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Name: Spring Vegetation Condition Survey Nambeelup
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SPRING VEGETATION CONDITION SURVEY NAMBEELUP

BACKGROUND

Parsons Brinckerhoff and Development Planning Strategies are currently working on the preliminary stages of an outline development plan for the proposed Nambeelup Industrial Park.

Current land uses include a horse stud, an intensive piggery with an associated mulch and soil production business, and cattle and sheep farming. More than 70% of the 1400 ha study area has been significantly affected by human activities, with a substantial area being a parkland cleared of all vegetation.

Nicole Siemon and Associates PL undertook this additional Spring botanical survey on behalf of PB and DPS, to confirm the findings of the preliminary survey undertaken in February 2005 and to further identify constraints associated with remnant vegetation.

METHODOLOGY

This supplementary survey was undertaken on 19th, 20th and 28th October 2005 to identify annual plants and to ensure that a more comprehensive assessment of the floristic diversity occurred. There was some concern that the preliminary survey would not represent a complete picture of the vegetation health and would affect the vegetation condition rating depending on the relative dominance of annual weeds and native annual herbs.

Each main vegetation node identified in the maps was traversed at 50 metre intervals on a north-south axis within each of the dominant vegetation types. Greater attention was paid to the closed shrubland and woodland areas that appeared to have greater floristic and habitat value.

Qualitative transects were also undertaken in areas with consistent vegetation types.

The primary purpose of the supplementary survey was to determine the applicability of the preliminary vegetation condition, identify any areas requiring prioritising for conservation purposes and to enable re-designing of the proposed industrial park to better protect the high conservation remnant vegetation.

The secondary purpose of the study was to determine whether or not any Declared Rare Flora or Priority Species occurred within the study area. Specimens of any plants considered unusual or unknown to the author were collected, pressed, dried and identified at the WA Herbarium. A second opinion was obtained from a qualified, independent consulting Botanist. Final verification was also required for a small number of specimens to confirm their identification.

CURRENT VEGETATION

The site falls within a Bassendean complex and includes both Central and South units. The vegetation communities are characterised by ten vegetation complexes:

- Parkland cleared,
- *Juncus pallidus* closed sedgeland,
- *Melaleuca preissiana*, *Melaleuca raphiophylla* and *Eucalyptus rudis* low open to closed woodland,
- Assorted Myrtaceae low open scrub,
- *Baumea* spp. sedgeland,
- *Melaleuca teretifolia* open to closed shrubland,

- Closed low *Verticordia* herbland,
- *Banksia* woodland with *Kunzea*,
- *Kunzea* over *Drosera* herbland and
- *Corymbia calophylla*, *Eucalyptus marginata* and *Banksia* spp. open to closed woodland over dense herbland.

A vegetation condition map based on the Supplementary survey is attached (Map 1). The condition assessment has been adjusted to reflect the condition scale developed by Trudgen (1991), from which Keighery B (1994) developed the scale used in Bush Forever.

The condition ratings definitions are provided below.

Excellent	A pristine area or nearly so, no obvious signs of damage caused by the activity of European people.
Very good	An area with relatively slight signs of damage caused by the activities of European people. For example, some signs of damage to tree trunks caused by repeated fires and the presence of some relatively non-aggressive weeds such as <i>Ursinia anthemoides</i> or <i>Briza</i> species, or occasional vehicle tracks.
Good	More obvious signs of damage caused by the activities of European people, including some obvious impact on the vegetation structure such as caused by low levels of grazing or by selective logging. Weeds as listed above, possibly with some more aggressive ones.
Poor	Still retains basic vegetation structure with the ability to regenerate after very obvious impacts of European man such as grazing or partial clearing (chaining) or very frequent fires. Weeds as listed above, with some more aggressive ones such as <i>Ehrharta</i> species.
Very poor	An area which is severely impacted by grazing, fire, clearing, or a combination of these activities. There is some hope for regeneration but it would need intensive management to achieve a state approaching good condition. A number of weed species, including some aggressive species were present.
Completely degraded	Areas that are completely or almost completely without native species in the structure of their vegetation i.e. areas that are cleared or 'parkland cleared' with their flora comprising weed or crop species with isolated native trees or shrubs.

SUMMARY OF VEGETATION NODES WITHIN THE STUDY AREA

The table below highlights the vegetation nodes worthy of retention and enhancement following the Supplementary survey (Map 2). These areas have a considerable to reasonable diversity of native annual herbs and lack extensive areas of weed infestation. The priority vegetation nodes shown on Map 2 are also highlighted in bold font. Nodes lacking sufficient vegetation structure have not been provided in the table.

Lot No	Vegetation polygon ref number	Vegetation type	Significant trees within property	Vegetation condition
221	K1	Banksia woodland with Kunzea	Yes	Very good
	K2	Banksia woodland with Kunzea		Very good
	K3	Assorted Myrtaceae wetland		Excellent
	K4	Baumea spp. wetland		Good – Very good
	K5	Eucalyptus marginata, Corymbia calophylla over Banksia woodland		Excellent
	K6	Eucalyptus marginata, Corymbia calophylla over Banksia woodland		Good
	K8	Banksia woodland with Kunzea		Good
	* K9	Riparian open closed woodland		* K.E.P.
219	M1	Melaleuca closed shrubland	Yes	Good
	M2	Melaleuca closed shrubland		Good
	M3	Melaleuca closed shrubland		Good
	M5	Verticordia herbland		Very good
21	T1	Eucalyptus rudis over Melaleuca raphiophylla	Many significant trees particularly on western boundary	Very good - good
	T2	Kunzea over Drosera herbland		Very good
	T5	Eucalyptus rudis over Melaleuca raphiophylla		Good
	T6	Eucalyptus rudis over Melaleuca raphiophylla		Good
92	T4	Assorted Myrtaceae wetland with <i>Juncus pallidus</i> sedgeland	No	Good
	N1	Eucalyptus rudis over Melaleuca raphiophylla		Poor
	N2	Eucalyptus rudis over Melaleuca raphiophylla		Poor
89	W3	Eucalyptus rudis, Melaleuca raphiophylla and M. preissiana woodland	Yes	Very good
	W5	Melaleuca raphiophylla closed wetland		Good
91	T3	Kunzea over Drosera	Yes	Good

Note properties 220 and 109 have limited salvageable vegetation, however offer some opportunities for drainage management,

A brief description of the floristic list based on the additional survey work follows. Appendix 1 provides a comprehensive list of species found. Note that it may not represent all of the species present within the study area because fieldwork was limited by budgetary constraints.

Identified vegetation communities do not typically have a homogenous condition rating, but are a mosaic of conditions. The dominant condition rating has been selected for each community.

Parkland cleared (more than 70% of study area)

There are many significant trees throughout this vegetation type that warrant protection within the road reserves if feasible. Retaining mature street trees would enhance the development. Tree species present include *Melaleuca preissiana* (Modong), *Eucalyptus rudis* (Flooded gum) and *Melaleuca raphiophylla* (Swamp paperbark) in the shallow groundwater table areas, with *Corymbia calophylla* (Marri) and occasional *Eucalyptus marginata* (Jarrah) and *Nuytsia floribunda* (WA Christmas tree) occurring on higher land.

The supplementary survey identified some relic native herbs – in particular *Sowerbaea laxiflora* (Purple tassels), *Isolepis cernua* and *I. cyperoides*, *Caesia* sp., *Hypoxis occidentalis* and *Hydrocotyle blepharocarpa*. Two species of orchid, *Caladenia* and *Microtis*, are also present with small seasonal pools retaining *Triglochin procera* and *Ranunculus colonorum*.

The Common starwort (*Callitriche stagnalis*) is an extensive exotic aquatic herb that forms mats throughout the wetland areas.

Recommendation 1: Undertake a survey of the remnant trees and protect significant trees where feasible.

***Juncus pallidus* closed sedgeland Vegetation Polygon Reference Number (T4)**

A substantial portion of Lots 89, 92A and parts of 92 and 220 have extensive stands of regenerating *Juncus pallidus* (Pale rush). This primary colonising species has occasional interspersed regenerating *Astartea aff. fascicularis* and infrequent *Eucalyptus rudis*. The regeneration has occurred following removal of stock, tree crops such as *Eucalyptus globulus* and or other historical land uses.

This is a regenerating community and an artefact of previous land use that co-occurs within areas naturally suited to drainage. These areas could be enhanced for such purposes.

Recommendation 2: Continue to develop design with the intention of enhancing the portions of this vegetation community.

***Melaleuca preissiana*, *Melaleuca raphiophylla* and *Eucalyptus rudis* open to closed woodland Vegetation Polygon Reference Numbers (K9, T1, T5, T6, N1, N2, W3 and W5)**

This vegetation community occurs throughout the study area in generally isolated nodes. The dominance of each species varies and is indicative of groundwater levels and the duration of inundation of each area. These areas range in condition but typically are very good to poor, with grazing having removed the majority of the expected understorey species and the diversity remains relatively high in others.

Three remnants requiring additional survey were identified during the preliminary survey and this report presents the findings of this supplementary work. The Supplementary survey resulted in the identification of additional values. In particular, the areas retain many native annual herbs and excellent frog habitat.

The overstorey is characterised by homogeneous and mixed groups of *Melaleuca preissiana* (Modong), *Melaleuca raphiophylla* (Freshwater paperbark) and *Eucalyptus rudis* (Flooded gum). The middlestorey is generally limited to *Pteridium esculentum* (Bracken fern), *Astartea fascicularis* and occasional *Hakea prostrata* (Harsh hakea) and *H. lissocarpha* (Honey bush). The understorey is typically weed dominated although as mentioned above, three remnants retain more characteristic species of this vegetation type. Rushes include *Isolepis marginata*,

I. oldfieldiana, *I. cernua*, *I. cyperoides*, *Baumea riparia* and *Juncus pallidus*. Three species of orchid were identified including *Pterostylis* aff. *nana* and *P. recurva* and *Caladenia latifolia*. Herbs present include *Sowerbaea laxiflora*, *Ranunculus colonorum*, *Caesia* and *Hydrocotyle blepharocarpa*.

Submerged plants persisting in small pools include *Triglochin procera* and the exotic aquatic plant *Callitriche stagnalis*.

Agricultural fodder crops, annual grasses and a range of pasture weeds are dominant particularly on the margins.

Recommendation 3: Determine appropriate methodology to protect remnant T1, T5, T6 and W3 and W5 from significant alterations to hydrology during the development of the proposed Industrial Park and thereafter.

**Assorted Myrtaceae low closed shrubland
Vegetation Polygon Reference Number (K3 and partial T4)**

The significant regeneration of vegetation within Lots 92, 92A and on the eastern margin of Lot 221 is resulting in the restoration of dense, low closed shrubland dominated by *Astartea fascicularis* beneath *Melaleuca raphiophylla* woodland with occasional *Calothamnus*. This vegetation complex is likely to have been characteristic of many portions of the study site. This vegetation complex ranges in condition from poor to moderate. Shrub species occur intermittently.

There is however one area of this vegetation community (K on Fig 16.1) which ranges in quality from very good to excellent condition, and is worthy of retention and linkage with the surrounding Bassendean upland *Banksia* community. The presence of *Leucopogon australis*, *Pericalymma ellipticum* and a range of peas including *Euchilopsis linearis*, *Aotus gracillima*, *Dillwynia dillwynioides* (Priority 3), *Dillwynia* sp.A and *Eutaxia virgata* and *Gompholobium tomentosum*.

There are infrequent specimens of *Lepidosperma longitudinale*, *Hypolaena exsulca* and *Tremulina tremulus*. Herbs present include *Caladenia flava*, *Thelymitra* sp., *Orthrosanthos laxus*, *Paterosonia occidentalis*, *Tricoryne elatior* and *Conostylis aculeata*.

The creek line that connects this perched wetland with the conservation category wetland has a small population of *Isolepis prolifera*, a difficult to control weed. This should be a priority for control, should land acquisition occur.

Recommendation 4: Ensure the perched wetland (K on Fig 16.1) is protected within the development and control *Isolepis prolifera*.

***Baumea* spp. sedgeland
Vegetation Polygon Reference Number (K4)**

There is one substantial node dominated by an open *Baumea* wetland in Lot 221. *Baumea rubiginosa* forms a low sedgeland although the area has been disturbed and has expanses of annual and perennial grasses interspersed throughout. This area has been identified by the Department of Environment as the only Conservation Class wetland in the study area. It ranges in condition from very good to good.

Recommendation 5: Retain the current design to protect this wetland and determine an effective means of protecting the hydrology.

***Melaleuca teretifolia* open to closed shrubland**
Vegetation Polygon Reference Number (M1, M2 and M3)

Lot 219 retains the only *Melaleuca teretifolia* shrubland within the study area and it ranges from poor to good condition. There is some *Calothamnus* and *Melaleuca lateritia* (Robin redbreast bush) interspersed throughout this community along with *Melaleuca raphiophylla* (Swamp paperbark). *Melaleuca preissiana* (Modong) and isolated small shrubs like *Hibbertia stellaris* are restricted to isolated sandy rises and the margins of the shrubland.

It is currently grazed and by summer the understorey is limited to annual grasses and agricultural weeds. However, the Supplementary survey revealed a range of native annual herbs and submerged plants, along with considerable populations of frogs. Species present include *Triglochin procera*, *Ranunculus colonorum*, *Cotula coronopifolia*, *Villarsia albiflora*, *Dampiera trigona*. *Isolepis marginata* is widespread. Floating plants include *Azolla* and two species of *Lemna*. The values of these vegetation nodes as winter/spring habitat make them more worthy of conservation.

The submerged and aquatic flora combine to provide extensive habitat for aquatic invertebrates, frogs and waterbirds. At the time of survey (mid-November) there was 40 – 70 cm of water across these wetlands and there were prolific numbers of damsel and dragonflies. Although there are artificial drains within this area it continues to provide niche habitat for a diverse range of animals. The importance of this site to fauna may need additional assessment.

Recommendation 6: Determine the feasibility of altering the current proposed design to protect this wetland and determine an effective means of replicating the hydrology.

Eucalyptus marginata*, and *Corymbia calophylla* and *Banksia* spp. woodland over *Kunzea
Vegetation Polygon Reference Numbers (K1, K2, K5, K6 and K8)

A typical Bassendean Complex occurs on the higher points within the study area. The sandy rise vegetation nodes within this property support a total of more than 130 species (Appendix 1). This vegetation complex ranges from very good to good condition in accordance with the Trudgen condition ratings (Trudgen 1991), with some areas having very minor weed infestation.

The overstorey is dominated by *Corymbia calophylla* (Marri), *Eucalyptus marginata* (Jarrah), *Banksia ilicifolia* (Holly-leaved banksia), *Banksia attenuata* (Candle banksia) and *Xylomelum occidentale* (Woody pear).

The middlestorey is highly variable in extent and diversity, with some areas retaining substantial stands of *Kunzea glabrescens* and *K. ericifolia* (Spearwood).

The understorey ranges from closed herbland to herbland and retains *Xanthorrhoea preissii* (Balga), *Dasypogon bromeliifolius* (Pineapple bush), *Patersonia occidentalis* (Purple flag) and at least five species of *Conostylis*. Numerous orchids occur along with many other annual species.

Annual grasses include Annual Veldt grass (*Ehrharta calycina*). Other agricultural weeds are restricted to the margins of the vegetation, with only infrequent weeds, particularly *Hypochaeris* spp. and *Briza maxima* in most remnants.

Recommendation 7: Prioritise the protection and enhancement of the bushland fragments within Lot 221.

***Kunzea* closed shrubland over *Drosera* herbland
Vegetation Polygon Reference Number (T2 and T3)**

There are two small areas of this vegetation community at the northern end of Lots 21 and 91. They have very few weeds present although T3 is somewhat impacted upon by stock trampling. These areas are proposed for inclusion in the public open space which is consistent with their values.

Recommendation 8: Retain these portions of vegetation within the design for conservation purposes.

***Verticordia* low closed herbland
Vegetation Polygon Reference Number (M5)**

There is one small area of herbland on the southern portion of Lot 219. This area is included within the conservation park within the preliminary design and it is recommended that this approach is continued.

Recommendation 9: Retain this portion of vegetation within the design for conservation purposes.

DECLARED RARE FLORA AND PRIORITY SPECIES

A desktop search undertaken of Department of Conservation and Land Management literature indicated that a number of populations of a Declared Rare Flora (DRF) and Priority Species have been found in the vicinity of the Nambelup site in the past. Information was sought from the Department of Conservation and Land Management relating to known populations of Declared Rare Flora, Priority Species and Threatened Ecological Communities.

The formal database search compiles results from (1) the Department's threatened (Declared Rare) Flora database, (2) the Western Australian Herbarium Specimen database for priority species opportunistically collected in the area of interest and (3) the Department's Declared Rare and Priority Flora List. The third list was used as a target species list and contains species that are declared rare (Conservation Code R or X for those presumed to be extinct), poorly known (Conservation Codes 1, 2 or 3) or require monitoring (Conservation Code 4).

From these three sources, it was suggested that seven species potentially occurred or had been collected from the vicinity. The rare flora listed were reviewed and type specimens were assessed in the Herbarium prior to fieldwork occurring. Where permitted images were copied and provided to all the field workers on the survey. This needed to be verified by fieldwork.

A number of specimens were collected and pressed during the field survey for further study in the WA Herbarium. Preliminary identifications suggest that there are some DRF and Priority species present within the study area. Collected specimens were pressed, dried, sorted and identified. Where there was doubt about the identification of any species an independent identification botanist was consulted for verification.

Consulting botanist Lorraine Graham was employed to review the specimens collected. Any specimens of interest were then shown to Mike Hislop of the WA Herbarium for final verification. The following Priority Flora were identified in the study area:

<i>Dillwynia dillwynioides</i>	Priority 3
<i>Asteridea gracilis</i>	Priority 3
<i>Rhodanthe pyrethrum</i> <i>Wrens</i>	Priority 3
<i>Eremaea asterocarpa</i> subsp <i>asterocarpa</i> .	To be removed from priority list

AREAS RECOMMENDED FOR RETENTION

The Supplementary survey has resulted in the need to adjust the preliminary design work to improve the retention and protection of some of the vegetation nodes within the development.

Priority areas for retention and protection from the impacts of development are:

- Uplands centred on Bassendean Dunes that retain a potentially sufficiently diverse shrubland and hermland to reflect key characteristics of Supergroup 3 in the Threatened Ecological Community classification (Bush Forever 2003), the extension of the dune system and their neighbouring wetlands (Lot 221).
- Riparian zone along Nambelup Brook (221). = 1C9
- Seasonal Myrtaceous wetlands (Lot 219). 171-3,5
- *Eucalyptus rudis* over *Melaleuca raphiophylla* and *M. preissiana* over mixed hermland (Lot 21 and Lot 89), and T1, 2, 5, 6
- *Kunzea* tall closed shrublands over *Drosera* hermland (Lot 21 and Lot 91). T3, T2

Additional work should be undertaken to identify significant trees that have the potential to enhance the landscape should any future development occur.

FAUNA

In the course of undertaking the fieldwork for this study, a number of different frog, aquatic invertebrate, reptiles and bird species were observed. It appeared that some of the remnant vegetation provides important breeding grounds for many of these species. The seasonal aquatic habitat is likely to support diverse invertebrate fauna that may warrant further investigation.

Recommendation 10: Consider undertaking fauna surveys of the remnant wetland and bushland to determine whether filling of the land will impact on any significant fauna populations.

CONCLUSIONS

The Supplementary survey of the remnant vegetation within the proposed Nambelup Industrial Park has resulted in some unexpected findings, with many of the bushland and wetland areas retaining a greater proportion of native annual herbs than expected. The higher diversity within the fragments has resulted in adjustments to the vegetation condition rating applied during the preliminary survey work.

There were also significant frog and other fauna populations throughout the wetland areas that should be considered.

Modifications to the preliminary design work to protect the specified remnants are essential, due to the presence of Priority and DRF flora species. There are also considerable opportunities to enhance some of the remnant vegetation and to restore corridors between the properties.

APPENDIX 1

Species identified within the study area

APPENDIX 1: SPECIES IDENTIFIED WITHIN THE NAMBEELUP PROPOSED INDUSTRIAL PARK STUDY AREA

Asso. Flyt
Baumea wet
vent - none on list

GENUS	SPECIES	K1	K3	K4	K5	K6	K7	K8	M1	M2	M3	M4	M5	N1	N2	T1	T2	T3	T4	T5	T6	Lot 224A	W1	W2	W3	W4	W5	W6	L1
Acacia	huegellii	1			x		x	x																					
Acacia	pulchella	2	x		x	x	x	x																					
Acacia	saligna	3		x	x															x	x				x				
Acetosella	vulgaris*	4														x		x							x	x			
Adenanthos	cygnorum	5	x		x																				x	x			
Agrostocrinum	scabrum	6			x																								
Aira	praecox*	7																			x						x		
Alexgeorgea	sp.	8			x																								
Allocasuarina	fraseriana	9	x		x	x																							
Allocasuarina	humilis	10			x																								
Amphipogon	turbinatus	11	x		x																								
Anagallis	arvensis*	12	x																	x	x								
Anigozanthos	humilis	32			x																								
Aphelia	cyperoides	13																											x
Arctotheca	calendula*	14			x			x	x							x							x			x		x	
Arnocrinum	preissii	15			x																								
Astartea	aff. fascicularis	16		x	x								x	x	x		x	x	x			x	x		x		x		x
Asteridea	gracilis (P3)	17	(x)		(x)																								
Austrostipa	flavescens	18			x																								
Avena	barbata*	19						x																					
Avena	fatua*	20						x																					
Azolla	spp.	21							x	x	x																		
Baeckea	camphorosmae	22			x	x		x																					
Banksia	attenuata	23	x		x	x	x	x																					
Banksia	ilicifolia	24	x		x	x	x	x																					
Banksia	menziesii	25	x		x	x	x																						
Baumea	articulata	26																			x								
Baumea	juncea	27														x				x	x								
Baumea	preissii	28																											
Baumea	riparia	29														x													
Baumea	rubiginosa	30																			x		x						
Boronia	dichotoma	31				x																							

Note: Some specimens could not be identified to species level due to a lack of flowering and fruiting parts. Therefore some of the species may be duplicated within the list.
 Jan 2006

APPENDIX 1: SPECIES IDENTIFIED WITHIN THE NAMBEELUP PROPOSED INDUSTRIAL PARK STUDY AREA

GENUS	SPECIES	K1	K3	K4	K5	K6	K7	K8	M1	M2	M3	M4	M5	N1	N2	T1	T2	T3	T4	T5	T6	Lot 224A	W1	W2	W3	W4	W5	W6	L1
Bossiaea	eriocarpa	x			x	x	x	x																					
Brachyloma	preissii				x			x																					
Briza	maxima*	x			x		x	x													x	x							
Briza	minor*																				x	x							x
Burchardia	umbellata	x			x	x	x	x														x							
Caesia	micrantha					x																							
Caesia	sp.																x												
Caladenia	flava	x	x		x	x		x										x	x	x									
Caladenia	latifolia																	x											
Caladenia	sp.																	x	x										
Callitriche	stagnalis*																												
Calothamnus	quadrifidus																												
	<i>hirsutus/loter</i>																												
Calytrix	sp.					x																							
Cassytha	sp.									x	x																		
Centella	asiatica																												
Centrolepis	sp.																												
Chamaescilla	corymbosa	x			x	x	x																						
Citrullus	lanatus*																												
Conospermum	sp.						x																						
Conostylis	aculeata	x	x		x		x	x																					
Conostylis	juncea							x																					
Conostylis	laxiflora	x			x	x	x	x																					
Conostylis	setigera	x			x			x																					
Conostylis	setosa					x																							
Conostylis	teretifolia					x		x																					
Corymbia	calophylla																												
Corynotheca	micrantha				x																								
Cotula	coronipifolia								x	x	x	x	x	x	x	x	x				x	x	x				x		
Crassula	colorata*	x			x			x																					
Crassula	natans*								x																				
Cynodon	dactylon*									x	x																		
Cyperus	polystachyos*		x																										

Note: Some specimens could not be identified to species level due to a lack of flowering and fruiting parts. Therefore some of the species may be duplicated within the list.
 Jan 2006

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GENUS	SPECIES	K1	K3	K4	K5	K6	K7	K8	M1	M2	M3	M4	M5	N1	N2	T1	T2	T3	T4	T5	T6	Lot 224A	W1	W2	W3	W4	W5	W6	L1
Dampiera	<i>alata</i>																				x								
Dampiera	<i>linearis</i>	x			x	x	x																						
Dampiera	<i>trigona</i>									x		x									x	x							
Dasyopogon	<i>bromeliifolius</i>	x			x	x	x	x																					
Daviesia	<i>decurrens</i>						x																						
Daviesia	<i>incrassata</i>	x																											
Daviesia	<i>inflata</i>						x																						
Daviesia	<i>phylloides</i>						x																						
Desmocladius	<i>?aspera</i>	x																											
Desmocladius	<i>fascicularis</i>						x	x	x																				
Desmocladius	<i>flexuosa</i>	x			x	x	x	x																					
Desmocladius	<i>sp.</i>						x																						
Dillwynia	<i>dillwynioides (P3)</i>		x																										
Dillwynia	<i>sp A</i>		x																										
Dittrichia	<i>graveolens</i>											x											x						x
Drosera	<i>ciliatus</i>	x			x																								
Drosera	<i>erythrorhiza</i>	x			x			x																					
Drosera	<i>flava</i>	x																											
Drosera	<i>glanduligera</i>																								x				
Drosera	<i>piliferum</i>	x			x	x	x																						
Drosera	<i>stolonifera</i>				x			x										x	x										
Ehrharta	<i>calycina</i>	x			x		x	x																					
Ehrharta	<i>longiflora</i>	x				x	x																						
Elyanthera	<i>sp.</i>	x																											
Epacridaceae					x																								
Eremaea	<i>asterocarpa subsp asterocarpa (no longer a priority species - M Hislop)</i>				x		x	x																					
Eucalyptus	<i>globulus*</i>																						x						
Eucalyptus	<i>marginata</i>				x			x																					
Eucalyptus	<i>rudis</i>												x	x	x	x						x	x		x				x
Euchilopsis	<i>linearis</i>		x																										
Euphorbia	<i>peplus*</i>																				x								

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Jan 2006

APPENDIX 1: SPECIES IDENTIFIED WITHIN THE NAMBEELUP PROPOSED INDUSTRIAL PARK STUDY AREA

GENUS	SPECIES	K1	K3	K4	K5	K6	K7	K8	M1	M2	M3	M4	M5	N1	N2	T1	T2	T3	T4	T5	T6	Lot 224A	W1	W2	W3	W4	W5	W6	L1
<i>Ficus</i>	<i>carica*</i>																			x									
<i>Gastrolobium</i>	<i>capitatum</i>					x	x																						
<i>Gompholobium</i>	<i>tomentosum</i>	x	x		x	x	x	x																					
<i>Haemodorum</i>	<i>sp.</i>						x																						
<i>Hemiandra</i>	<i>pungens</i>	x			x	x																							
<i>Hibbertia</i>	<i>hypericoides</i>	x			x		x	x																					
<i>Hibbertia</i>	<i>stellaris</i>			(x)	x																								
<i>Hibbertia</i>	<i>subvaginata</i>	x				x																							
<i>Hibbertia</i>	<i>vaginata</i>	x				x				x																			
<i>Holcus</i>	<i>lanatus*</i>																			x			x						
<i>Hovea</i>	<i>trisperma</i>	x			x	x		x																					
<i>Hyalosperma</i>	<i>cotula</i>	x			(x)																								
<i>Hybanthus</i>	<i>calycinus</i>				x																								
<i>Hydrocotyle</i>	<i>callicarpa</i>																					x							
<i>Hydrocotyle</i>	<i>diantha</i>															x					x								
<i>Hydrocotyle</i>	<i>sp.</i>								x	x	x																		
<i>Hydrocotyle</i>	<i>sp.</i>								x																				
<i>Hypocalymma</i>	<i>angustifolium</i>																									x			
<i>Hypocalymma</i>	<i>robustum</i>	x																											
<i>Hypochaeris</i>	<i>glabra*</i>	x						x	x														x						
<i>Hypochaeris</i>	<i>radicata*</i>																					x		x					
<i>Hypolaena</i>	<i>exsulca</i>		x			x	x	x										x	x										x
<i>Hypoxis</i>	<i>?occidentalis</i>																x												
<i>Isolepis</i>	<i>cernua</i>																				x	x							
<i>Isolepis</i>	<i>congrua</i>																		x	x	x					x			
<i>Isolepis</i>	<i>cyperoides</i>																												
<i>Isolepis</i>	<i>marginata*</i>								x	x	x	x		x	x	x				x	x	x							x
<i>Isolepis</i>	<i>oldfieldiana</i>																				x						x	x	x
<i>Isolepis</i>	<i>prolifera*</i>		x						x						x									x	x		x		
<i>Isolepis</i>	<i>setiformis</i>											x								x									
<i>Isotropis</i>	<i>cuneiformis</i>					x																							
<i>Jacksonia</i>	<i>furcellata</i> <i>gracillima</i>		x				x	x																					

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Jan 2006

APPENDIX 1: SPECIES IDENTIFIED WITHIN THE NAMBEELUP PROPOSED INDUSTRIAL PARK STUDY AREA

GENUS	SPECIES	K1	K3	K4	K5	K6	K7	K8	M1	M2	M3	M4	M5	N1	N2	T1	T2	T3	T4	T5	T6	Lot 224A	W1	W2	W3	W4	W5	W6	L1		
Jacksonia	<i>sternbergiana</i>				x			x																							
Johnsonia	<i>sp.</i>				x		x																								
Juncus	<i>bufonius*</i>																				x									x	
Juncus	<i>caespiticius</i>																									x					
Juncus	<i>holoschoenus</i>																				x					x					
Juncus	<i>microcephalus*</i>		x	x																											
Juncus	<i>pallidus</i>		x	x								x	x								x	x	x					x			
Juncus	<i>pauciflorus</i>																														
Juncus	<i>subsecundus</i>																														
Kennedia	<i>prostrata</i>				x		x	x																							
Kunzea	<i>ericifolia</i>																														
Kunzea	<i>glabrescens</i>	x	x		x	x	x																								
Kunzea	<i>micrantha</i>					x																									
Kunzea	<i>recurva</i>																														
Lagineria	<i>huegelii</i>				x																										
Laxmannia	<i>sp.</i>	x			x			x																							
Lemna	<i>spp.</i>								x	x	x																				
Lepidosperma	<i>angustatum</i>		x																												
Lepidosperma	<i>coangustatus</i>	x																													
Lepidosperma	<i>leptostachyum</i>				x																										
Lepidosperma	<i>longitudinale</i>		x																												
Lepidosperma	<i>pubisquamatum</i>					x		x																							
Lepidosperma	<i>squamatum</i>							x																							
Leucopogon	<i>australis</i>																										x	x			
Labelia	<i>alata</i>																														
Lolium	<i>perenne*</i>				x																										
Lolium	<i>rigidum</i>																														
Lomandra	<i>caespitosa</i>							x																							
Lomandra	<i>micrantha</i>		x																												
Lomandra	<i>preissii</i>	x			x																										
Lomandra	<i>sericea</i>				x	x		x																							
Lomandra	<i>sp.</i>				x			x																							

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Jan 2006

APPENDIX 1: SPECIES IDENTIFIED WITHIN THE NAMBEELUP PROPOSED INDUSTRIAL PARK STUDY AREA

GENUS	SPECIES	K1	K3	K4	K5	K6	K7	K8	M1	M2	M3	M4	M5	N1	N2	T1	T2	T3	T4	T5	T6	Lot 224A	W1	W2	W3	W4	W5	W6	L1	
Lomandra		x																												
Lotus	minor*							x		x				x	x		x		x				x		x					
Loxocarya	sp.																				x									
Lyginia	barbata	x			x		x																							
Lyginia	imberbis	x	x		x	x	x	x														x								
Lysinema	sp.				x																									
Macarthuria	australis				x																									
Medicago	polymorpha*	x			x			x				x		x	x							x	x							
Meeboldina	scariosa		x																											
Melaleuca	lateritia		x						x	x	x											x								
Melaleuca	preissiana												x			x		x			x	x	x	x		x		x	x	
Melaleuca	rhopiophylla									x	x		x	x	x						x	x	x	x		x			x	
Melaleuca	scabra				x	x																								
Melaleuca	teretifolia								x	x	x																			
Melaleuca	thymoides	x			x	x	x	x																						
Melilotus	indica*													x				x												
Mesomelaena	sp.		x																											
Microtis	atrata		x	x																										
Microtis	media																x				x	x			x		x	x	x	
Monadenia	bracteata					x	x	x																						
Nemcia	capitata						x																							
Nuytsia	floribunda							x																						
Opercularia	hispidula							x																						
Opercularia	vaginata							x																						
Ornithopus	sativus*	x			x			x																						
Orobanche	minor*					x	x																							
Orthrosanthos	laxus		x																											
Osteospermum	calendulaceum																					x								
Paspalum	dilatatum*									x													x							

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GENUS	SPECIES	K1	K3	K4	K5	K6	K7	K8	M1	M2	M3	M4	M5	N1	N2	T1	T2	T3	T4	T5	T6	Lot 224A	W1	W2	W3	W4	W5	W6	L1	
<i>Patersonia</i>	<i>juncea</i>		x																											
<i>Patersonia</i>	<i>occidentalis</i>	x	x		x																									
<i>Pelargonium</i>	<i>capitatum*</i>																													x
<i>Pennisetum</i>	<i>clandestinum*</i>																					x	x							
<i>Pericalymma</i>	<i>ellipticum</i>	x	x																											
<i>Petrophile</i>	<i>linearis</i>	x			x																									
<i>Philothea</i>	<i>spicata</i>	x			x																									
<i>Phlebocarya</i>	<i>ciliatum</i>	x			x	x	x	x																						
<i>Phyllangium</i>	<i>sp.?</i>																				w									
<i>Phytolacca</i>	<i>octandra*</i>																						x							
<i>Plantago</i>	<i>lanceolata</i>																x													
<i>Podotheca</i>	<i>?chrysantha</i>				x																									
<i>Podotheca</i>	<i>gnaphalioides</i>				x																									
<i>Polygonum</i>	<i>aviculare</i>															x														
<i>Polypogon</i>	<i>monspeliensis*</i>																						x							
<i>Prasophyllum</i>	<i>sp.?</i>				x																									
<i>Pronaya</i>	<i>fraseriana</i>				x	x		x																						
<i>Pseudognaphalium</i>	<i>luteoalbum*</i>																				x									
<i>Pteridium</i>	<i>esculentum</i>																						x							
<i>Pterostylis</i>	<i>aff nana</i>					x										x	x				x	x								
<i>Pterostylis</i>	<i>nivea</i>				x																									
<i>Pterostylis</i>	<i>recurva</i>				x	x											x		x											
<i>Pterostylis</i>	<i>sp.</i>	x			x			x																						
<i>Pyrorchos</i>	<i>nigricans</i>	x			x			x																						
<i>Ranunculus</i>	<i>colonorum</i>																x				x									x
<i>Rhodanthe</i>	<i>pyrethrum (P3)</i>				x																									
<i>Romulea</i>	<i>rosea*</i>									x													x							
<i>Rumex</i>	<i>conglomeratus*</i>										x											x	x							
<i>Rumex</i>	<i>crispus*</i>								x				x		x				x		x	x	x		x					x
<i>Schoenus</i>	<i>grandiflora</i>																													
<i>Schoenus</i>	<i>maschalinus</i>														x	x			x	x										

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Jan 2006

APPENDIX 1: SPECIES IDENTIFIED WITHIN THE NAMBEELUP PROPOSED INDUSTRIAL PARK STUDY AREA

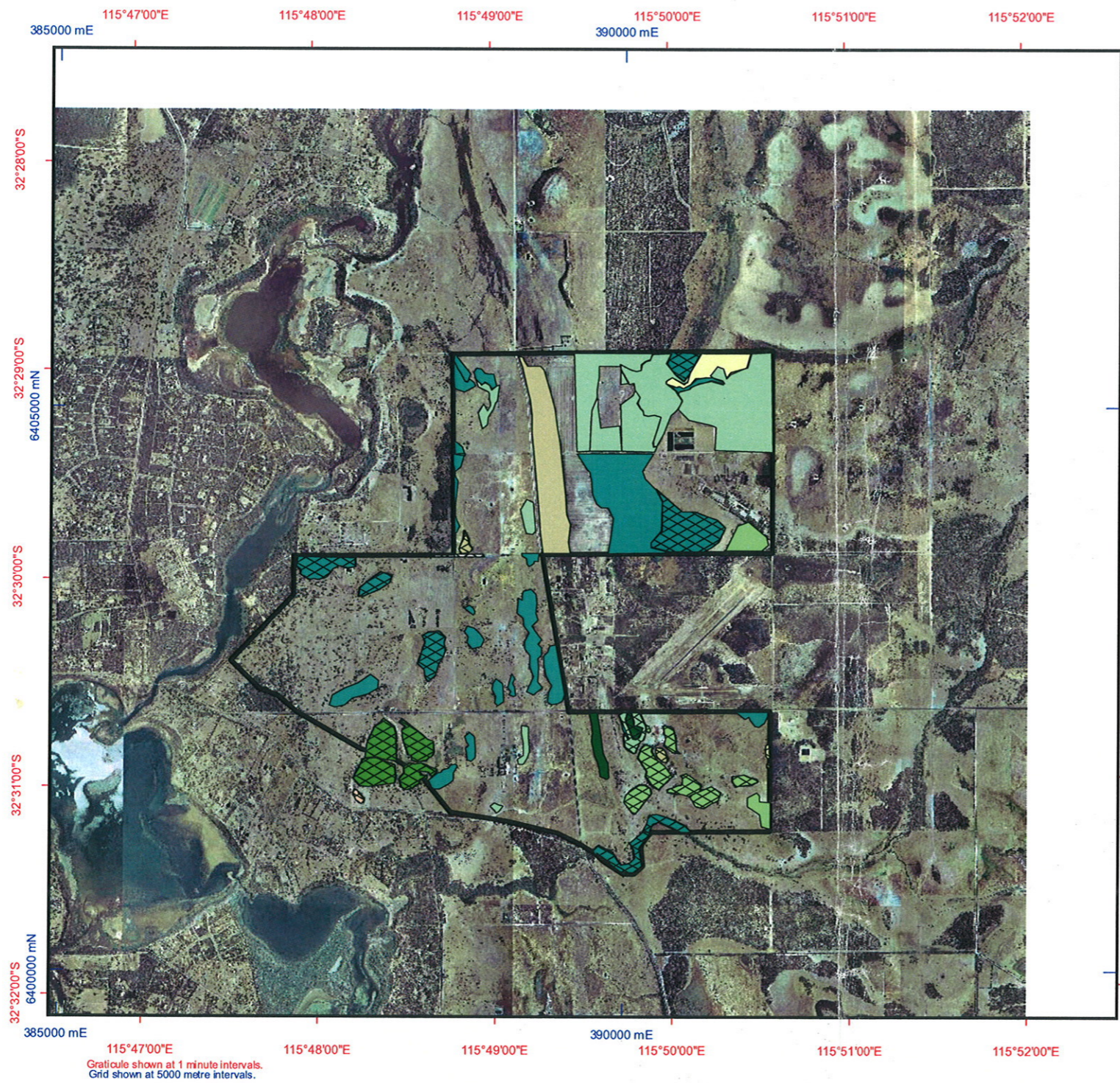
GENUS	SPECIES	K1	K3	K4	K5	K6	K7	K8	M1	M2	M3	M4	M5	N1	N2	T1	T2	T3	T4	T5	T6	Lot 224A	W1	W2	W3	W4	W5	W6	L1
<i>Schoenus</i>	<i>plumosus</i>																				x								
<i>Schoenus</i>	<i>sp.</i>																								x				
<i>Solanum</i>	<i>laciniatum*</i>																									x			
<i>Solanum</i>	<i>nigrum*</i>													x							x		x		x				x
<i>Sowerbaea</i>	<i>laxiflora</i>		x		x												x	x			x								x
<i>Stirlingia</i>	<i>latifolia</i>	x			x			x																					x
<i>Stylidium</i>	<i>?anema</i>	x				x																							
<i>Stylidium</i>	<i>?striatum</i>		x		x																								
<i>Stylidium</i>	<i>brunonianum</i>				x																								
<i>Stylidium</i>	<i>carnosum</i>					x		x																					
<i>Stylidium</i>	<i>ciliatum</i>	x			x			x																					
<i>Stylidium</i>	<i>piliferum</i>	x			x																								
<i>Stylidium</i>	<i>schoenoides</i>	x			x	x		x																					
<i>Stylidium</i>	<i>sp.</i>				x																								
<i>Taraxacum</i>	<i>officinale*</i>	x																				x							
<i>Thelymitra</i>	<i>canaliculata</i>																					x							
<i>Thelymitra</i>	<i>crinita</i>																												
<i>Thelymitra</i>	<i>holmesii</i>																												
<i>Thelymitra</i>	<i>sp.</i>				x			x									x												
<i>Thelymitra</i>	<i>wetland</i>		x	x																									
<i>Thysanotus</i>	<i>?patersonii</i>		x																										
<i>Thysanotus</i>	<i>manglesianus</i>	x						x														x							
<i>Thysanotus</i>	<i>multiflorus</i>		x																										
<i>Thysanotus</i>	<i>thyrsoideus</i>																												
<i>Trachymene</i>	<i>pilosa</i>	x			x		x	x																					
<i>Tricoryne</i>	<i>elatior</i>	x	x		x	x																x							
<i>Trifolium</i>	<i>campestre*</i>				x																								
<i>Trifolium</i>	<i>dubium*</i>				x																								
<i>Trifolium</i>	<i>fragiferum*</i>																												
<i>Triglochin</i>	<i>procera</i>								x	x				x															
<i>Ursinia</i>	<i>anthemoides</i>	x	x				x	x																					
<i>Vicia</i>	<i>sativa</i>				x			x																					

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Jan 2006

APPENDIX 1: SPECIES IDENTIFIED WITHIN THE NAMBEELUP PROPOSED INDUSTRIAL PARK STUDY AREA

GENUS	SPECIES	K1	K3	K4	K5	K6	K7	K8	M1	M2	M3	M4	M5	N1	N2	T1	T2	T3	T4	T5	T6	Lot 224A	W1	W2	W3	W4	W5	W6	L1
<i>Villarsia</i>	<i>albiflora</i>									x						x													
<i>Waitzia</i>	<i>citrina</i>	x			x		x																						
<i>Xanthorrhoea</i>	<i>preissii</i>					x		x																					
<i>Xylomelum</i>	<i>occidentalis</i>				x		x	x																					



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 Jan 2006












Proposed priority conservation areas

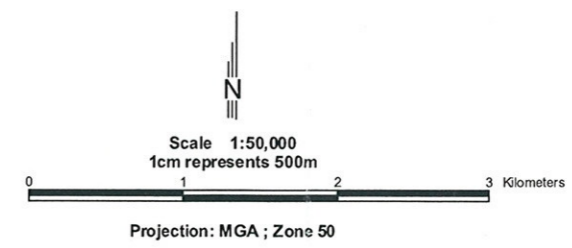
Legend

Conservation area priorities

-  Potential drainage areas
-  Priority conservation areas

Vegetation classes

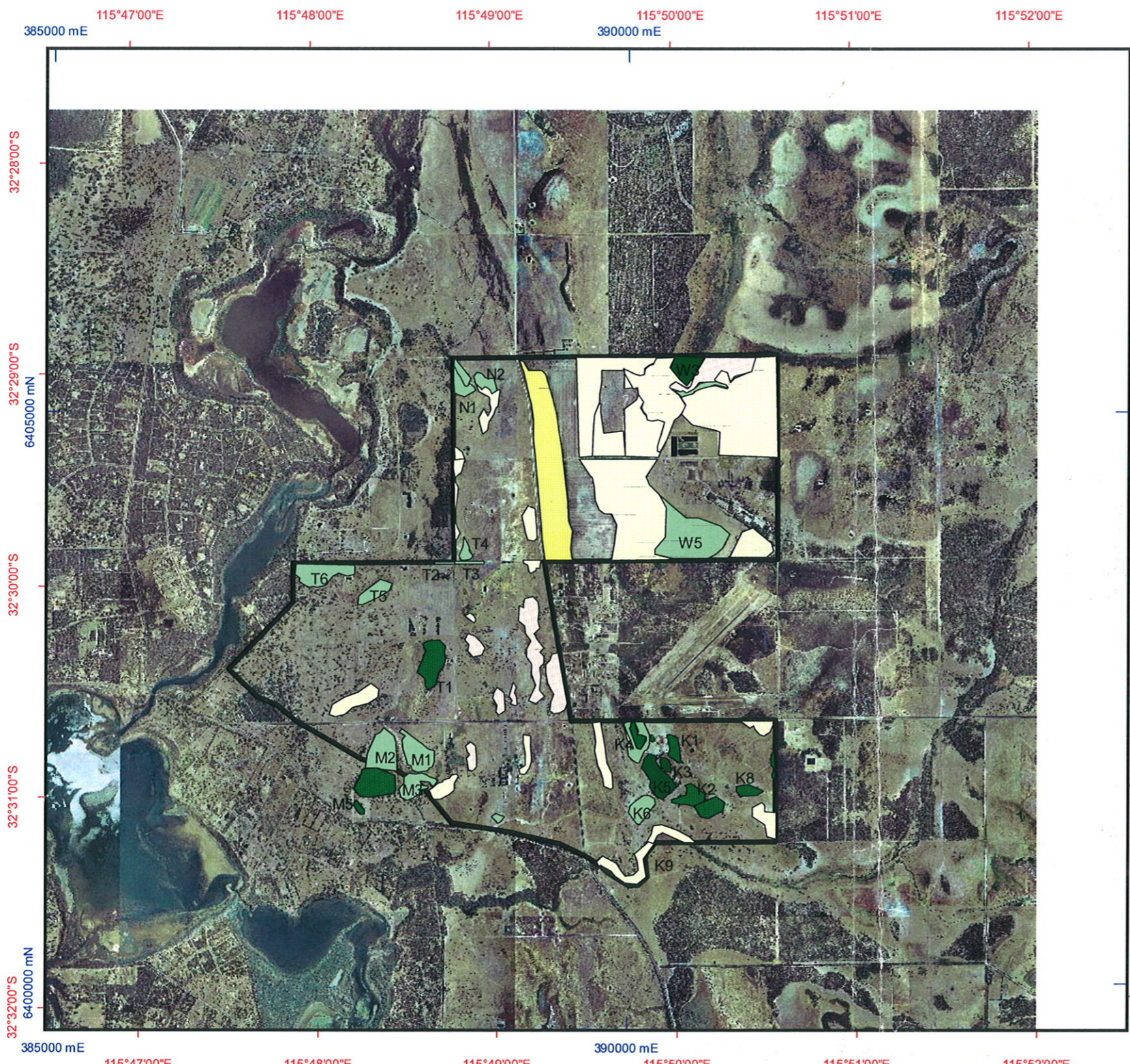
-  Parkland cleared
-  Eucalyptus marginata, Corymbia calophylla over mixed Banksia woodland
-  Juncus pallidus sedgeland
-  Melaleuca raphiophylla, M. preissiana and Eucalyptus rudis open to closed woodland
-  Assorted myrtaceae shrubland over Juncus pallidus
-  Baumea spp. open to closed sedgeland
-  Melaleuca teretifolia open to closed shrubland
-  Low closed Verticordia herbland
-  Tall closed Kunzea shrubland over Drosera herbland



December 1, 2005

Caveat: The assigned condition are based on survey undertaken within budgetary and time constraints.

Graticule shown at 1 minute intervals.
Grid shown at 5000 metre intervals.



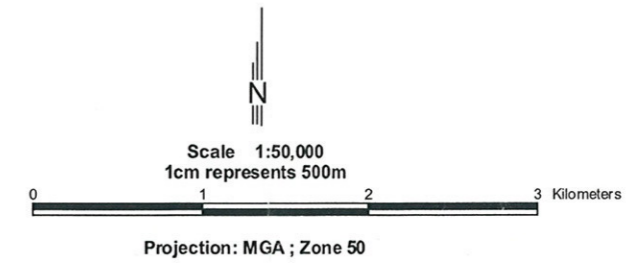
VEGETATION CONDITION

LEGEND

Vegetation condition

- Excellent
- Very good
- Good
- Poor
- Very poor

NOTE: The polygon reference numbers relate to the text descriptions.



December 1, 2005

Caveat: Condition assessment based on Trudgen 1991 and spring and summer survey.

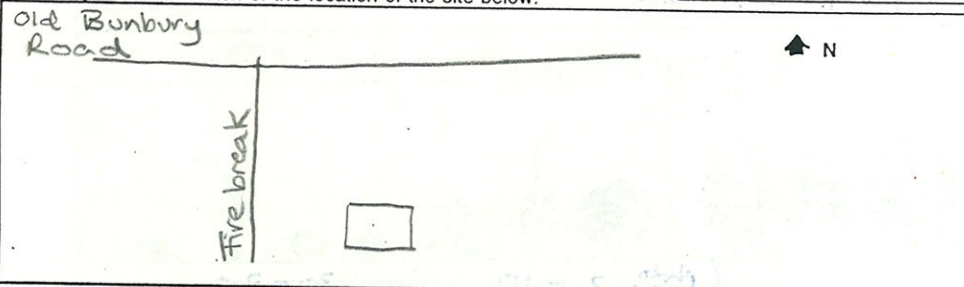
Adjacent to CSS

BUSHLAND PLANT SURVEY RECORDING SHEET 1- use pencil only

BUSHLAND AREA Loc. 3167 Old Bunbury Rd. Waroona SITE NUMBER 1
 DATE TRIP 16/5/00 RECORDERS BHG, NTH
 DATE TRIP _____ RECORDERS _____
 DATE TRIP _____ RECORDERS _____
 BOTANIST _____

1. LOCATION of the QUADRAT

Mud Map Draw a sketch of the location of the site below.

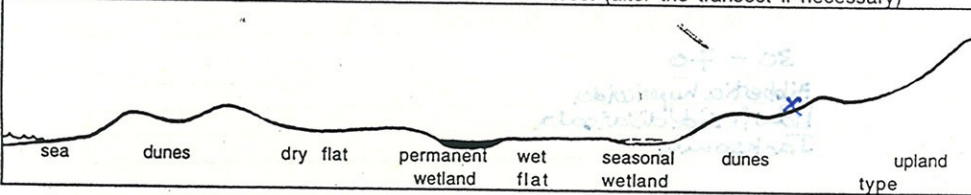


Road Location Just south of Old Bunbury Rd.

Geographic Location Latitude _____ S Longitude _____ E Altitude _____
 Reference Map _____

Photograph Photographer's Name NTH Photo No 1+2

Topographic position Circle position of site on the transect (alter the transect if necessary)



2. SITE DATA Circle the correct response.

Slope flat gentle steep Aspect N NE E SE S SW W NW

Surface Soil grey/brown sand Colour grey/brown
 Exposed rock type _____ % surface _____

Sub-surface Soil sand Colour yellow
 Rock type _____ depth to rock _____

Drainage well mod poor depth water _____ cm Wet all year winter/spring

Litter Depth 2cm % cover >70% Bare Ground <10 %cover

From 'Bushland Plant Survey' written B. Keighery (1994) and published by Wildflower Society of WA (Inc.), PO 1 64 Nedlands WA 6008.

LIFE FORM	TREES			MALLEES	
	over 30m	30m	under 10m	over 8m	under 8m
COVER CLASS (%)			<u>30-70</u>		
DOMINANT SPECIES			<u>Allocasuarina fra seriana</u>		
LIFE FORM	SHRUBS over 2m		2m - 1m	SHRUBS under 1m	
COVER CLASS (%)				<u>10-30</u>	
DOMINANT SPECIES				<u>Hibbertia hypericoides</u>	
LIFE FORM	GRASSES	HERBS	SEDGES	OTHER	
COVER CLASS (%)		<u>1-10</u>			
DOMINANT SPECIES		<u>Dasypogon bromeliifolius</u> <u>Conostylis dealbata</u>			

4. VEGETATION CONDITION

	COMMENTS
1 'PRISTINE'	
2 EXCELLENT	<u>Weeds minimal the odd</u> <u>Biza minor</u>
3 VERY GOOD	
4 GOOD	
5 DEGRADED	

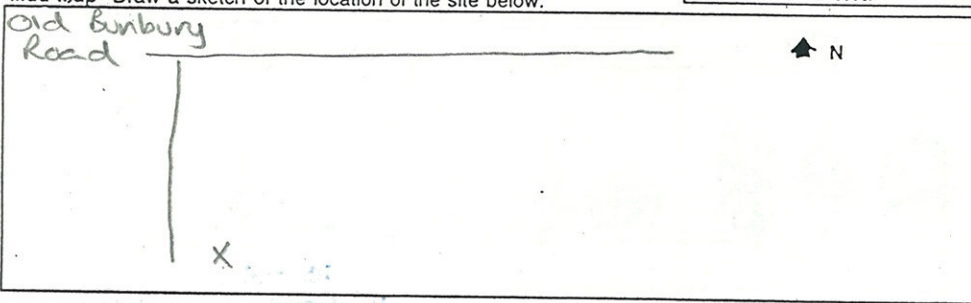
Other species included Pattersonia occidentalis

BUSHLAND PLANT SURVEY RECORDING SHEET 1- use pencil only

BUSHLAND AREA Loc. 3167 Old Bunbury Rd, Waroona SITE NUMBER 2
 DATE TRIP 16/5/00 RECORDERS BHG, NTH
 DATE TRIP _____ RECORDERS _____
 DATE TRIP _____ RECORDERS _____
 BOTANIST _____

1. LOCATION of the QUADRAT

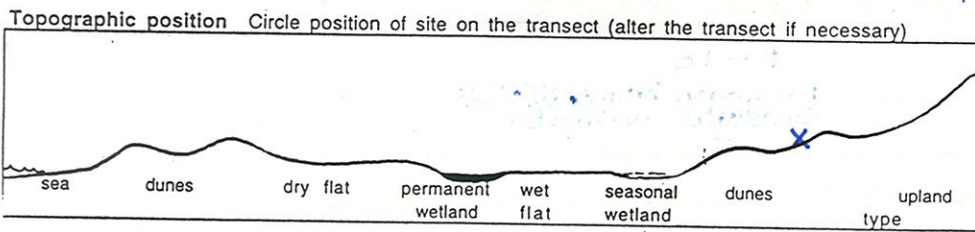
Mud Map Draw a sketch of the location of the site below.



From 'Bushland Plant Survey' written B. Keighery (1994) and published by Wildflower Society of WA (Inc.), PO 1 64 Nedlands WA 6008.

Road Location _____
 Geographic Location Latitude _____ S Longitude _____ E Altitude _____
 Reference Map _____

Photograph Photographer's Name NTH Photo No 3+4



2. SITE DATA Circle the correct response.

Slope flat gentle steep Aspect N NE E SE S SW W NW
 Surface Soil sand Colour grey/brown
 Exposed rock type _____ % surface _____
 Sub-surface Soil sand Colour yellow
 Rock type _____ depth to rock _____
 Drainage well mod poor depth water cm Wet all year winter/spring
 Litter 10-30 % cover _____ Bare Ground 10-30 % cover _____
 Depth <1cm cm

LIFE FORM	TREES			MALLEES	
	over 30m	10 - 30m	under 10m	over 8m	under 8m
COVER CLASS (%)	10-30	10-30			
DOMINANT SPECIES	<u>Eucalyptus gomphocephala</u>	<u>Agonis flexuosa</u>			
LIFE FORM	SHRUBS over 2m		2m - 1m	SHRUBS under 1m	
COVER CLASS (%)			(photo 3) 2-10		30-70
DOMINANT SPECIES			<u>Xanthorrhoea humilis</u> (with flowers at top of spike)	<u>Hibbertia hypericoides</u>	<u>Dawsonia divaricata</u> <u>Jacksonia sternbergiana</u>
LIFE FORM	GRASSES	HERBS	SEDGES	OTHER	
COVER CLASS (%)					
DOMINANT SPECIES			<u>Utricularia</u>		

4. VEGETATION CONDITION

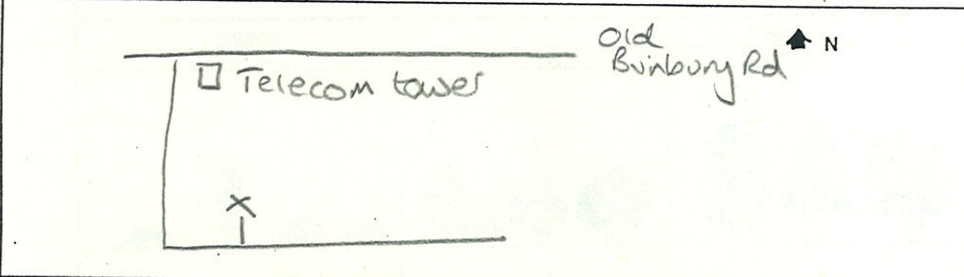
	COMMENTS
1 'PRISTINE'	
2 EXCELLENT	
3 VERY GOOD	A few tracks, past grazing a few weeds low growing * <u>Hypochaeris glabra</u> * <u>Leptospermum laevigatum</u> (coast tea tree) Rabbit grazing.
4 GOOD	
5 DEGRADED	

BUSHLAND PLANT SURVEY RECORDING SHEET 1- use pencil only

BUSHLAND AREA Loc. 3167 Old Binbury Rd, Waroona SITE NUMBER 3
 DATE TRIP 16/5/00 RECORDERS BHG, NTH
 DATE TRIP _____ RECORDERS _____
 DATE TRIP _____ RECORDERS _____
 BOTANIST _____

1. LOCATION of the QUADRAT

Mud Map Draw a sketch of the location of the site below.



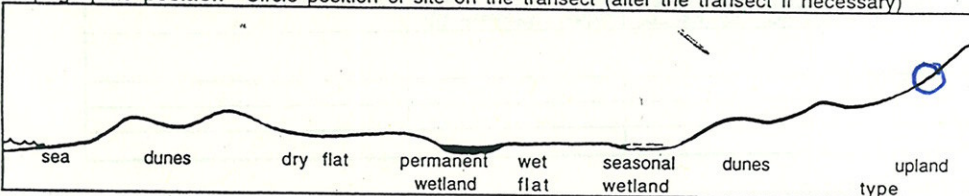
From 'Bushland Plant Survey' written B. Keighery (1994) and published by Wildflower Society of WA (Inc.), PO Box 64 Nedlands WA 6008.

Road Location _____

Geographic Location Latitude _____ S Longitude _____ E Altitude _____
 Reference Map _____

Photograph Photographer's Name NTH Photo No 5

Topographic position Circle position of site on the transect (alter the transect if necessary)



2. SITE DATA Circle the correct response.

Slope flat gentle steep Aspect N NE E SE S SW W NW

Surface Soil sandy loam Colour brown
 Exposed rock type _____ % surface _____

Sub-surface Soil sand Colour yellow
 Rock type _____ depth to rock _____

Drainage well mod poor depth water _____ cm Wet all year winter/spring

Litter 5mm % cover 30-70 Bare Ground 2-10 %cover
 Depth cm

LIFE FORM	TREES			MALLEES	
	over 30m	30m	under 10m	over 8m	under 8m
COVER CLASS (%)		<u>10-30</u>	<u>10-30</u>		
DOMINANT SPECIES		<u>Eucalyptus</u>	<u>Banksia attenuata</u>		
		<u>gymnophloia</u>	<u>Xylomelum occidentale</u>		
LIFE FORM	SHRUBS over 2m		2m - 1m	SHRUBS under 1m	
COVER CLASS (%)			<u>2-10</u>	<u>30-70</u>	
DOMINANT SPECIES			<u>Acacia pulchella</u>	<u>Hibbertia hypericoides</u>	
			<u>Kunzea ericifolia</u>		
LIFE FORM	GRASSES	HERBS	SEDGES	OTHER	
COVER CLASS (%)		<u>2-10</u>	<u>2-10</u>		
DOMINANT SPECIES		<u>Conostylis arcuata</u>	<u>Lepidosperma</u>		
		<u>Hemibelia pungens</u>	<u>squamatum</u>		

4. VEGETATION CONDITION

	COMMENTS
1 'PRISTINE'	<u>Some weed invasion Briza maxima</u>
2 EXCELLENT	
3 VERY GOOD	
4 GOOD	
5 DEGRADED	

BUSHLAND AREA Loc. 3167 Old Bunbury Rd, Waroona SITES 3 YES/NO NO

DATE 16/5/00 Adjacent to CSS RECORDERS BHG, NTH

Observations edge transects

Geographic Location Latitude S Longitude E

Reference Map

Photograph 1-5 Sites Photographer's Name N Photo No

6-8 Eastside

Transect of landscape units (draw in transect incorporating features listed and any other relevant unit)

dunes
dry/wet flats
sumplands
uplands
type

Soil - surface sub -soil
Exposed rock type % area

FLORA/VEGETATION (list dominant and significant plants below, see over for vege association descriptions) E. edge

Eucalypts	<i>E. calophylla</i> ✓	<i>E. wandoo</i>	<i>E. marginata</i> ✓	<i>E. todtianna</i>	<i>E. rudis</i>
	<i>E. decipiens</i>	<i>E. drummondii</i>	<i>E. haematoxylon</i>	<i>E. lanepolei</i>	<i>E. gomphocephala</i> ✓
	<i>E. accedens</i>	<i>E. patens</i>	<i>E. laeliae</i>	<i>E. megacarpa</i>	
Sheoaks	<i>Allocasuarina fraseriana</i> ✓	<i>Casuarina obesa</i>			
Banksia	<i>B. attenuata</i> ✓	<i>B. menziesii</i>	<i>B. prionotes</i>	<i>B. illicifolia</i>	<i>B. grandis</i> ✓ <i>B. littoralis</i>
Melaleuca	<i>M. preissii</i>	<i>M. raphiophylla</i>	<i>M. lanceolata</i>	<i>M. cuticularis</i>	
Others	<i>Callitris preissii</i>				
Mallees	Eucalypts	<i>E. argutifolia</i>	<i>E. petrensis</i>	<i>E. decurva</i>	<i>E. foecunda</i> <i>E. latens</i>

SIGNIFICANT SPECIES / DOMINANT SPECIES

Agonis flexuosa
Xylomelum occidentale (Picketly pear)
Nyctasia floribunda

(see over for vegetation descriptions)

Vegetation Condition - Keighery 1994 (Trudgen 1993) (show range and indicate predominant class)

- 1 = 'Pristine' (Excellent)
- 2 = Excellent (Very Good)
- 3 = Very Good (Good)
- 4 = Good (Poor)
- 5 = Degraded (Very Poor)
- 6 = Completely Degraded

Specific aspects of disturbance

partial clearing					
weeds (list):					
selective removal of species:	timber cutting ✓	mowing	fire	<u>past</u> grazing ✓	dieback %area
fire frequency:					
'enrichment plantings' (list)					
animal impact:	horse foxes	rabbits ✓	cats	dogs	goats pigs overgrazing by native mammals
soil movement:	mining	dumping	rubbish dumping	roadworks	
changes in water regimes:		flooding	drainage	watering	nutrient influx
Tracks:	fire breaks ✓	walk trails	off road vehicle use	animal tracks	
Service corridors:	SEC	Main Roads	Water Authority.	Telecom	
Other	<u>bore</u>	<u>swcarves</u>			

AREA INFORMATION

System 6 Area (C or M) or Update Area (Update) CLIFTONI

Conservation Area
Nature Reserve
Reserve No
National Park
Reserve No
Local Government
Reserve No
Other
Proposed Conservation Areas
Local Government
Reserve No
Other VCL - DOLA

Conservation Area

Nature Reserve
Reserve No
National Park
Reserve No
Local Government
Reserve No
Other

TOTAL AREA

Bushland Area	61.25	hectares
Completely Degraded	1.5 ha	

AREA MAPPED FLORISTIC UNITS

See CSS for map

Units	Site (Condition)	Code	Bound	Area (ha)
26a	62	63	B	2.625
25			B	57.125

Boundaries determined by use of

aerial photograph	Melbo Street Directory SS 513, 15 1
orthophoto	2032 III NE 1
vegetation map	
soil map	

CSS

Sites
x1

photos
8 →
6

x2

x3

5083

