE Site Visit, 2005). Small tree and larger shrub plants recorded include Brachychiton acuminatus, Trichodesma zeylanicum, Ipomoea costata, Ficus platypoda, Hakea lorea, and Acacia inaequilatera (Main Roads WA, 2003).	Good: Structure significantly altered by multiple disturbance; retains basic structure/ability to regenerate (Keighery 1994)	The description was determined by a desktop study using GIS databases and the Environmental Impact Assessment and Management Plan prepared by Main Roads WA (2003) and verified via a site visit by a DoE officer (DoE Site Visit, 2005).
Beard Vegetation Association 127: Bare Areas; mudflats.	The area under application between Bayly Ave and Cinders Road, once tidal mudflats, is now a highly altered landscape. Adjacent to both sides of Dampier Road are solar salt ponds. A small pocket of a Halophyte shrubland, dominated by members of the Chenopodiaceae, particularly Halosarcia species, occurs in a previously excavated area immediately adjacent to the western end of the salt ponds (Main Roads WA, 2003; DoE Site Visit, 2005).	Completely Degraded: No longer intact; completely/almost completely without native species (Keighery 1994)	The description was determined by a desktop study using GIS databases and the Environmental Impact Assessment and Management Plan prepared by Main Roads WA (2003) and verified via a site visit by a DoE officer (DoE Site Visit, 2005).
Beard Vegetation Associations 157: Hummock grasslands, grass steppe; hard spinifex Triodia wiseana.	The area under application between Pilbara TAFE and Balmoral Road (east) lies at the base of the Jaburara hills on the southern side of Karratha. This community is dominated by spinifex (Triodia wiseana) and grasses including the introduced Cenchrus ciliaris L. (Buffel Grass) (DoE Site Visit, 2005). Other species present include Ptilotus spp., Swainsona formosa (Sturts Desert Pea), Trichodesma zeylanicum, Acacia inaequilatera, and the introduced Aerva javanica (Kapok Bush) (Main Roads WA, 2003; DoE Site Visit, 2005).	Degraded: Structure severely disturbed; regeneration to good condition requires intensive management (Keighery 1994)	The description was determined by a desktop study using GIS databases and the Environmental Impact Assessment and Management Plan prepared by Main Roads WA (2003) and verified via a site visit by a DoE officer (DoE Site Visit, 2005).
Beard Vegetation Association 589: Mosaic Short bunch grassland - savanna / grass plain (Pilbara) / Hummock grasslands, grass steppe; soft spinifex. (Hopkins et al., 2001)	The area under application between Pilbara TAFE and Bayly Ave is largely a mixed low grassland consisting of native grass species and the introduced species introduced Cenchrus ciliaris L. (Buffel Grass) and introduced Aerva javanica (Kapok Bush) (Main Roads WA, 2003; DoE Site Visit, 2005). There are also patches of Acacia	Degraded: Structure severely disturbed; regeneration to good condition requires intensive management (Keighery 1994)	The description was determined by a desktop study using GIS databases and the Environmental Impact Assessment and Management Plan prepared by Main Roads WA (2003) and verified via a site visit by

	dominated shrubland consisting mainly of Acacia bivenosa, A. trachycarpa, A. ancistrocarpa, and Senna artemisiodes spp. helmsii (Main Roads WA, 2003; DoE Site Visit, 2005). A mixed Acacia with scattered Eucalyptus dominates the vegetation around 7-Mile Creek. Species are mixed Acacias, including Acacia trachycarpa, Acacia bivenosa and Acacia ancistrocarpa, with occasional Eucalyptus victrix (Coolabah) and an understorey of grasses and scattered herbaceous species (Main Roads WA, 2003; DoE Site Visit, 2005). Vehicle tracks and an equestrian path have disturbed the area.	a DoE officer (DoE Site Visit, 2005).

3. Assessment of application against Clearing Principles

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

Comments

Proposal is not likely to be at variance to this Principle

The proposed clearing will result in the clearing of four vegetation communities: Hummock grassland, grass steppe (both hard spinifex and soft spinifex); mudflats; and Mosaic Short bunch grassland - savanna / grass plain (Pilbara) / Hummock grasslands, grass steppe (Hopkins et al., 2001). Such communities are widespread in the Pilbara region (Shepherd et. al., 2001).

The Interim Biogeographic Regionalisation for Australia (IBRA) recognises 53 subregions in Western Australia. The area proposed for clearing is located within the Pilbara 4 (Roebourne) IBRA subregion. Kendrick and Stanley (2001) assessed biodiversity of the Roebourne IBRA subregions known special values in relation to landscape, ecosystem, species and genetic values. High species and ecosystem diversity as well as a centre of endemism are cited for the Burrup Peninsula, through which this proposal to clear intersects in the southwest extremity. Given previous disturbance from the existing Dampier Highway adjacent to the area under application, it is unlikely that the area under application has a higher level of biodiversity than other similar vegetation associations in the region, due to the current level of disturbance and existence alongside an already constructed highway. Therefore, the proposed clearing is not likely to be at variance to this principle.

Methodology Hopkins et al. (2001);
Shepherd et. al. (2001);
Kendrick and Stanley (2001).

Officer Kate Barr

(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

An assessment of fauna values by Bamford Consulting Ecologists (2003) identified four major habitat types existing within the area under application. The study revealed that there was very little evidence of fauna activity within the plain area and salt ponds. Areas are most likely to support the most fauna are 7-Mile Creek and the rocky hills on the Burrup Peninsula (Main Roads, 2003). However, the report identified several species of conservation significance as likely to be present within the vicinity of the area under application including:
~ One reptile, the Pilbara Olive Python (Morelia olivacea barroni), listed as vulnerable (schedule 1);
~ Four bird species including the Peregrine Falcon (Falco peregrinus) (schedule 4), Australia Bustard (Ardeotis australis) (Priority 4), Eastern Curlew (Numenius madagascaensis) (Priority 4), and Bush Stone-Curlew (Burhinus grallarius) (Priority 4),
~ Two mammal species including Rothschild's Rock-Wallaby (locally significant) and the Pebble-mound Mouse (Priority 4) (Main Roads, 2003).

The Pilbara Olive Python (Morelia olivacea barroni) (S1) is regarded as common, widespread and not declining by Kendrick and McKenzie (2001). This species is likely to occur near watercourses and is usually associated with permanent pools in rocky gorges (Main Roads WA, 2003). This habitat type is not within the area under application.

The Peregrine Falcon has been recorded on the Burrup Peninsula and is likely to forage widely but nesting sites, most likely to be on cliff in the rocky hills, would be significant (Bamford, 2003). There was no evidence of a nest site in any rocky areas adjacent to the area under application (Bamford, 2003; DoE Site Visit, 2005).

The Australian Bustard may use open areas close to Karratha (Bamford, 2003). The proposed clearing will not significantly reduce the habitat area of this species, as it is adjacent to the existing Dampier Highway.

The Eastern Curlew may occasionally use the salt evaporation ponds adjacent to the area under application (Bamford, 2003) and therefore unlikely to be affected by the highway duplication.

The Bush Stone-curlew is likely to be present in areas of acacia shrubland, particularly in open areas near Karratha and in valleys on the Burrup Peninsula, often foraging on open ground adjacent to roads (Bamford, 2003). Therefore, the proposed clearing will not significantly affect the habitat of this species.

The Burrup Peninsula supports and isolated population of Rothschild's Rock-wallaby that is considered to be locally significant because of its isolation. It is largely confined to the northern sector of the Burrup Peninsula (Bamford, 2003), located away from the area under application and therefore unlikely to be affected by the proposed clearing.

The Western Pebble mound Mouse is relatively widespread through the Pilbara and is regarded by Kendrick and McKenzie (2001) as not threatened or likely to be threatened by any processes.

The area under application is adjacent to the existing Dampier Highway and therefore the habitat values of the site have been significantly disturbed in the past. Thus, the vegetation is unlikely to support significant habitat for fauna populations.

Overall the vegetation in the area under application is highly disturbed and clearing is unlikely to have a significant impact to the scheduled and priority listed fauna species that could potentially occur in the area. All the species listed above are mobile and not limited to vegetation types within the area of application. Given that disturbance will be confined to a narrow band of mostly already disturbed vegetation it is unlikely that significant habitat for those species will be cleared.

Methodology Bamford (2003);
Main Roads WA (2003);
DoE Site Visit (2005).

Officer Kate Barr

(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

No known Declared Rare Flora species were recorded within the areas proposed to be cleared. However, three Priority species, Acacia glaucocaesia (Priority 3), Terminalia supranitifolia (Priority 1) and Themeda sp. Hamersley Station (M.E. Trudgeon) (Priority 3), have been recorded by CALM in the vicinity of the area under application (Main Roads WA, 2003).

Acacia glaucocaesia (Priority 3) is a glaucous shrub known to occur close to salt stockpiles near Dampier. Consultation between Main Roads WA and CALM staff indicate that this species is not known to be present along Dampier Highway.

Terminalia supranitifolia (Priority 1) is a small tree that has been recorded in the Burrup peninsula area but was not identified during a vegetation survey conducted by Main Roads (2003), nor is it known to be present along the Highway by CALM (Main Roads WA, 2003).

Themeda sp. Hamersley Station (M.E. Trudgeon) (Priority 3) was not identified during the vegetation survey conducted by Main Roads (2003) however it has been previously identified along the Dampier Highway (Main Roads WA, 2003). Consultation with CALM indicated that this species was not of high concern locally (Main Roads WA, 2003).

The vegetation in the area under application has been significantly degraded by the adjacent highway (DoE Site Visit, 2005). It is therefore unlikely that the area includes or is necessary for continued existence of significant flora.

Methodology DoE Site Visit (2005);
Main Roads WA (2003);
GIS Database: Declared Rare and Priority Flora List - CALM 01/07/05

Officer Kate Barr

(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

There are no known Threatened Ecological Communities recorded within a 50km radius of the area under application. However, Kendrick and Stanley (2001) have identified a number of ecosystems at risk in the IBRA Roebourne subregion including the Roebourne Plains coastal grasslands and the rock pile communities on the Burrup Peninsula.

The threatening processes affecting the Roebourne Plains coastal grasslands ecosystem grazing pressure and exotic weed invasion (buffel, kapok, parkinsonia) (Kendrick and Stanley, 2001). It is unlikely that the proposal will alter grazing pressure. Buffel grass (Cenchrus ciliaris) and Kapok bush (Aerva javanica have been

recorded during a survey of the site in 2003 and were also noted in a site visit in 2005 (Main Roads WA, 2003; DoE Site Visit, 2005). Both of these species are common in the region and are spread by wind and machinery.

The Rock Pile communities on the Burrup Peninsula are threatened by increasing fragmentation, exotic weeds (buffel grass), and pollution (in dust emissions) (Kendrick and Stanley, 2001). It is unlikely that the proposed clearing will significantly add to any of these threatening processes, as the area under application is adjacent to the existing Dampier Highway.

As the spread of weeds is considered a key threatening process in the Roebourne subregion, the DoE recommends that Main Roads WA implement the weed management practices outlines in the 'Handbook for Environmental Practice to Road Construction and Maintenance Works' (Roadside Conservation Committee WA, 2005), particularly around the Burrup Peninsula.

Therefore, the site under application is unlikely to be necessary for the maintenance of a threatened ecological community.

Methodology Kendrick and Stanley (2001);
Main Roads WA (2003);
DoE Site Visit (2005);
GIS Database: Threatened Ecological Communities - CALM 15/7/03

Officer Kate Barr

(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

The State Government is committed to the National Objectives and Targets for Biodiversity Conservation which includes a target that prevents clearance of ecological communities with an extent below 30% of that present pre-European settlement (Department of Natural Resources and Environment, 2002).

	Pre-European area (ha) *	Current extent (ha) *	Remaining %*	Conservation Status**	% in reserves/ CALM-managed land
IBRA Bioregion - Pilbara	17,944,694	17,944,694	~100%	Least concern	
IBRA Sub-region - PIL 4	2,008,983	2,008,983	~100%	Least concern	13.6
Shire of Roebourne	No information available				
Beard vegetation association					
- 117	917,087	917,087	~100%	Least concern	14.3
- 127	778,381	778,153	~99.9%	Least concern	11.0
- 157	542,861	542,861	~100%	Least concern	17.6
- 589	848,201	848,201	~100%	Least concern	1.6

* Shepherd et al. (2001)
** Department of Natural Resources and Environment (2002)

Vegetation complexes within this application are above 30% representation (Hopkins et al, 2001). The vegetation of the site is a component of Beard Vegetation Associations 117, 127, 157 and 589 (Hopkins et al, 2001), of which there is ~100% of the pre-European extent still remaining (Shepherd et al, 2001). The vegetation type is therefore of 'least concern' for biodiversity conservation (Department of Natural Resources and Environment, 2002).

Methodology Hopkins et al (2001);
Shepherd et al (2001);
Department of Natural Resources and Environment (2002);
GIS Database:
~ Pre-European Vegetation - DA 01/01;
~ Interim Biogeographic Regionalisation of Australia - EA 18/10/00;
~ Interim Biogeographic Regionalisation of Australia (subregions) - EA 18/10/00.

Officer Kate Barr

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

Comments

Proposal is not likely to be at variance to this Principle

The area under application will cross 7-mile Creek and some small tributaries within the Karratha Townsite. A section 17 (bed and banks) permit may be required under the Rights in Water and Irrigation Act 1914 before works commence on the 7-mile Creek crossing. A deep gully on the Burrup Peninsula will also be crossed. All of these waterways are ephemeral with existing bridges and culverts not creating any obvious problems with flooding or the creation of backwaters (Main Roads WA, 2003). Due to the moderately sparse nature of the vegetation, it is unlikely that the proposed clearing will significantly impact upon the watercourses near the area under application.

Approximately 2.8kms of the area under application runs through saline coastal flats which have been highly altered by the existing road and adjacent solar salt ponds. Water movement is controlled in the flats by levee banks and the Dampier Salt operations. Three constructed channels containing pumped seawater cross the road along the causeway (Main Roads WA, 2003). Roadside vegetation along the causeway is very sparse with only occasional chenopods and grasses present (DoE Site Visit, 2005). It is unlikely that the proposed clearing will significantly impact upon the saline coastal flats.

Therefore, the proposed clearing is not likely to be at variance to this Principle.

Methodology DoE Site Visit (2005);
Main Roads WA (2003);
GIS Database:
~ Hydrology, linear - DOE 1/02/04;
~ Lakes 250K - GA;
~ Rivers 250K - GA;
~ Aerial Photograph - Dampier Archipelago 80cm Orthomosaic - DLI 01

Officer Kate Barr

(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

The removal of existing vegetation in the area under application would not directly contribute to a salinity problem due to low vegetation density (Site Visit, 2005). Currently minimal small tree root systems are present to take up water and their removal would not significantly affect the ground water table to mobilise salts in the soil.

Wind erosion will be minimised by the use of water carts to wet down any soils which have the capacity to produce dust (Main Roads WA, 2003).

Water erosion will be minimised by constructing batter-slopes at a maximum grade of 1:4 (B. Rikli, pers. comm., 2006). Further to this, Main Roads plan to carry out works during the winter months when there is a low chance of rainfall (B. Rikli, pers. comm., 2006).

If any erosion results from the proposed clearing it will be limited to the road verge and rehabilitated during the construction of the Dampier Highway will be carried out in accordance with Main Roads Specification 301 and 302 (B. Rikli, pers. comm., 2006). Land adjoining the worked areas will be reshaped if necessary to remove ridges and dips and to match the soil levels and shapes of the surrounding landscape (Main Roads WA, 2003). All cleared and impacted areas will be ripped to a depth of approximately 400mm, where possible, to promote water infiltration and subsequent plant germination and establishment (Main Roads WA, 2003). Vegetative material which has been removed during the project will be retained and mixed or placed over the topsoil to facilitate revegetation where appropriate (Main Roads WA, 2003).

Therefore it is unlikely that the proposed clearing will cause appreciable land degradation.

Methodology Main Roads WA Pilbara Region Environmental Officer, pers. comm. (2006);
Main Roads WA (2003);
DoE Site Visit (2005);
GIS Database:
~ Soils, Statewide - DA 11/99;
~ Groundwater Salinity, Statewide - 22/02/00.

Officer Kate Barr

(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

There are no reserves or conservation areas within or adjacent to the area under application. The nearest conservation reserves are East Lewis Island (~7km from the area), West Lewis Island (~10km from the area) and the Burrup Peninsula Conservation Area (~ 12km from the area). Due to the distance from the area under application, it is unlikely that the proposed clearing will have an impact on the environmental values of these reserves.

Methodology GIS Database: CALM Managed Land and Waters - 1/06/04.

Officer Kate Barr

(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

The proposed clearing area is not in a Public Drinking Water Source Area.

Runoff from the site is controlled by maintaining all natural and designed waterway flows. Culverts will be constructed to carry water under the road within the Karratha townsite and other natural drainage lines (Main Roads WA, 2003).

Drainage from the area under application is expected to replicate current drainage patterns from the existing Dampier Highway. Runoff from the highway is currently mostly infiltrated directly adjacent to the road, or flows into isolated sections of the salt ponds (Main Roads WA, 2003). On the area under application within the Burrup Peninsula, water is expected to collect in roadside drains and carried to low points where it will be allowed to infiltrate or follow minor drainage lines (Main Roads, 2003).

Therefore, the clearing of vegetation is unlikely to significantly impact on surface water quality or groundwater resources in the area.

Methodology

DoE Site visit (2005);
Main Roads WA (2003)
GIS Database:
~ Public Drinking Water source Areas (PDWSA's) -DOE 29/11/04;
~ Hydrography, linear (hierachy) - DOE 13/4/05.

Officer

Kate Barr

(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

The average annual rainfall of the site is 400mm, with most rainfall occurring during the summer months, and an evaporation rate of 400mm per annum.

Drainage from the area under application is expected to replicate current drainage patterns from the existing Dampier Highway. Runoff from the highway is currently mostly infiltrated directly adjacent to the road, or flows into isolated sections of the salt ponds (Main Roads WA, 2003). On the area under application within the Burrup Peninsula, water is expected to collect in roadside drains and carried to low points where it will be allowed to infiltrate or follow minor drainage lines (Main Roads, 2003).

A bridge will be constructed to cross the 7-mile Creek, similar in design to the existing bridge on the Dampier Highway (Main Roads WA, 2003). The existing bridge has not created any obvious problems with flooding or the creation of backwaters (Main Roads WA, 2003). A section 17 (Bed and Banks) permit under the Rights in Water and Irrigation Act 1914 may be required.

Therefore it is unlikely that the clearing of vegetation is likely to cause or exacerbate the incidence of flooding.

Methodology

Main Roads WA (2003);
GIS Databases:
~ Rainfall, Mean Annual - BOM 30/09/01;
~ Evapotranspiration, Areal Actual - BOM 30/09/01.

Officer

Kate Barr

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

Comments

The property is zoned as a road reserve.

No objections have been raised to the proposed clearing.

This application is not at variance to the conditions set under section 38 in Ministerial Statement No 702 (Minister for the Environment, Science (2005); CRN 213129) nor in Ministerial Statement No. 116 (Minister for the Environment (1990); CRN 36089).

Interference or disturbance of primary and secondary order tributaries requires a Permit, and these are "named watercourses" on a normal 1:250K topographic map and would be available as a theme on the company's GIS system. It is discretionary as to whether a s.17 Permit is required for minor drainage lines (or "unnamed watercourses"). Therefore a Section 17 (Bed and Banks) Permit may be required for the construction of the second bridge across 7-Mile Creek.

There are no other relevant approvals or planning instruments that affect this proposal.

The area under application lies within three Native Title Claims. The Ngaluma / Injibandi claim was determined on 02/05/2005. The Yaburara / Mardudhunera claim was registered on 01/08/1996. The wong-goo-tt-oo claim was registered on 10/07/1998.

Granting of CPS 848/1 will not constitute a future act, as defined in the Native Title Act, because the Commissioner for MRWA is exercising powers under the Main Roads Act 1930 (and other written laws), which powers necessarily include a power to clear for those purposes, subject to compliance with the EP Act. Accordingly, the clearing permit is a secondary approval that removes statutory prohibition imposed by the EP Act on clearing.

The obligation to comply with the NTA future act processes rests with MRWA, and an endorsement to this effect has been made in the covering letter accompanying the permit.

The Burrup Peninsula contains one of the world's largest and most important collections of petroglyphs. Several Aboriginal Heritage Sites of Significance listed on the Permanent and Interim Registers are located within or adjacent to the area under application. Main Roads WA have carried out ethnographic and archaeological surveys over the length of the Dampier Highway by qualified sub-consultants (Main Roads WA, 2003). Main Roads will manage Aboriginal heritage in accordance with the Department of Indigenous Affairs and the Aboriginal Heritage Act, 1972 requirements (Main Roads WA, 2003).

No sites listed on the Register of Heritage Places are located within or in the vicinity of the area under application.

Methodology

Main Roads WA (2003)
Minister for the Environment, Science (2005) Trim Ref: CRN 213129;
Minister for the Environment (1990) Trim Ref: CRN 36089;
GIS Database:
~ Aboriginal Sites of Significance - DIA 28/02/03;
~ Register of Heritage Places - DPI 14/7/03

Officer

Kate Barr

4. Assessor's recommendations

Purpose	Method	Applied area (ha)/ trees	Decision	Comment / recommendation
Road construction or maintenance	Mechanical Removal	22	**Grant**	Assessable criteria have been addressed and no objections were raised. The assessing officer therefore recommends that the permit should be granted. The applicant may be required to obtain a section 17 (bed and banks) permit under the Rights in Water and Irrigation Act 1914, prior to commencing works across 7-Mile Creek. It is recommended that Main Roads WA implement the weed management practices outlines in the 'Handbook for Environmental Practice to Road Construction and Maintenance Works' (Roadside Conservation Committee WA, 2005), particularly around the Burrup Peninsula.

5. References

Bamford, M.J. and Bamford, A.R. (2003) Duplication of the Dampier Highway Between Karratha and Dampier: Assessment of Fauna Values.

Department of Environment (2005) Site Visit. Trim Ref KTD3052

Department of Environment and Heritage (2005) EPBC Act Protected Matters Report. www.deh.gov.au

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

Hopkins, A.J.M., Beeston, G.R. and Harvey J.M. (2001) A database on the vegetation of Western Australia. Stage 1. CALMScience after J. S. Beard, late 1960's to early 1980's Vegetation Survey of Western Australia, UWA Press.

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

Kendrick, P. and Stanley, F. (2001) Pilbara 4 (PIL4 - Roebourne synopsis). From "Bioregional Summary of the 2002 biodiversity Audit for Western Australia". Department of Conservation and Land Management.

Main Roads WA (2003) Dampier Highway - Dual Carriageway: SLK 7.0 - 25.84. Environmental Impact Assessment and Management Plan.

Main Roads WA Pilbara Region Environmental Officer, pers. comm. (2006) Main Roads WA land degradation control measures. Personal Communication (Trim Ref: KTI 6100)

Minister for the Environment (1990) Ministerial Statement No. 116: Dampier Solar Salt Field Enhancement (Trim Ref: CRN 36089).

Minister for the Environment, Science (2005) Ministerial Statement No 702: Hamersley Iron Dampier Port Upgrade to a Throughput Capacity of 120 Million tonnes per Annum (Trim Ref: CRN 213129).

Roadside Conservation Committee, Western Australia (2005) Handbook of Environmental Practice for Road Construction and Maintenance Works. Roadside Conservation Committee, Western Australia.

Shepherd, D.P., Beeston, G.R. and Hopkins, A.J.M. (2001) Native Vegetation in Western Australia, Extent, Type and Status. Resource Management Technical Report 249. Department of Agriculture, Western Australia.

6. Glossary

Term	Meaning
CALM	Department of Conservation and Land Management
DAWA	Department of Agriculture
DEP	Department of Environmental Protection (now DoE)
DoE	Department of Environment
DoIR	Department of Industry and Resources
DRF	Declared Rare Flora
EPP	Environmental Protection Policy
GIS	Geographical Information System
ha	Hectare (10,000 square metres)
TEC	Threatened Ecological Community
WRC	Water and Rivers Commission (now DoE)