FLORA AND VEGETATION OF MIDLAND CEMETERY

DRAFT

Prepared for:
Ministry for Planning
Albert Facey House
469 Wellington Street
PERTH.

Prepared by:
Bennett Environmental Consulting Pty Ltd
21 Currawong Drive
GOOSEBERRY HILL 6076

August 2001

SYNAPHAEA ACUTILOBA

JARRAH AND MARRI

MARRI

LAMBERTIA MULTIFLORA

DEVELOPED BURIAL

AND CREMATION AREAS

BANKSIA LOW WOODLAND

JARRAH AND MARRI

LAMBERTIA MULTIFLORA

&

ISOPOGON DRUMMONDII

ENVIRONMENTAL MANAGEMENT PROGRAM REQUIRED

No.	DATE	REVISION	BY	APP'D
	X	X		
	X	X		
	X	X		
2	9/10/01	Isop.Drum. Patch Removed	T.Ferreira	P.Deague
1	4/7/01	X		

MYLES RO

Flora data - PAUL V. D. MOEZEL /

TESTING No.	
AREA	
PURPOSE	
FILE No.	

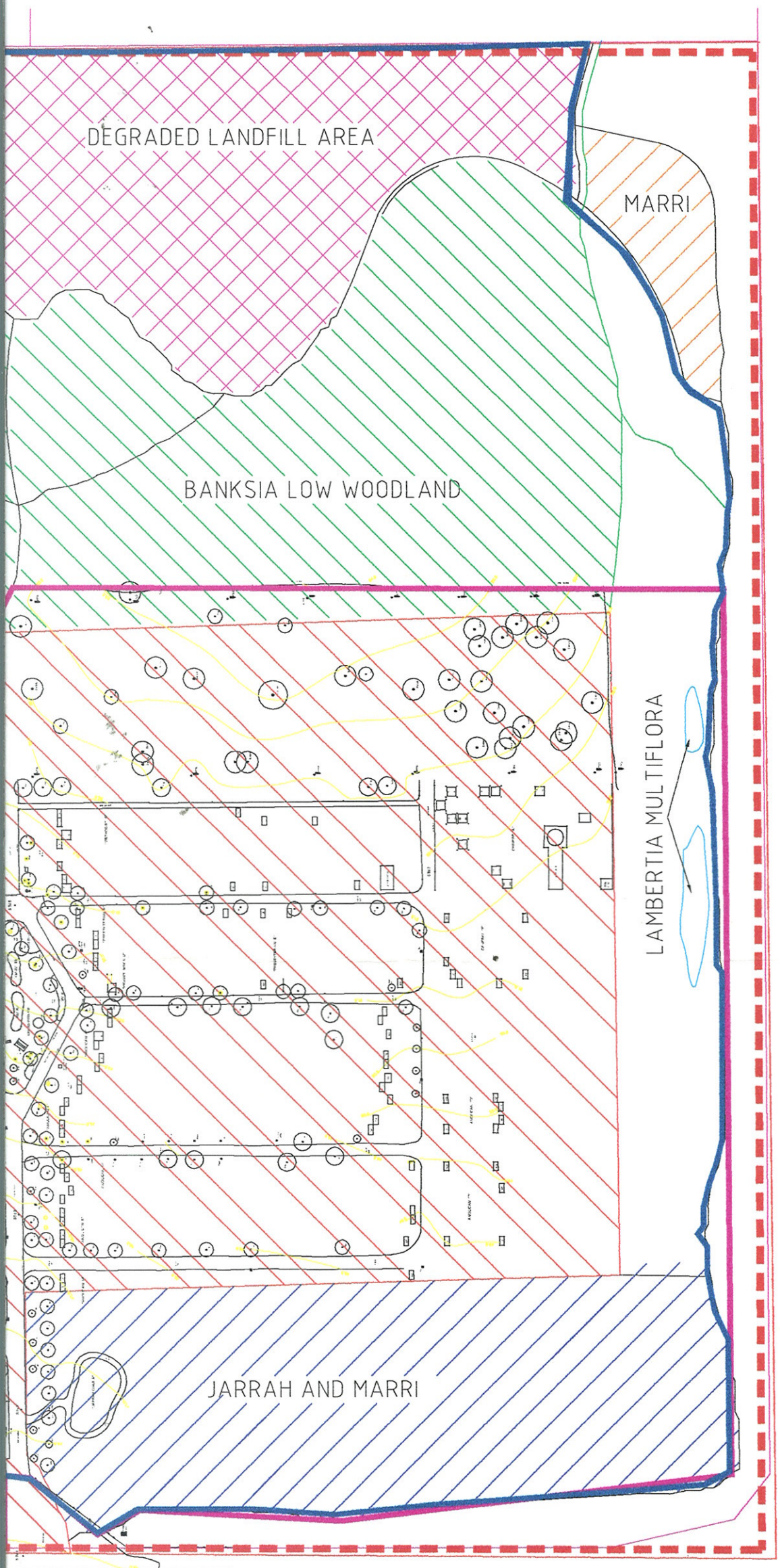
METROPOLITAN CEMETERIES BOARD

RAILWAY ROAD KARRAKATTA

Telephone: (08) 9384 7144 Fax: (08) 9383 3683

Email: Administrator@mcb.wa.gov.au

DESIGNED	PAUL VAN DER MOEZEL	08/00	DATUM A.H
DRAWN	L.PROSPERO	08/00	SCALE NOT TO
CHECKED	P.DEAGUE	08/00	APPROVED
RECOMMENDED			



COMMUNITY NEEDS

RELIGION	QUANTITIES
CHINESE	1900 PLOTS
POLISH	550 PLOTS
RUSSIAN ORTHODOX	803 PLOTS
MEMORIALS	ALTERNATE MEMORIALS BY DEMAND
FREE SERBIANS	990 PLOTS
VIETNAMESE	800 PLOTS
SERBIANS	550 PLOTS
ROMAN CATHOLIC	2000 PLOTS
GENERAL	2530 PLOTS

Bushplan(Subject to Master Plan Process)

NOTE:

GROUPS WITH SPECIAL BURIAL NEEDS RELEVANT TO THEIR COMMUNITY.

ZEL / Cemetery data - Tech.Services Manager

Last Update 5/10/01

A.H.D

OT TO SCALE

MIDLAND CEMETERY
BUSH PLAN DEVELOPMENT OPTIONS

OPTION 2 PARTIAL DEVELOPMENT OF SITE

PREFERRED

SHEET 1 OF 1

DRAWING No.

M/00/08/BP/3

ACC/JOB No.

A
2

CONTENTS

CONTENTS (cont.)

APPENDICES

1 INTRODUCTION

1.1 General Introduction

The Ministry for Planning commissioned Bennett Environmental Consulting Pty Ltd to prepare a report on the flora and vegetation of the remnant vegetation at Midland Cemetery. Midland Cemetery is part of Talbot Road Bushland, Stratton/Swan View, the Bush Forever Site 306 (Government of Western Australia, 2000).

Planning for the cemetery requires the development of additional areas of the site for burials and memorials. The undeveloped areas are bushland. This requires that a survey of these bushland areas be undertaken.

1.2 Location

Midland Cemetery is located in the eastern sector of the Perth metropolitan Region, 3km northeast of Midland and just over 20km northeast of Perth centre, located within an established suburban district. The only entrance is from Myles Road. Blanchard Road and Myles Road form the southern and western boundaries respectively. Talbot Road Bushland is on the northern edge and houses back onto the cemetery bushland on the eastern side. Houses face onto the cemetery across Blanchard and Myles Roads.

1.3 Land Tenure

Midland Cemetery lies within a public reserve designated for cemetery purposes. On survey plan 17552 it is Location 11313, Reserve 6855. On the northern boundary is vacant crown land, Location 11314, an area of 10.95ha of bushland through which runs Blackadder Creek. Adjacent to the northern boundary and at the head of the Blackadder Creek is a compensation basin, Location 10477, Reserve 37939. Adjacent to the southeast corner of the cemetery reserve is Vacant Crown Land, Location 11764, bushland and the site of an old sand/gravel quarry. Talbot Road Bushland Location 23953 is to the north of Location 11314.

1.4 Objectives of the Current Survey

There are several objectives for the current survey. These include:

- vegetation communities and their associated flora;
- presence of any threatened ecological communities;
- regional assessment of the area;
- linkage to other bushland areas;
- any relevance to the Commonwealth Biodiversity Legislation;
- vegetation community viability;
- assessment of protection values and
- vegetation management issues.

The above information was to be obtained by undertaking a vegetation and flora survey of the area in June – July with a second survey to be undertaken during the spring. The second survey should record plants flowering, especially orchid species, many of which were observed in leaf during the first survey.
Each of the above topics will be discussed in the report.

2 PHYSICAL ENVIRONMENT

2.1 Climate

The area has a dry Mediterranean climate with 98 rain days, an average rainfall of 737mm per year, a mean maximum temperature of 25.4°C and a mean minimum temperature of 10.9°C.
Midland cemetery is situated at the base of the Darling Scarp, slightly elevated above the coastal plain and is therefore affected by localised climate influences. Rainfall is slightly higher and the summer temperatures a few degrees higher than nearer the coast. The cooling sea breezes come later in the afternoon, but the slightly elevated position of the site allows capture of any local cooling breezes.

2.2 Geology

Midland cemetery is included in the Yonganup Formation (Biggs and Wilde, 1980), which consists of basal conglomerate overlain by a unit of sand containing lenticular beds of clay. It occurs along the ancient shorelines at the foot of the present Darling Scarp and contains localised concentrations of heavy minerals. The yellow sand probably accumulated as a fore-dune or beach ridge under active surf conditions. The formation occurs at elevations of 45m to 75m above present sea level and is commonly lateritised.

2.3 Soils

The Talbot Road Bushland, including Midland Cemetery, is located on the Ridge Hill Shelf of the Swan Coastal Plain. This is a strip of lateritised low relief spurs along the base of the Darling Scarp between Bullsbrook and Harvey. It is a narrow, dissected strip 1-3km wide and slopes gently to the west to form the foothills of the Darling Scarp.
The soils are deep, rapidly draining, siliceous yellow brown sands; well drained yellow or brown duplex soils, with a sandy top soil; lateritic outcrops with shallow moderately well-drained brownish sands; poorly drained areas of bleached grey sands over an iron organic hardpan and variants of the above. The soils are an important determinant of the location and diversity of the plant communities.
Within the cemetery the sand deposits extend over the existing site to at least 4m in depth. The overlay sand is shallow and begins to mix with pea gravel and weathered lateritic alluvial clays along the cemetery's northern boundary. Pea gravel and conglomerate soils are recorded in the Vacant Crown Land along the ridge to the east. The cemetery soils are free draining, generally low in fertility with poor moisture holding properties. The sandy pea gravel and the weathered lateritic soils are poor in quality and lack moisture. Much of the pea gravel in Location 11764 adjacent to the southeast corner has been mined out along with some yellow sand.

2.4 Landforms

Midland Cemetery is located at the base of the Darling Scarp and south of the Blackadder Creek on a gently rising ridge. The lowest point in the cemetery is 40m above the Coastal Plain and land continues to rise gently to 55m in the vacant crown land adjacent to the southeast corner before ascending the nearby Darling Scarp.

2.5 Flora and Vegetation

Heddle et al. (1980) lists two vegetation complexes for the Talbot Road Bushland:

- The Forrestfield Complex varying from open forest of *Corymbia calophylla, Eucalyptus wandoo* subsp. *wandoo* and *E. marginata* to open forest of *E. marginata, C. calophylla, Allocasuarina fraseriana* and *Banksia* species. 9% is remaining, (Government of Western Australia, 2000).
- The Guildford Complex being a mixture of open forest to tall open forest of *Corymbia calophylla, Eucalyptus wandoo* subsp. *wandoo, E. marginata* and woodland of *E. wandoo* subsp. *wandoo*. 6% remaining (Government of Western Australia, 2000).

In Bush Forever (Government of Western Australia, 2000) the above was further subdivided into Floristic Community Types as below.

Supergroup 1: Foothills/Pinjarra Plain

3c. *Corymbia calophylla – Xanthorrhoea preissii* woodlands and shrubland.

Supergroup 3: Uplands centered on Bassendean Dunes and Dandaragan Plateau

20c: Eastern shrublands and woodlands.

Through Talbot Road Bushland there is also a creek that is not included in the Midland cemetery.

Keighery and Keighery (1993) mapped the vegetation of the Talbot Road Bushland. They recognised four principal plant communities:

- Wandoo (*Eucalyptus wandoo* subsp. *wandoo*) Open Woodland, Marri (*Corymbia calophylla*) and Wandoo and Lateritic Heath, on the lateritic areas with shallow moderately well drained gravelly brownish soils.
- Marri Open Woodland to Woodland and Marri and Jarrah (*Eucalyptus marginata*) Woodland, on well drained gravelly yellow or brown duplex soils with a sandy topsoil.
- Banksia Open Low Woodland to Low Woodland and a highly variable Sand Shrubland of *Adenanthos cygnorum* subsp. *cygnorum* and *Allocasuarina humilis* on open draining siliceous yellow brown sands of varying depth.
- Marri Woodland in the drainage channel on poorly drained gravelly yellow or brown duplex soils and *Hakea varia* and *Hakea trifurcata* Heath on the adjacent clays.

Within the woodlands, small patches of shrubland and heath occur. These were too small to be mapped.

Within the Midland Cemetery three plants communities have been mapped (Figure 5 in Safstrom and Taman, 1999). These are:

- Wandoo Low Open Woodland
- Marri and Wandoo Low Open Woodland and
- Marri/Jarrah Woodland.

The first two are recorded from the Vacant Crown Land, Location 11764. The vegetation of the Midland Cemetery is therefore Marri/Jarrah Woodland.

Van Der Moezel (2000b) in correspondence to the Metropolitan Cemeteries Board, stated the vegetation is more diverse than indicated above. He recognised three units within the cemetery (not including Location 11764). These are:

- Jarrah/Marri Woodland
- Marri Woodland

- Banksia Low Woodland.

Van Der Moezel concluded that the vegetation of the entire cemetery belongs to the Floristic Community Type 20C (Gibson et al, 1994), which also covers a large portion of the Talbot Road Reserve. This community type is listed as Critically Endangered by English (2000).

3 SURVEY METHODOLOGY

The whole cemetery site, as defined in the information provided by the Ministry for Planning (Appendix E, Figure 1), was surveyed on foot to assess the different vegetation units present. In each vegetation unit a permanent, 10m x 10m ($100m^2$) quadrat was placed in a N,S,E,W orientation selecting the quadrat site for the best vegetation condition. A star picket was placed at the NW corner and metal droppers placed at the remaining three corners. A metal tag with the quadrat number was attached to the star picket. A GPS reading was made and a photograph taken at the NW corner.
In addition to the placement of each permanent quadrat the whole of the vegetation unit was traversed on foot to record additional taxa for the unit not represented in the quadrat. By recording these opportunistic species the total species list for each vegetation unit was increased considerably.

3.1 Vegetation

The vegetation of the area was defined for the whole unit, not just for the quadrat. The quadrat was placed in a characteristic section of the community but often it was not possible to include all tree species within the 10m x 10m quadrat. Where tree taxa occurred outside of the quadrat these taxa were recorded separately and built into the vegetation classification. The descriptions were prepared using the vegetation layers as listed in Table 1.
Changes in vegetation structure at Midland included variation in the:

tree layer, eg. Banksia spp, Jarrah and Marri,
shrub layer, eg. Proteaceae, Myrtaceae and Papilionaceae species, and
understorey layer, eg. sedges, herbs, grasses.

Table 1. Vegetation layers. Adapted from: Bush Forever (Government of Western Australia 2000)

Life Form/ Height Class	Canopy Cover			
	100-70%	70-30%	30-10%	10-2%
Trees over 30m	Tall Closed Forest	Tall Open Forest	Tall Woodland	Tall Open Woodland
Trees 10-30m	Closed Forest	Open Forest	Woodland	Open Woodland
Trees under 10m	Low Closed Forest	Low Open Forest	Low Woodland	Low Open Woodland
Tree mallee/Mallee	Closed Tree Mallee	Tree Mallee	Open Tree Mallee	Very Open Tree Mallee
Shrub mallee	Closed Shrub Mallee	Shrub Mallee	Open Shrub Mallee	Very Open Shrub Mallee
Shrubs over 2m	Closed Tall Scrub	Tall Open Scrub	Tall Shrubland	Tall Open Shrubland
Shrubs 1-2m	Closed Heath	Open Heath	Shrubland	Open Shrubland
Shrubs under 1m	Closed Low Heath	Open Low Heath	Low Shrubland	Low Open Shrubland
Grasses	Closed Grassland	Grassland	Open Grassland	Very Open Grassland
Herbs	Closed Herbland	Herbland	Open Herbland	Very Open Herbland

3.2 Taxa Present

For each quadrat all taxa were recorded, together, where applicable, with their flower colour, average height, percentage cover and if the taxa were rare or endangered. Time was spent locating additional species within the same vegetation unit but outside of the quadrat. Where the same vegetation unit occurred in different areas these were also

searched to increase the taxa for the unit. Taxa were recorded in the field, but where the identity was unknown or uncertain these were collected and pressed, then later identified using keys and by comparison with the specimens housed at the Western Australian Herbarium. Current nomenclature was checked using FloraBase (Western Australian Herbarium, 2001a) and MAX (Western Australian Herbarium, 2001b).

3.3 Vegetation Condition

The vegetation condition of each quadrat and the vegetation community as a whole were recorded using the 6-scale condition rating as appeared in Bush Forever Vol 2, p. 48 (Government of Western Australia, 2000).

Table 2: Condition rating scale from Bush Forever (Government of Western Australia 2000)

Rating	Description	Explanation
1	Pristine	Pristine or nearly so, no obvious signs of disturbance.
2	Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.
3	Very Good	Vegetation structure altered, obvious signs of disturbance.
4	Good	Vegetation structure significantly altered by very obvious signs of multiple disturbance. Retains basic vegetation structure or ability to regenerate it.
5	Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management.
6	Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species.

If the description as given in Table 2 is used, it gives the impression that the bushland is in better condition than it really is. The classification after Trudgen (1991) gives a better indication of the true bushland condition. Categories 4 and above would be better described using the Trudgen method rather than Bush Forever. As an example, category 4, where the bushland is significantly altered, often with many weeds, would be better termed "Poor" rather than "Good".

Table 3: Comparison between the Condition descriptions in Bush Forever and Trudgen (1991)

Description Bush Forever	Description Trudgen (1991)
Pristine	Excellent
Excellent	Very Good
Very Good	Good
Good	Poor
Degraded	Very Poor
Completely Degraded	Completely Degraded

3.4 Rare and Priority Flora

Known Rare and Priority flora for the Talbot Road Bushland are listed in Bush Forever, together with any other significant taxa. Where possible Priority taxa were included in the 10m x 10m quadrats.

Table 4. Rare and Priority Flora listed for Talbot Road Bushland in Bush Forever (Government of Western Australia, 2000)

Significant Flora	Comments
Isopogon drummondii	Priority 3 taxon
Synaphea acutiloba	Priority 3 taxon
Synaphea pinnata	Priority 3 taxon
Lambertia multiflora var. *darlingensis*	Priority 3 taxon
Thysanotus glaucus	Priority 4 taxon

Table 5. Code and description of Rare and Priority Flora categories

Code	Code Declared Rare and Priority Flora Categories
R	DRF (Declared Rare Flora) -Extant Taxa. Taxa, which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection.
X	DRF (Declared Rare Flora) -Presumed Extinct Taxa. Taxa which have not been collected, or otherwise verified, over the past 50 years despite thorough searching, or of which all known wild populations have been destroyed more recently.
1	Priority One -Poorly Known Taxa. Taxa, which are known from one or a few (generally <5) populations, which are under threat.
2	Priority Two -Poorly Known Taxa. Taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat.
3	Priority Three -Poorly Known Taxa. Taxa which are known from several populations, at least some of which are not believed to be under immediate threat.
4	Priority Four -Rare Taxa. Taxa which are considered to have been adequately surveyed and which whilst being rare, are not currently threatened by any identifiable factors.

3.5 GPS Measurements

At the north west corner of each quadrat the GPS reading was recorded in UTM and latitude and longitude. In addition a photograph taken from this same corner recorded the quadrat. These measurements will be used to locate the quadrats on the maps produced from the survey.
Where rare or priority flora were located outside the quadrat a GPS reading was recorded for these taxa.

3.6 Soil Assessment

A simple soil assessment was undertaken at each quadrat. This recorded the colour of the soil and its structure. Where rocks were observed these were also recorded.

3.7 Topography

The Ministry for Planning provided maps with contours for the area prior to undertaking the field work. Field notes also included the positions of the quadrats and vegetation units in relation to the topography.

4 RESULTS

Field work was undertaken on 10th July 2001. The perimeter roads were driven prior to undertaking any field work to determine the variation in vegetation present and its condition. This was compared to the vegetation map produced by Van Der Moezel (2000b). As it was known that Priority Flora had been located, several transects were walked through the cemetery bushland. All quadrats were placed as far away from tracks as was possible for two reasons. The first was to ensure that pegs would not be visible to the public using the many tracks and secondly to avoid the highly degraded verges along the track perimeters. Additional opportunistic taxa were recorded by walking the vegetation units, firstly that surrounding the quadrat, and then other areas with the same unit.

The active cemetery site was not surveyed as it had been cleared and several exotic trees planted in the area.

4.1 Vegetation and Flora

4.1.1 Quadrats

Five permanent 10m x 10m ($100m^2$) quadrats were established in the bushland. These correlated with the vegetation mapping of Van Der Moezel (2000b) and Keighery and Keighery (1993).

The positions of the permanent quadrats are given in Table 6 and marked on Appendix E, Figure 1.

Table 6: GPS position of quadrats at Midland Cemetery

Quadrat Number	UTM Easting	UTM Northing	Latitude	Longitude
M1	50 409 397	647 2832	S 31°52'36.1"	E 116°02'31.6"
M2	50 409 654	647 2817	S 31°52'36.7"	E 116°02'41.3"
M3	50 409 859	647 2413	S 31°52'49.9"	E 116°02'49.0"
M4	50 409 895	647 2339	S 31°52'52.3"	E 116°02'50.4"
M5	50 409 414	647 2325	S 31°52'52.6"	E 116°02'32.0"

In addition to these permanent quadrats the degraded sand/gravel pit was recorded and the taxa present listed. No permanent quadrat was established in the degraded area.

4.1.2 Vegetation

In Section 2.5 the different past surveys undertaken at Talbot Road Bushland and Midland Cemetery are listed. Many annual taxa were very small when this survey was undertaken so the percentages and the taxa present may change with the spring survey. The current survey identified five different vegetation units. The different vegetation units are described below followed by the quadrat number and abbreviation used in the vegetation map, Appendix E, Figure 1.

Floristic Community Type 20c: Eastern shrublands and woodlands
This Floristic Community type was located on the western side of the cemetery through to the houses backing onto the cemetery from Natham Road. Two vegetation units were identified and mapped within this Floristic Community Type.

- **Low Woodland of *Banksia attenuata* and *Banksia menziesii* over an Open Low Heath over a Grassland/Sedgeland** on sand. (Quadrat M1) **BaBm**
  Dominant trees: *Banksia attenuata, B. menziesii, Corymbia calophylla* (Cover 30%)
  Dominant shrubs: *Allocasuarina humilis, Bossiaea eriocarpa, Burtonia conferta, Calothamnus sanguineus, Dryandra lindleyana* subsp. *lindleyana, Eremaea pauciflora, Gompholobium confertum* (Cover 55%)
  Dominant herbs: *Dasypogon obliquifolius, Drosera erythrorhiza, Chamaescilla corymbosa, Conostylis aurea, Patersonia occidentalis* (Cover 30%)
  Dominant grasses/sedges: *Amphipogon turbinatus, Cyathochaeta avenacea, Desmocladus fasciculatus, Mesomelaena pseudostygia* (Cover 40%)

- **Open Forest of *Eucalyptus marginata* subsp. *thalassica* over a Tall Shrubland over a Low Shrubland over a Grassland/Sedgeland** on sand. (Quadrat M5) **(Em)**
  Dominant trees: *Corymbia calophylla, Eucalyptus marginata* subsp. *thalassica, Nuytsia floribunda* (Cover 45%)
  Dominant tall shrubs: *Allocasuarina humilis, Dryandra sessilis* subsp. *sessilis, Hakea ruscifolia, Xanthorrhoea preissii* (Cover 15%)
  Dominant shrubs: *Bossiaea eriocarpa, Calothamnus sanguineus, Dryandra lindleyana* subsp. *lindleyana, Eremaea pauciflorus, Hakea trifurcata, Xanthorrhoea brunonis* subsp. *brunonis* (Cover 35%0
  Dominant herbs: *Anigozanthos manglesii* subsp. *manglesii, Opercularia vaginata, *Ursinia anthemoides* (Cover 10%)
  Dominant grasses/sedges: *Briza maxima, Ehrharta longiflora, Hypolaena exsulca, Mesomelaena pseudostygia, Schoenus brevisetis, Tetraria octandra* (Cover 90%)

This vegetation unit was restricted to the southwest corner of the cemetery, although Van Der Moezel (2000) stated that it continued on the western side up to the Low Woodland of *Banksia attenuata* and *Banksia menziesii.*

Floristic Community Type 3c: *Corymbia calophylla – Xanthorrhoea preissii* woodlands and shrubland.
The remainder of the bushland, except for the degraded sand/gravel pit was this Floristic Community Type.

- **Woodland to Low Woodland of *Corymbia calophylla* over an Open Heath of *Xanthorrhoea preissii* over Grassland/Sedgeland dominated by *Mesomelaena pseudostygia*** on sandy loam soil. (Quadrat M2) **(CcXp)**
  Dominant trees: *Corymbia calophylla* (Cover 0-15%)
  Dominant shrubs: *Allocasuarina humilis, Daviesia incrassata* subsp. *incrassata, Dryandra lindleyana, Hakea prostrata, Hibbertia hypericoides, Jacksonia sternbergiana, Xanthorrhoea brunonis* subsp. *brunonis, X. preissii* (Cover 55%)
  Dominant herbs: *Anigozanthos manglesii, Conostylis aculeata* subsp. *aculeata, *Romulea rosea, *Ursinia anthemoides* (Cover 23%)
  Dominant grasses/sedges: *Desmocladus fasciculatus, *Ehrharta calycina, Hypolaena exsulca, Mesomelaena pseudostygia, M. tetragona, Tetraria octandra* (Cover 57%)

This vegetation unit was dominant on the southeastern side of the area surveyed. There was also an area from the southwestern side through to the southeastern side to the compensation basin.

- **Open Woodland of *Corymbia calophylla* over Open Low Heath over a Grassland/Sedgeland** in loamy soil with pea gravel on the surface. (Quadrat M3) **(Cc)**
  Dominant trees: *Corymbia calophylla* (Cover 10%)
  Dominant shrubs: *Beaufortia purpurea, Gompholobium aristatum, Hakea auriculata, H. lissocarpha, H. trifurcata, Hibbertia hypericoides, Kingia australis, Synaphea acutiloba* (Cover 42%)
  Dominant herbs: **Freesia* hybrid, *Laxmannia squarrosa, *Oxalis purpurea, *Romulea rosea* (Cover 50%)
  Dominant grasses/sedges: *Desmocladus fasciculatus, Lepidosperma leptostachyum, Mesomelaena tetragona, Neurachne alopecuroidea, Tetraria octandra* (Cover 47%)

Occurred on the northern side of Location 11764.

- **Open Forest of *Eucalyptus wandoo* subsp. *wandoo* and scattered *Corymbia calophylla* over an Open Low Heath over an Open Grassland/Sedgeland** in loam soil with laterite. (Quadrat M4) **(Ew)**
  Dominant trees: *Corymbia calophylla, Eucalyptus wandoo* subsp. *wandoo* (Cover 45%)
  Dominant shrubs: *Calothamnus sanguineus, Dryandra armata* var. *armata, D. lindleyana* subsp. *lindleyana, Hakea lissocarpha, H. trifurcata, Hypocalymma angustifolia, Nemcia spathulata, Xanthorrhoea preissii* (Cover 45%)
  Dominant herbs: *Chamaescilla corymbosa, Pterostylis vittata, *Romulea rosea, Stylidium bulbiferum, Xanthosia candida* (Cover 20%)
  Dominant grasses/sedges: *Desmocladus fasciculatus, Lepidosperma leptostachyum, Loxocarya cinerea, Neurachne alopecuroidea, Tetraria octandra* (Cover 35%)

Occurred on the southern side of Location 11764.

Degraded Sand/Gravel Pit

Closed Herbland at the old sand/gravel pit.

Dominant trees: *Banksia attenuata, *Chamaecytisus palmensis, Corymbia calophylla, *Melia azedarach, *Tamarix aphylla, *Ricinus communis* (Cover <5%)

Dominant herbs: **Arctotheca calendula, *Chasmanthe floribunda, *Echium plantagineum, *Fumaria capreolata, *Lathyrus tingitanus, *Lupinus angustifolium, *L. consentinium, *Raphanus raphanistrum* (Cover 90%)

Dominant grasses: **Arundo donax, *Ehrharta longiflora, *Eragrostis curvula* (Cover 10%)

In addition, this degraded area is used as a dumping ground for excess soil, stone etc from the cemetery and in the past by local people for dumping cars.

4.1.3 Vegetation Condition

Each of the quadrats was placed in an area where the vegetation was in the best available condition. The overall condition of the Midland Cemetery bushland is indicated in Appendix E, Figure 2. Generally the bushland was in very good to excellent condition. The areas of degradation were confined to the edges of tracks through the bushland, to the old sand/gravel pit area and the northwest corner of the graves areas and Myles Road. The bushland edges of the older section of the cemetery also had weed infestation but generally it did not extend in far.

Table 7. Vegetation condition of each quadrat

Quadrat Number	Vegetation Condition	Safstrom & Taman (1999)
M1	1-2	Very good condition
M2	1	Very good condition
M3	3	Good condition
M4	1-2	Good condition
M5	3-4	Not assessed
Degraded	6	Degraded special treatment

Safstrom and Taman (1999) classified the vegetation at Talbot Road Bushland into 4 conditions: very good, good, grassy weeds and degraded requiring special treatment. This classification correlates well with the condition recognised in the field.

4.1.4 Flora

A total of 366 taxa have been recorded for the Talbot Road Bushland, Stratton/Swan View (Bush Forever, 2000). During the current survey a total of 213 taxa in 145 genera and 48 families (Appendix A) were recorded. The dominant families are listed in Table 8.

Table 8. Dominant Plant families (>10 taxa) recorded from Midland Cemetery

Vascular Plant Family	Number of Genera	Number of Native Taxa	Number of Weed Taxa	Total Number Taxa
Proteaceae	13	27	0	27
Papilionaceae	15	17	6	23
Myrtaceae	12	13	1	14
Poaceae	12	4	8	12
Cyperaceae	6	11	0	11
Anthericaceae	8	10	0	10
TOTAL	**62**	**82**	**15**	**97**

These six vascular plant families represent 12.5% of the vascular plant families, 42.75% of the genera and 45.75% of the taxa recorded at Midland Cemetery. Both the Low Woodland of *Banksia attenuata* and *Banksia menziesii* and Woodland to Low Woodland of *Corymbia calophylla* over an Open Heath of *Xanthorrhoea preissii* recorded the most taxa, 79, followed by the Open Woodland of *Corymbia calophylla* with 77 taxa. The Open Forest of *Eucalyptus marginata* subsp. *thalassica* and Open Forest of *Eucalyptus wandoo* subsp. *wandoo* and scattered *Corymbia calophylla* recorded 67 and 62 taxa respectively.

4.1.5 Rare, Priority and Significant Flora

Three priority and two significant taxa were recorded from the Midland Cemetery bushland. These are listed in Table 9 and mapped in Appendix E, Figure 3.

Table 9. Significant Flora recorded for Midland Cemetery in Bush Forever (Government of Western Australia 2000)

Taxon	Significance Code	Community Unit	Quadrat Number
Isopogon drummondii	Priority 3 taxon	BaBm	M1
Synaphea acutiloba	Priority 3 taxon	CcXp, Cc	M3, near M2
Synaphea pinnata	Priority 3 taxon	Not recorded first survey	
Lambertia multiflora var. *darlingensis*	Priority 3 taxon	BaBm, Em	M1,M5
Stylidium affine	Not listed	Ew	M4
Thysanotus glaucus	Priority 4 taxon	not recorded first survey	
Hakea myrtoides	p,s	Ew	M4
Trichocline spathulata	s	not recorded first survey	
Lomandra spartea	r,s	not recorded first survey	
Haemodorum brevisepalum	p	not recorded first survey	
Aristida contorta	Not listed most western population	not recorded first survey	
Grevillea endlicheriana	Not listed mainly on Darling Scarp	not recorded first survey	
Grevillea glabrata var. *glabrata*	Not listed restricted to moist soils on Darling Range	Not expected to be located as occurs along streams.	
Conospermum incurvum	most southern population in reserve - Perth Region	not recorded first survey	
Melaleuca tuberculata var. *tuberculata*	d	not recorded first survey	
Eremaea fimbriata	r,s	not recorded first survey	

Geographical variation
d = populations disjunct from their known geographical range
r = populations at the northern or southern limit of their known geographical range
s = significant populations
p = considered to be poorly reserved

Isopogon drummondii and *Lambertia multiflora* var. *darlingensis* were numerous and distributed throughout the Low Woodland of *Banksia attenuata* and *Banksia menziesii* in the northwest area to the north of the main entrance to the cemetery. A few plants of *Lambertia multiflora* var. *darlingensis* were also recorded in the Open Forest of *Eucalyptus marginata* subsp. *thalassica* adjacent to current graves in the southwest corner.

Several groups of up to 20 plants of *Synaphea acutiloba* were recorded from the Woodland to Low Woodland of *Corymbia calophylla* over an Open Heath of *Xanthorrhoea preissii.* The few plants located by Van Der Moezel (2000) were relocated but all were dead. However this taxon was very common in the Open Woodland of *Corymbia calophylla* over Open Low Heath in loamy soil with pea gravel on the surface where more than 100 plants were counted.

4.1.6 Weed Taxa

A total of 42 weed taxa were recorded from the cemetery bushland representing 18.8% of all taxa recorded. The dominant weed families are; Poaceae with 8 weeds, Iridaceae and Papilionaceae with 6 and Asteraceae with 4, totalling 18 taxa. These four families represent 33% of the weed taxa recorded. The degraded site was the only area surveyed that recorded 19 of the weeds, over 45%. .

Forty one of the 42 weeds have all been determined as weeds by CALM (1999) and the Western Australian Herbarium (2001) and their rating is given below in Table 10.

The distribution of the weeds within the different vegetation units is given in Appendix B. Seven of the weed taxa are rated as High on both invasivenss and impacts, indicating that these environmental weeds should be targeted for removal. *Asparagus asparagoides*, Bridal creeper, a common weed through metropolitan Perth was not recorded during the survey. It is expected that during the spring survey this taxon will be recorded

The rating allocated to each weed by Department of Conservation and Land Management (1999) is based on three criteria:

- **Invasiveness** – ability to invade natural bushland in good to excellent condition or ability to invade waterways.
- **Distribution** – wide current or potential distribution including consideration of known history of wide spread distribution elsewhere in the world.
- **Environmental impacts** – Ability to change the structure, composition and function of ecosystems. In particular an ability to form a monoculture in a vegetation community.

Ratings indicate the following:

- **High** indicates this weed is prioritised for control and/or research ie prioritising funding to it.
- **Moderate** indicates control or research effort should be directed to it if funds are available, however it should be monitored (possibly a reasonably high level of monitoring).
- **Mild** indicates monitoring of the weed and control where appropriate.
- **Low** indicates that this species would require a low level of monitoring.

Table 10. List of Weed Taxa recorded from Midland Cemetery

Scientific Name	Common Name	CALM Rating		
		Rating	Invasiveness	Impacts
**Ehrharta calycina*	Perennial veldt grass	High	✓	✓
**Eragrostis curvula*	African lovegrass	High	✓	✓
**Freesia* hybrid	Freesia	High	✓	✓
**Leptospermum laevigatum*	Victorian teatree	High	✓	✓
**Lupinus consentinii*	Western Australian blue lupin	High	✓	✓
**Moraea flaccida*	Oneleaf cape tulip	High	✓	✓
**Romulea rosea*	Guildford grass	High	✓	
**Arctotheca calendula*	Cape weed	Moderate	✓	
**Avena barbata*	Bearded oats	Moderate	✓	
**Briza maxima*	Blowfly grass	Moderate	✓	
**Chasmanthe floribunda*	African cornflag	Moderate	✓	
**Disa bracteata*	South African orchid	Moderate	✓	
**Ehrharta longiflora*	Annual veldt grass	Moderate	✓	
**Gladiolus caryophyllaceus*	Pink galdiolus	Moderate	✓	
**Hypochaeris glabra*	Flat weed	Moderate	✓	
**Parentucellia latifolia*	Red bartsia	Moderate	✓	
**Schinus terebinthifolia*	Japanese peppercorn tree	Moderate	✓	
**Solanum nigrum*	Black berry nightshade	Moderate	✓	
**Ursinia anthemoides*	Ursinia	Moderate	✓	
**Vicia sativa*	Common vetch	Moderate	✓	
**Chamaecytisus palmensis*	Tree lucerne	Mild	✓	
**Lupinus angustifolius*	Narrowleaf lupin	Mild		
**Melinis repens*	Natal redtop	Mild		
**Oxalis glabra*	Finger leaf oxalis	Mild		
**Oxalis pes-caprae*	Soursob	Mild		
**Pennisetum setaceum*	Fountain grass	Mild		
**Amaryllis belladonna*	Belladonna lily	Low		
**Arundo donax*	Giant Reed	Low		
**Babiana angustifolia*	Baboon flower	Low		
**Conyza bonariensis*	Flaxleaf fleabane	Low		
**Lathyrus tingitanus*	Tangier pea	Low		
**Malva parviflora*	Small flowered mallow	Low		
**Narcissus tazetta*	Jonquil	Low		
**Oxalis purpurea*	Four o'clock	Low		
**Plantago lanceolata*	Ribwort plantain	Low		
**Raphanus raphanistrum*	Wild radish	Low		
**Ricinus communis*	Castor oil tree	Low		
**Trifolium angustifolium*	Narrowleaf clover	Low		
**Echium plantagineum*	Paterson's curse+	Declared Plant+		
**Melia azedarach*	Cape lilac	Not Listed[1]		
**Foeniculum vulgare*	Fennel	TBA		
**Fumaria capreolata*	White fumitory	TBA		

+ Declared Plant – landowners with these plants on their properties are obliged to remove them.
[1] This taxon is native in the Kimberley Region of WA
TBA = To be assessed

Gladiolus caryophyllaceus was recorded from all vegetation units; *Briza maxima* and *Romulea rosea* from 4 vegetation units; *Ehrharta longiflora, Eragrostis curvula* and *Ursinia anthemoides* from 3 vegetation units, including the degraded area. Safstrom and Taman (1999) recorded *Watsonia bulbillifera* but during the July 2001 survey this taxon was not identified. A common taxon was *Chasmanthe floribunda.* The spring survey will confirm the correct identification.

Pinus radiata has been planted on the eastern side of the cemetery adjacent to the bushland but there appears to be no invasion into the surrounding bushland although CALM list it as having a moderate rating and as being invasive. Other exotic taxa are planted in the cemetery, often in formal beds or as avenues through the cemetery but none are near bushland. At the entrance *Agonis flexuosa* has been planted as an avenue. This taxon is native to Western Australia but not this area, its seedlings are not invading the adjacent bushland.

4.2 Threatened Ecological Communities

Ecological communities are naturally occurring biological assemblages that occur in a particular type of habitat (English, 2001). Threatened Ecological Communties are communities that have been assigned to one of seven categories related to the status of threat to the community; presumed totally destroyed, critically endangered, endangered, vulnerable, data deficient, not evaluated and lower risk.

Two of the ecological communities recorded for the Talbot Road Bushland in Bush Forever (Government of Western Australia, 2000) are critically endangered (English, 2001). A critically endangered ecological community is found to be facing an extremely high risk of total destruction in the immediate future.

The two critically endangered communities are the Floristic Community Types 3c and 20c (Gibson *et al.*, 1994).

Floristic Community Type 3c – *Corymbia calophylla – Xanthorrhoea preissii* woodlands and shrublands. Safstrom and Taman (1999) estimate that this community occupied 27ha in Location 23953. In addition it occurs in Location 6955 and Location 11764. The dominant plants are *Corymbia calophylla* with occurrences of *Eucalyptus wandoo* subsp. *wandoo* and *Xanthorrhoea preissii.* This community occurs on soil defined by the intersection of the Guildford and Forrestfield Units of the Ridge Hill Shelf.

Floristic Community Type 20c – Eastern shrublands and woodlands. Safstrom and Taman (1999) estimate that 40ha of the 66.77ha in reserve 23953 is of this community. In addition it extends into Location 11314 and the cemetery reserve 6955. It also includes taxa more common on the scarp, *Templetonia biloba* and *Neurachne alopecuroidea*, a taxon more typical of the marri-wandoo woodlands of the heavy soils (Gibson *et al.*, 1994). This community is identified by the presence of *Banksia attenuata* and *B. menziesii* and is located in the Forrestfield Unit of the Ridge Hill Shelf. This community includes the following vegetation units identified during the survey:

Low Woodland of *Banksia menziesii* and *Banksia attenuata*; and

Open Forest of *Eucalyptus marginata* subsp. *thalassica.*

The original area of the Foothills Landform Element was 11,367ha, now 1,023ha remains representing 9% of the original in the Swan Coastal Plain. Therefore any vegetation community within this landform should be retained, as the target to be achieved is at least

10% of the original extent of the vegetation although the proposed protection in Bush Forever is 5% (Bush Forever, Government of Western Australia, 2000).

4.3 Regional Assessment

Floristic Community Type 20c comprises most of the bushland of the Midland Cemetery. This community type is known from two areas, the Talbot Road Bushland and Bushmead Rifle Range. About 79ha of this community type is known to remain. About 38ha is vested with the Commonwealth of Australia (Bushmead Rifle Range), 36ha is vested with the Shire of Swan and about 5ha is unvested. Regionally it is extremely significant. Floristic Community Type 3c is more widespread although it is estimated there is approximately 41ha of the community remaining on seven widely separated remnants. Of this 41ha, 4ha occur on land vested in the Commonwealth Government, 27ha vested in Shire Councils, 10ha in unvested reserves or vacant crown land and about 0.3ha in a Nature Reserve.
Both of the above are listed as Threatened Ecological Communities by the Department of Conservation and Land Management (English, 2001) and Environment Australia (2001).

4.4 Linkage to Other Bushland Areas

There is no adjacent bushland to this area. Talbot Road Bushland is included as part of the regionally significant fragmented bushland/wetland linkage. This linkage extends from the bushland corridor at the base of the foothills, past Talbot Road Bushland to the largely contiguous bushland corridor along the Great Northern Highway. It is therefore an important part/link of this corridor. It is also part of Greenways 45 (Tingay, Alan and Associates, 1998) linking with lower Jane Brook and Whiteman Park.
Consideration should therefore be given to extending the Talbot Road Bushland to include the cemetery bushland and adjacent vacant crown land thus conserving this total, unique bushland.

4.5 Commonwealth Biodiversity Legislation

None of the taxa recorded in the Midland Cemetery bushland are listed by Environment Australia as endangered.
Two of the Floristic Community Types (Appendix E, Figure 4) recorded at Midland Cemetery are listed as Threatened Ecological Communities by Environment Australia under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) (Environment Australia, 2001). Prior to the establishment of the EPBC Act threatened species and ecological communities were listed under the Endangered Species Protection Act 1992. Taxa or Communities listed under the original act will retain their classification, although vulnerable and extinct have now been added under the 1999 Act to the original endangered under the 1992 Act. As both these Floristic Community Types were listed in Schedule 2 of the Endangered Species Protection Act they are classified as "Endangered".
In this schedule the listing is as below:

- ***Corymbia calophylla – Xanthorrhoea preissii* Woodlands and Shrublands of the Swan Coastal Plain.** It is characterised by woodlands with common taxa including *Corymbia calophylla, Xanthorrhoea preissii* and *Dryandra nivea* with *Eucalyptus wandoo* subsp. *wandoo* as an occasional dominant. It occurs on the driest soils and on sites with lowest rainfall compared to the other three *Corymbia*

calophylla communities that occur on the heavy soils of the eastern Swan Coastal Plain. Introduced species include *Briza maxima* and *Romulea rosea* but weed levels in most are quite low. The mean richness for the plots surveyed is 48 taxa per $100m^2$. The remaining seven patches are threatened by clearing, weed invasion, too frequent fires, hydrological changes due to clearing and draining. Originally this community would have extended from Bullsbrook to Waterloo but has been reduced by at least 97%.

- **Shrubland and Woodlands of the eastern Swan Coastal Plain.** It is characterised by shrubland or woodland of *Banksia attenuata* and *B. menziesii*, sometimes with *Allocasuarina fraseriana*, over diverse shrub and herb layers. It occurs on soils mapped as the Forrestfield Unit of the Ridge Hill Shelf, which occur as undulating spurs at the foot of the scarp, and is dominated by gravelly and sandy soils. The mean richness for the plots surveyed is 64 taxa per 100 m^2. The two remaining patches are under threat by weed invasion, hydrological changes due to clearing and draining, too frequent fires and dieback resulting from *Phytophthora cinnamomi*. The Forrestfield Unit consists of a one to three kilometre wide belt between the Darling and Gingin Scarps and Darling Fault, from Walyunga National Park to Harvey, so it likely to have always been rare prior to human intervention.

Only ecological communities classified by English (2001) as 'critically endangered' are listed under the EPBC Act as 'endangered'.
If development of the cemetery is to be continued a referral will need to be made to Environment Australia on a special form. If it is determined there will be a significant impact on the viability of the Threatened Ecological Community a Commonwealth environmental impact assessment and approval will be required.
In addition the Talbot Road Natural Bushland, comprising Reserve A23953 Swan Location 5524, Reserve 6955 Location 11313 and Swan Location 11314 and 11764 is included on the Register of the National Estate Database (Australian Heritage Commission, 2001). Two areas were excluded:

- the landscaped part of the cemetery and
- the degraded sand/gravel pit.

Owners of registered places are not required to change the way in which they manage, maintain, or dispose of their property. The Talbot Road bushland is listed by the National Trust (WA), which carries no legal requirements for owners.

4.6 Vegetation Community Viability

Midland Cemetery has been used for decades and yet most of the remnant vegetation is in excellent condition so the vegetation has already existed with development for many years.

4.6.1 Important Vegetation Communities

All of the Midland Cemetery bushland, except for the old sand/gravel pit has vegetation communities listed as Threatened Ecological Communities by Environment Australia under the Environment Protection and Biodiversity Conservation Act 1999 (Environment Australia, 2001). Therefore the bushland at Midland cemetery is extremely important. In

addition three Priority 3 taxa (Government of Western Australia, 2000) were recorded from the bushland and one plant regarded as significant in Bush Forever (Government of Western Australia, 2001).

4.6.2 Size of Communities

The communities are of reasonable size but if combined with Talbot Road Bushland the total area of both Floristic Community Types would be enhanced and increased to an even larger area.

4.6.3 Condition of Communities

The vegetation units described for the Midland Cemetery bushland are predominantly in very good to excellent condition. The edges of tracks and roads are degraded but with effort could be readily restored to a very good condition. The sections of vegetation units bounding the degraded sand/gravel pit recorded more disturbance than further away but again this "edge effect" should be readily restored once a decision is made on the final use of the old pit.

Although there is an avenue of *Pinus radiata* on the eastern side of the current cemetery adjacent to the bushland, there were no seedlings or younger plants of this taxon recorded in the bushland. However *P. radiata* is rated by the Department of Conservation and Land Management (1999) as a moderate environmental weed that can invade into the bushland so monitoring should occur and any young plants seen should be removed.

Nearly 45% of the weeds recorded in the first survey were from the old sand pit with 20 of the 42 weed taxa recorded in the bushland. Although 7 weed taxa are listed as high category environmental weeds, as having invasive and impacts on the vegetation these are scattered except along the tracks and not dominant in the bushland.

4.6.4 Threatening Processes

Only the large sand pit that is now used as a car dump fragments the vegetation communities. Children have made a BMX trail through the pit, which appears well used. The vegetation survey was undertaken during the school holidays and a group of about 10 children under the supervision of an adult were riding in the area. It is now used by cemetery staff as a dump as several old headstones were dumped and by local residents for the dumping of rubbish. If the dump is to be closed and used for burials an alternative dump must be found as any excess soil, stone, grass and other waste must not be dumped in the bushland. As the area is beyond rehabilitation to the original vegetation it would be better suited to burials/memorials after levelling.

Tracks also dissect the bushland allowing weeds to be introduced into the area. The number of tracks should be rationalised although when the survey was undertaken several people were enjoying using them for walking. The tracks that are closed, must be rehabilitated using seed collected from the adjacent bushland and appropriate for the vegetation unit. Safstrom and Taman (1999) have a track rationalisation plan which should be followed as it still allows access through the bushland to and from all areas.

Fires are a threatening process as the natural vegetation cover is opened allowing weeds to become established. The north west corner had been burnt within the last 5 years, yet the vegetation had recovered very well with few weed taxa persisting. If the vegetation is kept in good condition weeds will be reduced considerably.

Dieback is present in the area although it did not appear to be active. Safstrom and Taman (1999) have mapped the presence of dieback in the area from information sourced in a CALM survey undertaken in 1998. All of the Floristic Community Type 20c, Eastern shrublands and woodlands, were recorded as being infested with dieback and Floristic Community Type 3c as uninterpretable. Taxa in the family Proteaceae are susceptible to dieback as well as jarrah and *Xanthorrhoea* species. There were a few tall dead jarrah trees noted on the south west corner but most appeared quite healthy. Very few *Banksia attenuata* and *B. menziesii* were recorded dead, but most of the deaths could be put down to fire. Also throughout metropolitan Perth there have been many deaths of trees, including those not susceptible to dieback (e.g. marri) due to the recent, long dry and hot summer. However, as dieback has been recorded, a dieback management plan should be prepared and tracks which pass through the low-lying wetter areas should be closed. If it is not feasible to close tracks then signs should be erected informing those who walk the tracks about the presence of dieback and how it will affect the bushland. In addition signs should inform those using the tracks on the care they should take to ensure minimal spread of dieback Dieback is a major threat to this bushland.
The formal cemetery is placed close to the southern boundary of the reserve. There is a naturally vegetated strip acting as a buffer between the formal cemetery and residences, 40m wide along Blanchard Road and approximately 60m wide along Myles Road. This should be retained as it provides an aesthetic setting for the residents in both these roads and also for the cemetery visitors.

4.7 Assessment of Protection Values

The assessment of protection values takes into account several factors including:

- presence of Threatened Ecological Communities;
- presence of rare, priority or signficant flora;
- vegetation condition as assessed in the report;
- variation in the vegetation units recorded; and
- the potential to rehabilitate degraded areas.

Table 11. Assessment of Protection Values for Vegetation at Midland Cemetery

SCALE	DESCRIPTION
1	Includes Threatened Ecological Community by Environment Australia (EPBC Act) and/or CALM (English, 2001); Presence of Rare or Priority Flora; vegetation in Excellent to Pristine Condition.
2	Scale 1 but where vegetation is Good to Very Good; may include Significant Taxa.
3	Area degraded but can with effort be restored to a good or better condition. The vegetation community may be common but it is important as a buffer to Protection Value 1 and 2 areas.
4	Includes areas that are not necessary as a buffer and that are in Poor condition.
5	Developed. Vegetation severely altered.

All the bushland, except the sand/gravel pit at Midland Cemetery, is regarded as having the highest protection value due to all the vegetation being listed as Threatened Ecological Communities by Environment Australia under the Environment Protection and Biodiversity Conservation Act 1999. To consider using the sand/gravel pit for

cemetery expansion requires a linkage between the current cemetery and this new area, so although this vegetation is in good, this report has suggested that a small area may be used to connect the two areas. These are described in Table 11 and illustrated in Appendix E, Figure 5.

4.7.1 Protection Value 1

At Midland Cemetery all the area is realistically of high protection value due to the two ecological communities present being listed as Threatened Ecological Communities by Environment Australia under the Environment Protection and Biodiversity Conservation Act 1999. This indicates that the vegetation communities are unique and therefore essential to be conserved.
Other considerations are the presence of rare and priority flora, condition of the bushland, linkage with other bushland areas and distribution within the cemetery. The north west and north east corners need to be protected due to the presence of Priority 3 flora, *Isopogon drummondii, Lambertia multiflora* var. *darlingensis* and *Synaphea acutiloba*.
Edges of the tracks and the roads are typically degraded but the remainder of the vegetation is very good to excellent and all should be readily rehabilitated.

4.7.2 Protection Value 2

For the cemetery to be able to expand additional land will be required. The old sand/gravel pit would be the best area for future expansion as it is currently degraded, but there is a stretch of Banksia Woodland between the current cemetery and this area. To enable continuity between the two sections of the cemetery a road or other connection will be necessary between the two areas. Funeral processions must have access into this potential expansion requiring at least a hard surface road, with sufficient area of on either side for mourners to walk.
If it is decided to expand as indicated above an application will need to be made to the Commonwealth Environment Minister for approval to remove some bushland. This will allow the current section of the cemetery to connect with this proposed extension.
If the sand/gravel pit was to be used for additional burials a natural vegetation corridor will be required to link the bushland of Location 11764 with the remaining bushland in the cemetery. It is important to ensure that Location 11764 does not become a small isolated patch of bushland. This corridor will need to be at least 40m wide and must be rehabilitated as part of the extension agreement.

4.7.3 Protection Value 3

The south west corner of the Open Forest of *Eucalyptus marginata* subsp. *thalassica* over a Tall Shrubland over a Low Shrubland is degraded. The remainder of the vegetation unit is in good condition. Although this area is more degraded than the areas included in Protection Values 1 and 2 there is only a limited amount of this vegetation unit in the cemetery bushland and should be retained. It also acts as a very important buffer between the road and the cemetery and forms a pleasant backdrop for the graves.
The other areas nominated also requires rehabilitation and it is essential that this is undertaken as a condition of expansion into the old sand/gravel pit. There is a good tree canopy but the understorey is degraded. Most of the weeds are readily removed with a

selective herbicide, but once this occurs the area must be seeded with appropriate species for that particular vegetation unit.

4.7.4 Protection Value 4

These areas should also be protected but they are highly degraded with very few or no native understorey taxa present. They do have the potential with effort to be restored to a reasonable vegetation condition but it will require time and persistent effort. However it is recommended that this be considered.

4.7.5 Protection Value 5

The degraded area of the old sand/gravel pit, which is reasonably extensive in area and the cemetery, are the only section of low protection. An area to the east of the current graves has recently been cleared and pegged out for burials allowing for limited expansion. An alternative entrance from Blanchard Road could be considered as this unofficial entrance was previously used by people entering the sand/gravel pit to dump cars and now by children for their BMX area. This would not be satisfactory for the continuity between the different areas of the cemetery, but could be considered an alternative to a connection between the current cemetery and the sand/gravel pit if this option proceeds.

4.8 Vegetation Management Issues

Vegetation Management Issues are discussed below on the assumption that only the old sand/gravel pit and the current burial area undergo further development pending approval of any application to the Commonwealth Minister for the Environment to utilise parts of the bushland that is protected under the EPBC Act (1999).

4.8.1 General Issues

- Make a decision on the future of the old sand/gravel pit. This is the only area acceptable for the future extension of the cemetery
- Obtain permission from the Commonwealth Minister of the Environment if any of the vegetation is to be disturbed as both the Floristic Community Types in the Midland Cemetery bushland are listed as Endangered by Environment Australia.
- Dieback will continue to be an issue so monitoring of the area must occur on a regular basis. Training some of the volunteers involved with The Friends of Talbot Road Bushland and enlisting their assistance could achieve this.
- Ensure that no further exotic plants are planted in the areas adjacent to the bushland. Exotic plants include all plants not naturally occurring within that particular vegetation unit.

4.8.2 Short Term issues

- Commence the closure of unnecessary tracks through the bushland as illustrated in Safstrom and Taman (1999). This can be achieved by the placement of bollards across the closed tracks. An article in the local paper explaining the importance of the vegetation and why the tracks are to be closed should occur. The Friends of Talbot Road Bushland should

be approached for agreement on these closures. This group often has publicity in the local paper.

- Treat the edges of the closed tracks for weeds, using acceptable techniques and preferably undertaken by someone who has sympathy for the vegetation.
- Undertake maintenance of the fence around Midland Cemetery on Blanchard and Myles Roads.
- Remove or crush car bodies and other rubbish from the pit prior to landscaping.
- Develop a fire management plan and ensure that all staff are trained in the required techniques.
- Develop a dieback management plan and ensure all staff understand the importance of the plan and its management.

4.8.3 Medium Term Issues

- Removal of weeds and rehabilitation of degraded areas around the perimeter of the vegetation backing on to the houses especially adjacent to the compensation basin in Natham Road.
- Continue to close and rehabilitate tracks.
- Combine all the bushland of the Midland Cemetery and Talbot Road Bushland into one area, preferably an A-class Reserve.
- Commence the landscaping or rehabilitation of the old sand/gravel pit.

4.8.4 Long Term Issues

- Continue weed removal and ensure full rationalisation of tracks.
- Continue monitoring for spread of dieback. If additional dieback areas identified, ensure immediate treatment.
- Prepare information on the uniqueness of the vegetation to be distributed to adjacent residences and visitors to the bushland.

5 DISCUSSION

The bushland at the Midland Cemetery is unique and in excellent condition with only the current cemetery and the old sand pit being completely degraded. The perimeter edges, adjacent to residences, tracks and roads, are also degraded and should be rehabilitated back to the original vegetation unit.

Both the Floristic Community Types, 3c and 20c are listed as Endangered Vegetation Communities under the EPBC Act (1999). To have the vegetation of the total area of the Talbot Road Bushland (including the adjacent reserves) classified as endangered must be unique, making this bushland special.

This means no further clearing of the Midland Cemetery bushland should occur. An area to the east of the current cemetery was recently cleared and pegged for burial sites. Permission must be obtained from the Commonwealth Minister for the Environment before any further clearing can occur. It would be reasonable to seek approval to clear a small section between the current burial area and the sand/gravel pit, to keep all burial and memorial sites contiguous and accessible from the main entrance, as an arguable case.

Dieback has been identified as a major issue for the bushland. A survey undertaken by CALM in 1998 indicated that all of Floristic Community Type 20c is infected and that Floristic Community Type 3c could not be assessed. Monitoring for dieback should occur on a regular basis to ensure that any new infections are noted and treated.

The presence of three Priority 3 taxa, *Lambertia multiflora* var. *darlingness, Isopogon drummondii* and *Synaphea acutiloba* further adds to the biological asset of the area. All three taxa belong to the family Proteaceae, a family very susceptible to dieback, so monitoring of these taxa should occur. This should be undertaken each time the area is monitored for dieback.

A Friends of Talbot Road Bushland is already active with work being undertaken on the frogs in the area. By seeking support from this group it is likely that funds could be attracted to rehabilitate tracks, undertake weed removal, conduct dieback monitoring and treatment etc.

Consideration should be given to combining the Midland Cemetery bushland with the Talbot Road Bushland to form, one large A-class Reserve. This would ensure the continuation of this unique bushland and may encourage the members of the Friends of Talbot Road Bushland to become involved in the monitoring and rehabilitation of the area.

Tracks should be rationalised using the plan suggested by Safstrom and Taman (1999). This will ensure that access through the bushland is available to all. Vehicle tracks are essential for maintenance and fire management and these have also been considered in that plan. Once the tracks are closed weeds should be removed and the area rehabilitated with seed collected from the Midland Cemetery bushland and relevant to that particular vegetation unit.

Fire will continue to be a problem in the area. An education program for all the residents within a 1km radius of the bushland should be provided with information on the destructive effect of fire on the vegetation. A fire management plan must be prepared and staff at the cemetery educated in its implementation. This plan should be drawn up

with the assistance of the local fire brigade, as they will be the ones required to fight any large fire.

Dogs must be kept on a leash when walked through the bushland and notices stating this should be erected at all bushland entrances.

As the old sand/gravel pit is degraded and would be an impossible task to rehabilitate back to the natural vegetation, it is recommended that this area be utilised for additional cemetery area. However to allow access from the current cemetery area through to this area a road connection will be required. It is recommended that permission be sought from Commonwealth Minister for the Environment to allow some of Floristic Community Type 20c be removed.

Informative signs and/or literature should be available on aspects of the vegetation communities present, the flora and fauna of the area. The Friends of Talbot Road Bushland often have articles in the local paper on the work they are doing and the assistance provided by fauna specialists in monitoring the fauna of the area. If they are encouraged to assist with aspects of the Midland Cemetery bushland they should be encouraged and assisted by Cemetery and Shire of Swan staff with the publication of similar articles.

6 RECOMMENDATIONS

Due to the uniqueness and the very good to excellent condition of this bushland the main recommendation is that the cemetery and old sand/gravel pit be excised as a separate reserve and that the remaining section of the cemetery and other locations become one large Talbot Road Nature Reserve. This should be given A-class classification and vested in the NPNCA (Markey, 1997). However the excision of the old sand/gravel pit occurs linkage must be maintained between Location 11314 and the remainder of the bushland. This can be achieved by a corridor at least 40m wide, which is rehabilitated with the appropriate taxa along Blanchard Road.

The edge of the cemetery that abuts with the bushland must only have taxa native to that vegetation community planted, however gardens with exotic taxa can be planted away from the boundaries, as is the current situation with the old cemetery.

The bushland must be managed and maintained for its;

- unique endangered vegetation communities
- priority taxa within the area and
- as one entity, either by the City of Swan or CALM.

Continued monitoring on a regular basis must occur;

- of the permanent quadrats established during this and previous surveys and
- for the presence of new dieback occurrences by professional dieback qualified personnel.

Interpretation should be developed;

- for major entrances as at other bushland reserves,
- stating all dogs must be on leads,
- as informative signposting as occurs at CALM areas,
- as interpretative information and sent to schools for their use prior to visiting the reserve and
- as regular media stories about the uniqueness of the area and the continuing conservation work being undertaken.

Action plans should be developed for;

- fire prevention and management, in conjunction with the local Fire Brigade and CALM,
- weed control techniques and methods in conjunction with a professional practitioner to ensure the correct spray and/or techniques are applied,
- rehabilitation methods, including ground preparation, seeding and planting techniques,
- seed collection and storage as well as
- monitoring and accepted treatment methods for dieback.

After a fire, the permanent quadrats in the fire devastated area(s) should be monitored for the plants germinating or regrowing especially the weed taxa. These results should then be compared to the original data collected when the quadrats were established.

The Friends of Talbot Road Bushland must be encouraged in their activities and assistance provided where appropriate.

7 REFERENCES

Australian Heritage Commission (2001). http://www.ea.gov.au

Beard, J.S. (1981). *Vegetation Survey of Western Australia, Swan.* University of Western Australia Press, Crawley

Bennett, E.M. (1993). *Common and Aboriginal Names of Western Australian Plant Species.* Wildflower Society of WA, Eastern Hills Branch, Glen Forrest

Biggs, E.R. and Wilde, S.A. (1980). *Geology, Mineral Resources and Hydrology of the Darling System, Western Australia.* Department of Conservation and Environment, Perth, Western Australia

Churchward, H.M. and McArthur, W.M. (1980). *Landform and Soils of the Darling System* In *Atlas of Natural Resources, Darling System, Western Australia.* Department of Conservation and Environment, Perth, Western Australia

Department of Conservation and Land Management (1999). *Environmental Weed Strategy for Western Australia*

English, V. (2001). List of Communities on CALM's Threatened Ecological Community data base

Environment Australia. (2001). http://www.erin.gov.au

Gibson, N., Keighery, B.J., Keighery, G.J., Burbidge, A.H., Lyons, M.N. (1994). *A Floristic Survey of the Southern Swan Coastal Plain.* Unpublished report for the Australian Heritage Commission prepared by the Department of Conservation and Land Management and the Conservation Council of Western Australia (Inc.)

Government of Western Australia. (2000). *Bush Forever.* Department of Environmental Protection

Grieve, B.J. (1998). *How to Know Western Austalian Wildflowers – Part II.* Univserity of Western Australia Press, Crawley

Government of Western Australia. (1998). *Perth's Bushplan.* Western Australian Planning Commission

Government of Western Australia.. (2000). *Bush Forever.* Department of Environmental Protection

Heddle, E.M., Loneragan, O.W., Havell, J.J. (1980). *Vegetation of the Darling System* In *Atlas of Natural Resources, Darling System, Western Australia.* Department of Conservation and Environment, Perth, Western Australia

Hussey, B.M.J., Keighery, G.J., Cousens, R.D., Dodd, J., Lloyd, S.G. (1997). *Western Weeds – A guide to the weeds of Western Australia.* Plant Protection Society of Western Australia

Keighery, G.J. and Keighery, B.J. (1993). *Floristics of Reserves and Bushland Areas of the Perth Region (System 6), Parts V-IX.* Wildflower Society of WA (Inc.), Nedlands

Keighery, B.J. and Trudgen, M.E. (1992). *The Remnant Vegetationof the Eastern Side of the Swan Coastal Plain.* Unpublished report to the Department of Conservation and Land Management for the National Estate Grants Program

Marchant, N.G., Wheeler, J.R., Rye, B.L., Bennett, E.M., Lander, N.S., Macfarlane, T.D. (1987). *Flora of the Perth Region.* Western Australian Herbarium

Markey, A. (1997). *A Floristic Survey of the Northern Darling Scarp.* Unpublished report to the Western Australian Department of Conservation and Land Management, Department of Environmental Protection and the Cosnervation Council of Western Australia (Inc.) for the Australian Heritage Commission, Canberra, ACT.

Meney, K.A. and Pate, J.S. (1999). *Australian Rushes.* University of Western Australia Press, Crawley

Peter Cala and Associates. (1997). *Midland Cemeteries, Master Planning Review.* Metropolitan Cemeteries Board

Safstrom, R. and Taman, L (1999). *Talbot Road Bushland Management Plan.* Unpublished report for the Friends of Talbot Road Reserve, Shire of Swan and Department of Conservation and Land Management

Tingay, Alan and Associates. (1998). *A Strategic Plan for Perth's Greenways – Final Report.* Prepared for Environment Australia, Ministry for Planning

Trudgen, M.E. (1991). *Vegetation Classification Scale* In National Trust (WA) 1003 Urban Bushland Policy. National Trust of Australia (WA), Wildflower Society of Western Australia (Inc.) and the Treee Society (Inc.) Perth, Western Australia

Van Der Moezel, P. (2000a) Correspondence in July 2000 to Metropolitan Cemeteries Board

Van Der Moezel, P. (2000b) Correspondence in November 2000 to Metropolitan Cemeteries Board

Western Australian Herbarium (2001). *FloraBase*. Department of Conservation and Land Management. http://www.calm.wa.gov.au/science/florabase.html

Western Australian Herbarium. (2001). *Max*. Department of Conservation and Land Management

APPENDIX A

List of taxa recorded from the Midland cemetery bushland

FAMILY	SCIENTIFIC NAME	COMMON NAME
ZAMIACEAE	*Macrozamia riedlei*	Zamia
POACEAE	**Arundo donax*	Giant reed (Bamboo)
	**Avena barbata*	Bearded oat
	**Briza maxima*	Blowfly grass
	**Ehrharta calycina*	Perennial veldt grass
	**Ehrharta longiflora*	Annual veldt grass
	**Eragrostis curvula*	African lovegrass
	**Pennisetum setaceum*	Fountain grass
	**Melinis repens*	Natal redtop
	Amphipogon turbinatus	
	Austrodanthonia sp.	
	Austrostipa ? pycnostachya.	
	Cyathotheca avenacea	
	Neurachne alopecuroidea	Foxtail mulga grass
CYPERACEAE	*Lepidosperma angustatum*	
	Lepidosperma leptostachyum	
	Lepidosperma scabrum	
	Lepidosperma squamatum	
	Lyginia barbata	
	Mesomelaena pseudostygia	
	Mesomelaena tetragona	Semphore sedge
	Schoenus brevisetis	
	Schoenus curvifolius	
	Tetraria octandra	
	Tricostularia neesii	
RESTIONACEAE	*Chordifex sinuosus*	
	Desmocladus fasciculatus	
	Desmocladus flexuosum	
	Hypolaena exsulca	
	Loxocarya cinerea	
ANTHERICACEAE	*Arthropodium preissii*	
	Caesia parviflora	
	Chamaescilla corymbosa	
	Johnsonia pubescens	Pipe lily
	Laxmannia ramosa	Branching lily
	Laxmannia sessiliflora subsp. *australis*	
	Laxmannia squarrosa	
	Sowerbaea laxiflora	
	Thysanotus manglesianus	
	Tricoryne elatior	
COLCHICACEAE	*Burchardia multiflora*	
	Burchardia umbellata	
DASYPOGONACEAE	*Calectasia cyanea*	
	Chamaexeros serra	
	Dasypogon bromeliifolius	Pineapple bush
	Dasypogon obliquifolius	

FAMILY	SCIENTIFIC NAME	COMMON NAME
DASYPOGONACEAE (cont)		Black gin
	Kingia australis	
	Lomandra caespitosa	
	Lomandra preissii	
	Lomandra sericea	
LILIACEAE	Liliaceae	
XANTHORRHOEACEAE	*Xanthorrhoea brunonis* subsp. *brunonis*	Grasstree
	Xanthorrhoea preissii	Balga
HAEMODORACEAE	*Anigozanthos humilis* subsp. *humilis*	Cats paw
	Anigozanthos manglesii subsp.*manglesii*	Red and green kangaroo paw
	Conostylis aculeata subsp. *aculeata*	Prickly conostylis
	Conostylis aurea	Golden conostylis
	Conostylis serrulata	
	Haemodorum laxum	Blood root
	Haemodorum simplex	
AMARYLLIDACEAE	**Amaryllis belladonna*	Belladonna lily
	**Narcissus tazetta*	Jonquil
IRIDACEAE	**Babiana angustifolia*	Baboon flower
	**Chasmanthe floribunda*	African cornflag
	**Freesia* hybrid	Freesia
	**Gladiolus caryophyllaceus*	Pink gladiolus
	**Moraea flaccida*	One leaf cape tulip
	**Romulea rosea*	Guildford grass
	Patersonia occidentalis	Purple flag
ORCHIDACEAE	*Caladenia* sp.	
	Cyanicula deformis	Blue orchid
	Orchid	
	Prasophyllum fimbria	Fringed leek orchid
	Prasophyllum parvifolium	Autumn leek orchid
	Prasophyllum sp	Greenhood
	Pterostylis vittata	Banded greenhood
	Thelymitra sp.	Sun orchid
CASUARINACEAE	*Allocasuarina humilis*	Scrub sheoak
PROTEACEAE	*Adenanthos cygnorum subsp. cygnorum*	Woolly bush
	Banksia attenuata	Slender banksia
	Banksia menziesii	Firewood banksia
	Conospermum stoechadis subsp. *sclerophyllum.*	Smoke bush
	Dryandra armata var. *armata*	Prickly dryandra
	Dryandra lindleyana	Couch honeypot
	Dryandra sessilis subsp. sessilis	Parrot bush
	Grevillea bipinnatifida subsp. *bipinnatifida*	Native Fuschia
	Hakea auriculata	

FAMILY	SCIENTIFIC NAME	COMMON NAME
PROTEACEAE (cont.)	*Hakea erinacea*	Hedgehog hakea
	Hakea incrassata	Marble hakea
	Hakea lissocarpha	Honey bush
	Hakea myrtoides	Myrtle hakea
	Hakea prostrata	Harsh hakea
	Hakea ruscifolia	Candle hakea
	Hakea stenocarpa	Narrow fruited hakea
	Hakea trifurcata	Two leaf hakea
	Hakea undulata	Wavy leaf hakea
	Hakea varia	Variable leaved hakea
	Isopogon drummondii	
	Lambertia multiflora subsp. *darlingensis*	Many flowered honeysuckle
	Persoonia angustiflora	
	Petrophile linearis	Pixie mops
	Petrophile macrostachya	
	Stirlingia latifolia	Blueboy
	Synaphea acutiloba	
	Synaphea gracillima	
	Xylomelum occidentale	Woody pear
LORANTHACEAE	*Nuytsia floribunda*	Christmas tree
AMARANTHACEAE	*Ptilotus manglesii*	Pompoms
MOLLUGINACEAE	*Macarthuria australis*	
LAURACEAE	*Cassytha flava*	Dodder laurel
	Cassytha racemosa	
FUMARIACEAE	**Fumaria capreolata*	White fumitory
BRASSICACEAE	**Raphanus raphanistrum*	Turnip weed
	**Ricinus communis*	Castor oil tree
DROSERACEAE	*Drosera ? menziesii*	Pink rainbow
	Drosera erythrorhiza	Red ink sundew
	Drosera macrantha	Bridal rainbow
	Drosera pallida	Pale rainbow
PITTOSPORACEAE	*Pronaya fraseri* var. *fraseri*	Eleagant pronaya
MIMOSACEAE	*Acacia applanata*	
	Acacia auronitens	
	Acacia huegelii	
	Acacia pulchella var. *pulchella*	Prickly moses
	Acacia saligna	Orange wattle
	Acacia sessilis	
	Acacia teretifolia	
PAPILIONACEAE	**Chamaecytisus palmensis*	Tagasaste
	**Lathyrus tingitanus*	Tangier pea
	**Lupinus angustifolius*	Narrowleaf lupin
	**Lupinus consentinii*	Western Australian blue lupin
	**Trifolium angustifolium*	Narrowleaf clover
	**Vicia sativa*	Common vetch
	Bossiaea eriocarpa	Common brown pea

FAMILY	SCIENTIFIC NAME	COMMON NAME
PAPILIONACEAE (cont.)	*Chorizema dicksonii*	Yellow eyed flame pea
	Daviesia horrida	Prickly bitter pea
	Daviesia incrassata subsp. *incrassata*	
	Daviesia triflora	
	Gompholobium aristatum	
	Gompholobium confertum	
	Gompholobium marginatum	
	Gompholobium tomentosum	Hairy yellow pea
	Hovea trisperma var. *trisperma*	Common hovea
	Jacksonia floribunda	Holly pea
	Jacksonia restioides	
	Jacksonia sternbergiana	Stinkwood
	Kennedia prostrata	Red runner
	Nemcia spathulata	
	Pultenaea ericifolia	
	Templetonia biloba	Horned templetonia
OXALIDACEAE	**Oxalis glabra*	Finger leaf oxalis
	**Oxalis pes-caprae*	Soursob
	**Oxalis purpurea*	Four o'clock
RUTACEAE	*Boronia ramosa* subsp. *anethifolia*	
	Philotheca spicata	Pepper and salt
MELIACEAE	**Melia azedarach*	Cape lilac
EUPHORBIACEAE	*Phyllanthus calycinus*	False boronia
ANACARDIACEAE	**Schinus terebinthifolia*	Japanese pepper
RHAMNACEAE	*Cryptandra arbutiflora*	
	Stenanthemum notiale	
STERCULIACEAE	**Malva parviflora*	Small flowered mallow
DILLENIACEAE	*Hibbertia huegelii*	
	Hibbertia hypericoides	Yellow buttercups
TAMARICACEAE	**Tamarix aphylla*	Tamarix
VIOLACEAE	*Hybanthus calycinus*	Wild violet
THYMELAEACEAE	*Pimelea imbricata*	
MYRTACEAE	*Baeckea camphorosmae*	Camphor myrtle
	Beaufortia purpurea	
	Calothamnus sanguineus	Silky leaved blood flower
	Calytrix flavescens	Summer starflower
	Corymbia calophylla	Marri
	Eremaea asterocarpa var. *asterocarpa*	
	Eremaea pauciflora	
	Eucalyptus marginata subsp. *thalassica*	Blue leaved jarrah
	Eucalyptus wandoo subsp. *wandoo*	Wandoo
	Hypocalymma angustifolium	Coconut ice
	**Leptospermum laevigatum*	Victorian teatree
	Melaleuca parviceps	
	Regelia ciliata	

FAMILY	SCIENTIFIC NAME	COMMON NAME
MYRTACEAE (cont.)	*Scholtzia involucrata*	Spiked scholtzia
HALORAGACEAE	*Glischrocaryon* sp.	Pop flower
APIACEAE	**Foeniculum vulgare*	Fennel
	Trachymene pilosa	Native parsnip
	Xanthosia candida	
	Xanthosia huegelii	
EPACRIDACEAE	*Andersonia lehmanniana*	
	Conostephium pendulum	Pearl flower
	Leucopogon propinquus	
	Leucopogon pulchellus	Beard heath
	Leucopogon sprengelioides	
	Lysinema ciliatum	Curry flower
BORAGINACEAE	**Echium plantagineum*	Paterson's curse
SOLANACEAE	**Solanum nigrum*	Black berry nightshade
SCROPHULARIACEAE	**Parentucellia latifolia*	Red bartsia
PLANTAGINACEAE	**Plantago lanceolata*	Ribwort plantain
RUBIACEAE	*Opercularia vaginata*	Dog weed
GOODENIACEAE	*Lechenaultia biloba*	Blue leschenaultia
	Scaevola canescens	Grey scaevola
	Scaevola repens var. *repens*	
STYLIDIACEAE	*Stylidium affine*	Queen triggerplant
	Stylidium amoenum	Lovely triggerplant
	Stylidium bulbiferum	Circus triggerplant
	Stylidium piliferum	Common butterfly triggerplant
	Stylidium repens	Matted triggerplant
	Stylidium ? piliferum	
ASTERACEAE	**Arctotheca calendula*	Capeweed
	**Conyza bonariensis*	Flaxleaf fleabane
	**Hypochaeris glabra*	Flatweed
	**Ursinia anthemoides*	Ursinia
	Lagenifera huegelii	Coarse lagenifera
	Olearia paucidentata	Autumn scrub daisy
	Pithocarpa pulchella	Beautiful pithocarpa

APPENDIX B

Taxa recorded from vegetation units

Abbreviation	Vegetation Description
BmBa	Low Woodland of *Banksia menziesii* and *Banksia attenuata* over an Open Low Heath over a Grassland/Sedgeland
Em	Open Forest of *Eucalyptus marginata* subsp. *thalassica* over a Tall Shrubland over a Low Shrubland over a Grassland/Sedgeland
CcXp	Woodland to Low Woodland of *Corymbia calophylla* over an Open Heath of *Xanthorrhoea preissii* over Grassland/Sedgeland dominated by *Mesomelaena pseudostygia*
Cc	Open Woodland of *Corymbia calophylla* over Open Low Heath over a Grassland/Sedgeland
Ew	Open Forest of *Eucalyptus wandoo* subsp. *wandoo* and scattered *Corymbia calophylla* over an Open Low Heath over an Open Grassland/Sedgeland
Degraded	Degraded Closed Herbland at the old sand/gravel pit.

Taxon/ Presence Absence	Vegetation Unit						
	BmBa	CcXp	Cc	Ew	Em	Degraded	Grand Total
Acacia applanata	1		1		1		3
Acacia auronitens	1						1
Acacia huegelii					1		1
Acacia pulchella var. *pulchella*	1	1	1	1			4
Acacia saligna		1					1
Acacia sessilis	1	1			1		3
Acacia teretifolia				1			1
Adenanthos cygnorum subsp. *cygnorum*	1				1		2
Allocasuarina humilis	1	1	1	1	1		5
**Amaryllis belladonna*						1	1
Amphipogon turbinatus	1	1	1		1		4
Andersonia lehmanniana			1				1
Anigozanthos humilis subsp. *humilis*			1				1
Anigozanthos manglesii subsp.*manglesii*	1	1	1		1		4
**Arctotheca calendula*						1	1
Arthropodium preissii				1			1
**Arundo donax*						1	1
Austrodanthonia sp.		1					1
Austrostipa ? pycnostachya.			1				1
**Avena barbata*						1	1
**Babiana angustifolia*					1		1
Baeckea camphorosmae			1				1
Banksia attenuata	1					1	2
Banksia menziesii	1						1
Beaufortia purpurea			1				1
Boronia ramosa subsp. *anethifolia*		1			1		2
Bossiaea eriocarpa	1	1	1		1		4
**Briza maxima*		1	1	1	1		4
Burchardia multiflora		1					1
Burchardia umbellata	1	1					2
Caesia parviflora		1					1
Caladenia sp.	1		1				2
Calectasia cyanea	1	1	1				3
Calothamnus sanguineus	1	1	1	1	1		5
Calytrix flavescens		1			1		2
Cassytha flava	1						1
Cassytha racemosa			1	1			2
**Chamaecytisus palmensis*					1	1	2
Chamaescilla corymbosa	1	1		1			3
Chamaexeros serra				1			1
**Chasmanthe floribunda*				1		1	2
Chordifex sinuosus	1	1			1		3
Chorizema dicksonii			1	1			2
Conospermum stoechadis subsp. *sclerophyllum*	1				1		2
Conostephium pendulum	1				1		2
Conostylis aculeata subsp. *aculeata*		1					1

Taxon/	Vegetation Unit						
Presence Absence	BmBa	CcXp	Cc	Ew	Em	Degraded	Grand Total
**Conyza bonariensis*			1				1
Corymbia calophylla	1	1	1	1	1	1	6
Cryptandra arbutiflora				1			1
Cyanicula deformis			1				1
Cyathotheca avenacea	1	1	1				3
Dasypogon bromeliifolius	1	1			1		3
Dasypogon obliquifolius	1						1
Daviesia incrassata subsp. *incrassata*	1	1	1				3
Daviesia horrida				1			1
Daviesia triflora	1						1
Desmocladus fasciculatus		1	1	1			3
Desmocladus flexuosum	1						1
Drosera ? menziesii		1					1
Drosera erythrorhiza	1		1				2
Drosera macrantha	1		1	1			3
Drosera pallida		1			1		2
Dryandra armata var. *armata*				1			1
Dryandra lindleyana	1	1	1	1	1		5
Dryandra sessilis			1		1		2
**Echium plantagineum*						1	1
**Ehrharta calycina*		1	1		1		3
**Ehrharta longiflora*			1		1	1	3
**Eragrostis curvula*		1	1			1	3
Eremaea asterocarpa var. *asterocarpa*	1						1
Eremaea pauciflora	1	1			1		3
Philotheca spicata	1	1			1		3
Eucalyptus marginata subsp. *thalassica*					1		1
Eucalyptus wandoo subsp. *wandoo*				1			1
**Foeniculum vulgare*						1	1
**Freesia* hybrid			1				1
**Fumaria capreolata*						1	1
**Gladiolus caryophyllaceus*	1	1	1	1	1		5
Glischrocaryon sp.	1						1
Gompholobium aristatum		1	1		1		3
Gompholobium confertum	1						1
Gompholobium marginatum			1				1
Gompholobium tomentosum	1	1			1		3
Grevillea bipinnatifida subsp. *bipinnatifida*				1			1
Haemodorum laxum	1	1	1	1	1		5
Haemodorum simplex		1					1
Hakea auriculata			1				1
Hakea erinacea		1		1			2
Hakea incrassata			1				1
Hakea lissocarpha			1	1			2
Hakea prostrata	1	1					2
Hakea stenocarpa		1					1

Taxon/	Vegetation Unit						
Presence Absence	BmBa	CcXp	Cc	Ew	Em	Degraded	Grand Total
Hakea trifurcata	1	1	1	1	1		5
Hakea undulata			1	1			2
Hakea varia		1					1
Hibbertia huegelii	1						1
Hibbertia hypericoides		1	1	1			3
**Moraea flaccida*		1					1
Hovea trisperma var. *trisperma*					1		1
Hybanthus calycinus	1				1		2
Hypocalymma angustifolium		1	1	1			3
**Hypochaeris glabra*		1					1
Hypolaena exsulca	1	1			1		3
Isopogon drummondii	1						1
Jacksonia floribunda	1				1		2
Jacksonia restioides	1						1
Jacksonia sternbergiana		1					1
Johnsonia pubescens			1				1
Kennedia prostrata	1		1		1		3
Kingia australis		1	1				2
Lagenifera huegelii				1			1
Lambertia multiflora subsp. *darlingensis*	1	1					2
Lathyrus tingitanus			1	1		1	3
Laxmannia ramosa				1			1
Laxmannia sessiliflora subsp. *australis*	1		1		1		3
Laxmannia squarrosa		1	1				2
Lechenaultia biloba	1		1				2
Lepidosperma angustatum			1				1
Lepidosperma leptostachyum	1	1	1	1			4
Lepidosperma scabrum					1		1
Lepidosperma squamatum		1		1			2
Leptospermum laevigatum						1	1
Leucopogon propinquus					1		1
Leucopogon pulchellus			1				1
Leucopogon sprengelioides		1					1
Liliaceae			1				1
Lomandra caespitosa		1		1			2
Lomandra preissii			1	1	1		3
Lomandra sericea		1					1
Loxocarya cinerea				1	1		2
**Lupinus angustifolius*						1	1
**Lupinus consentinii*		1				1	2
Lyginia barbata	1				1		2
Lysinema ciliatum	1						1
Macrozamia riedlei	1				1		2
Melaleuca parviceps				1			1
**Melia azedarach*						1	1
Mesomelaena pseudostygia	1	1	1		1		4

Taxon/	Vegetation Unit						
Presence Absence	BmBa	CcXp	Cc	Ew	Em	Degraded	Grand Total
Mesomelaena tetragona		1	1				2
**Disa bracteata*		1					1
**Narcissus tazetta*						1	1
Nemcia spathulata				1			1
Neurachne alopecuroidea		1	1	1			3
Nuytsia floribunda					1		1
Olearia paucidentata	1		1				2
Opercularia vaginata				1	1		2
Orchid				1	1		2
**Oxalis glabra*						1	1
**Oxalis pes-caprae*						1	1
**Oxalis purpurea*			1				1
**Parentucellia latifolia*						1	1
Patersonia occidentalis	1	1			1		3
**Pennisetum setaceum*				1			1
Persoonia angustiflora	1						1
Petrophile linearis	1				1		2
Petrophile macrostachya			1				1
Philotheca spicata			1				1
Phyllanthus calycinus				1			1
Pimelea imbricata			1				1
Pithocarpa pulchella			1	1			2
**Plantago lanceolata*						1	1
Prasophyllum fimbria	1						1
Prasophyllum parvifolium				1			1
Prasophyllum sp		1					1
Pronaya fraseri var. *fraseri*		1	1		1		3
Pterostylis vittata			1	1			2
Ptilotus manglesii				1			1
Pultenaea ericifolia				1			1
**Raphanus raphanistrum*						1	1
Regelia ciliata		1					1
**Melinis repens*		1					1
**Ricinus communis*						1	1
**Romulea rosea*		1	1	1		1	4
Scaevola canescens	1				1		2
Scaevola repens var. *repens*	1				1		2
**Schinus terebinthifolia*						1	1
Schoenus brevisetis	1	1			1		3
Schoenus curvifolius	1	1					2
**Solanum nigrum*						1	1
Sowerbaea laxiflora				1			1
Stenanthemum notiale	1						1
Stirlingia latifolia	1	1			1		3
Stylidium ? piliferum					1		1
Stylidium affine				1			1

Taxon/	Vegetation Unit						
Presence Absence	BmBa	CcXp	Cc	Ew	Em	Degraded	Grand Total
Stylidium bulbiferum			1	1			2
Stylidium piliferum			1				1
Stylidium repens			1		1		2
Synaphea acutiloba		1	1				2
Synaphea gracillima		1					1
Tamarix aphylla						1	1
Templetonia biloba	1	1	1	1	1		5
Tetraria octandra	1	1	1	1	1		5
Thelymitra sp.			1	1			2
Thysanotus manglesianus	1	1	1	1	1		5
Trachymene pilosa	1				1		2
Tricoryne elatior				1			1
Tricostularia neesii	1						1
**Trifolium angustifolium*				1		1	2
Unknown Monocotyledon					1		1
**Ursinia anthemoides*		1	1		1		3
**Vicia sativa*						1	1
Xanthorrhoea brunonis subsp. *brunonis*	1	1			1		3
Xanthorrhoea preissii	1	1	1	1	1		5
Xanthosia candida				1			1
Xanthosia huegelii	1						1
Xylomelum occidentale	1						1
Grand Total	**79**	**79**	**77**	**62**	**67**	**31**	**396**

APPENDIX C

Quadrat Data

FLORA DATA SHEETS

Project: MFP -	Date: 10th July 2001	Surveyors: EB &JB

Location: To the east of Myles Road at northern end of Midland Cemetery
M1

Aerial Photograph:N/A

DATUM:	Easting	Northing
Site 1	**50 409 397**	**647 2832**
Site 2		
Site 3		
Site 4		
Site 5		
Site 6		

Soil type:	**Rocks**: (average size)	**Outcropping**
Sand ✓ :silt : clay	**N/A**	Type and percentage **N/A**
Colour Grey		

Litter	**Topography:** Br; R; US; MS;	**Film No:**
Bark %; Leaves 5 %	LS; DL; MIC; MAC	
Twigs **5** %; Logs %	**Aspect: Mid slope**	**Photo No. 15**

Percentage cover of strata (for quadrat)
Trees 30 %; Shrubs >2m %; Shrubs 1-2m %; Shrubs <1m 55 %;
Herbs 30 %; Grasses/sedges 40 %; Bare Ground %

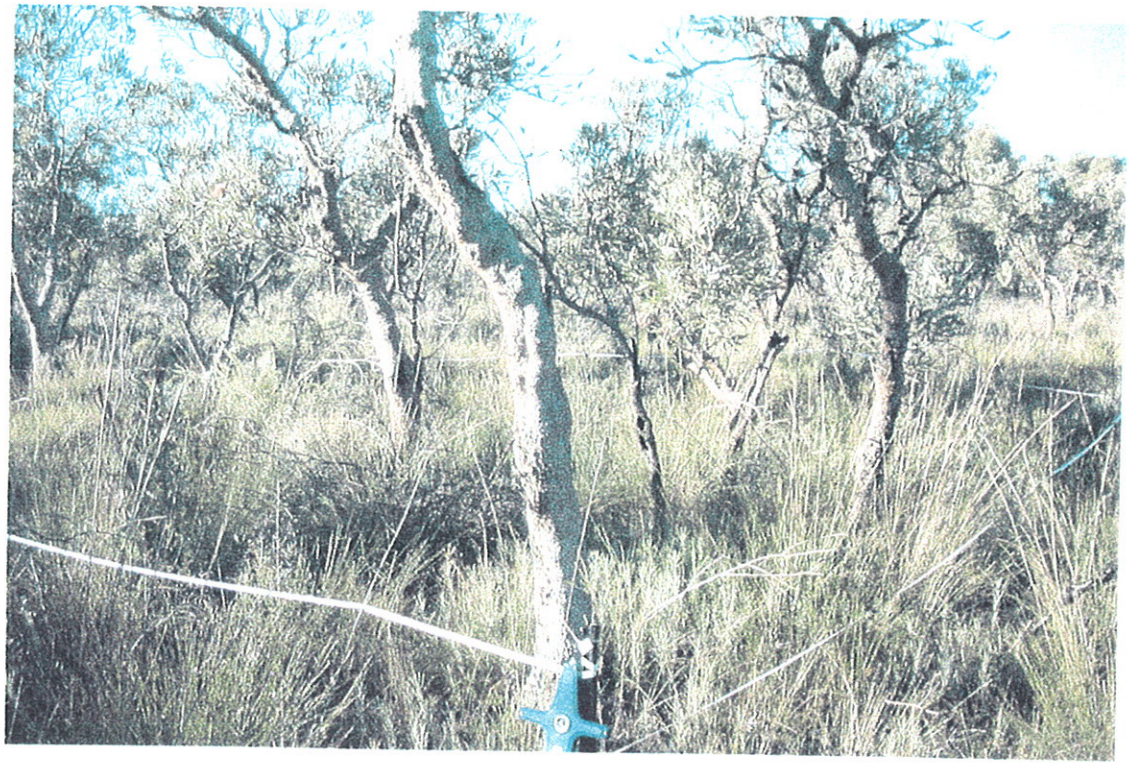
Vegetation Description:
Banksia Woodland with occasional marri over low shrubs, herbs and sedges

Condition:
1-2

Rare or Priority Flora:
Isopogon drummondii
Lambertia multiflora* var. *darlingensis

Other Notes: Dieback/Age since fire/ Predators/Erosion/Weeds/Tracks/Position in cemetery
Fire through the area about 2 years ago. Isopogon drummondii regrows from underground stock
Vegetation dense in very good condition

Colln No	Species	Fl Colour	Ht (cm)	% Cover	Rare/1°
	Acacia applanata		20	1	
M1-5	*Acacia sessilis*	yellow	45	1	
	Allocasuarina humilis		210	15	
	Amphipogon turbinatus		50	5	
	Anigozanthos manglesii subsp.*manglesii*		15	1	
	Banksia menziesii	pink	800	15	
	Bossiaea eriocarpa		55	5	
	Burchardia umbellata		50	<1	
	Caladenia sp.		15	<1	
M1-13	*Calothmanus sanguineus*		50	10	
	Chamaescilla corymbosa		5	3	
M1-12	*Chordifex sinuosus*	black	15	4	
	Conospermum stoechadis subsp. *sclerophyllum*		45	1	
M1-6	*Conostylis aurea*		30	5	
	Cyathotheca avenacea		120	20	
	Dasypogon bromeliifolius		15	<1	
	Dasypogon obliquifolius		50	15	
	Daviesia triflora		50	1	
	Desmodium flexuosum		10	10	
	Drosera erythrorhiza		T	3	
M1-9	*Drosera macrantha*		T	<1	
	Dryandra lindleyana		10	5	
M1-4	*Eremaea pauciflora*		50	15	
	Philotheca spicata		50	1	
	Gladiolus caryophyllaceus		30	<1	
	Glischrocaryon sp.		30	<1	
	Gompholobium confertum		30	5	
	Gompholobium tomentosum		50	<1	
	Haemodorum laxum		40	1	
	Hakea prostrata		30	1	
	Hakea ruscifolia		120	5	
	Hypolaena exsulca		50	1	
	Isopogon drummondii		70	3	P3
M1-7	*Jacksonia floribunda*		35	1	
M1-10	*Jacksonia restioides*		25	1	
	Lechenaultia biloba		40	3	
	Macarthuria australis		30	<1	
	Mesomelaena pseudostygia		50	20	
	Patersonia occidentalis		30	5	
	Petrophile linearis		50	2	
	Scaevola canescens		10	5	
	Scholtzia involucrata		50	1	
M1-8	*Stenanthemum notiale*		15	1	
	Stirlingia latifolia		50	1	
M1-2	*Thysanotus manglesianus*		T	<1	
M1-3	*Xanthosia huegelii*		30	1	



Quadrat M1

FLORA DATA SHEETS

Project: MFP -	**Date:** 10th July 2001	**Surveyors:** EB &JB

Location: To the east of M1
M2
Aerial Photograph:N/A

DATUM:	Easting	Northing
Site 1	**50 409 654**	**647 2817**
Site 2		
Site 3		
Site 4		
Site 5		
Site 6		

Soil type:	**Rocks**: (average size)	**Outcropping**
Sand **5** :silt **5** : clay Colour Grey	**N/A**	Type and percentage **N/A**
Litter Bark %; Leaves 60% Twigs %; Logs %	**Topography:** Br; R; US; MS; LS; DL; MIC; MAC **Aspect: Flat**	**Film No:** **Photo No. 26,27**

Percentage cover of strata (for quadrat)
Trees 0-15 %; Shrubs >2m %; Shrubs 1-2m %; Shrubs <1m 55 %;
Herbs 23 %; Grasses/sedges 57 %; Bare Ground 5 %

Vegetation Description:
Dense marri Woodland with occasional open areas. Dominant mid level Xanthorrhoea preissii over sedges

Condition:
1 Excellent

Rare or Priority Flora:
***Synaphea acutiloba* located to the NE of the quadrat**

Other Notes: Dieback/Age since fire/ Predators/Erosion/Weeds/Tracks/Position in cemetery
Beside a major track on the north side of the cemetery. Placed away from the track on the edge of dense marri and an open area. Area has had frequent fires as the marris were short.

Colln No	Species	Fl Colour	Ht (cm)	% Cover	Rare/1°
M1-21	*Acacia pulchella* var. *pulchella*		40	2	
	Acacia sessilis	yellow	40	3	
	Allocasuarina humilis		90	1	
	Angianthus manglesii		30	3	
	Austrodanthonia sp.		60	<1	
	Briza maxima		10	<1	
	Burchardia umbellata		70	<1	
	Caesia parviflora		40	<1	
	Calectasia cyanea	blue	30	1	
M2-1	*Conostylis aculeata* subsp. *aculeata*		40	5	
	Conostylis aculeata		30	5	
	Cordifex sinuosus	black	30	5	
	Corymbia calophylla		800	15	
	Cyathotheca avenacea		130	3	
	Daviesia decurrens	orange-red	50	5	
	Desmodium fasciculatus		15	5	
	Dryandra lindleyana		40	5	
	Ehrharta calycina		10	2	
	Gladiolus caryophyllaceus		30	1	
M2-4	*Gompholobium aristatum*		25	2	
	Gompholobium tomentosum		45	1	
	Haemodorum laxum		30	1	
	Hakea prostrata		50	3	
	Hibbertia hypericoides		50	5	
	Hypochaeris glabra		2	<1	
	Hypolaena exsulca	brown	45	2	
	Jacksonia sternbergiana		500	1	
	Kingia australis		30	<1	
M2-3	*Laxmannia squarrosa*		15	1	
M2-2	*Lepidosperma leptostachya*		30	1	
	Lepidosperma squamatum		70	2	
	Lomandra caespitosa		15	1	
	Mesomelaena pseudostygia		55	35	
	Mesomelaena tetragona		55	2	
	Prasophyllum sp		10	<1	
	Romulea rosea		20	5	
	Tetraria octandra		50	15	
	Thysanotus manglesianus		T	<1	
	Ursinia anthemoides		5	10	
	Xanthorrhoea brunonis subsp. *brunonis*		120	3	
	Xanthorrhoea preissii		150	30	

Quadrat M2

FLORA DATA SHEETS

Project: MFP -	Date: 10th July 2001	Surveyors: EB &JB

Location: On the south east of the Midland cemetery, behind the degraded area M3

Aerial Photograph:N/A

DATUM:	Easting	Northing
Site 1	**50 409 859**	**647 2413**
Site 2		
Site 3		
Site 4		
Site 5		
Site 6		

Soil type:	**Rocks**: (average size)	**Outcropping**
Sand ✓ :silt : clay Colour Grey over laterite	**<10cm**	Type and percentage **Laterite**

Litter	**Topography:** Br; R; US; MS; LS; DL; MIC; MAC	**Film No:**
Bark %; Leaves **10** % Twigs **20** %; Logs % %	**Aspect: W**	**Photo No. 32**

Percentage cover of strata (for quadrat)

Trees 10 %; Shrubs >2m %; Shrubs 1-2m %; Shrubs <1m 42 %;
Herbs 50 %; Grasses/sedges 47 %; Bare Ground **10** %

Vegetation Description:

Open marri woodland over shrubs on sand over laterite

Condition:

3. Near the edge of the degraded area between a track and sand pit.

Rare or Priority Flora:

Synaphea acutiloba

Other Notes: Dieback/Age since fire/ Predators/Erosion/Weeds/Tracks/Position in cemetery
Scattered rubbish through the area. to the east of the degraded area.
Burnt within the last 3 years.

Colln No	Species	Fl Colour	Ht (cm)	% Cover	Rare/1°
	Acacia pulchella var. *pulchella*		110	3	
	Angianthus manglesii		20	<1	
M3-9	*Austrostipa sp.*		45	1	
	Baeckea camphorosmae		40	1	
M3-2	*Beaufortia purpurea*		60	2	
	Caladenia sp.		5	<1	
	Chorizema dicksonii		40	1	
M2-1	*Conostylis aculeata* subsp. *aculeata*		15	1	
	Corymbia calophylla		1000	10	
	Desmocladus fasciculatus		20	5	
	Drosera erythrorhiza		2	<1	
	Ehrharta longiflora		5	1	
	Eragrostis curvula		70	1	
	Freesia hybrid		10	30	
M2-4	*Gompholobium aristatum*		70	30	
	Gompholobium marginatum		30	<1	
	Haemodorum laxum		20	1	
	Hakea lissocarpha	white/pink	80	1	
	Hakea trifurcata		120	10	
	Hibbertia hypericoides		40	2	
	Hypocalymma angustifolium		60	1	
M3-7	*Johnsonia pubescens*		20	<1	
	Lathyrus tingitanus		T	<1	
M3-3	*Laxmannia ramosa*	white	30	10	
M3-8	*Laxmannia squarrosa*	white	15	1	
M3-6	*Lepidosperma leptostachyum*	brown	30	5	
M3-5	*Leucopogon pulchellus*	white	45	<1	
	Liliaceae		30	5	
	Lomandra preissii	white/purple	40	1	
	Mesomelaena pseudostygia	black	70	2	
	Mesomelaena tetragona		50	15	
	Neurachne alopecuroides		10	15	
	Oxalis purpurea		2	5	
	Philotheca spicata		110	1	
M3-4	*Pimelea imbricata*		45	1	
	Romulea rosea		40	2	
	Stylidium amoenum		5	<1	
	Stylidium bulbiferum		5	<1	
	Stylidium piliferum		5	<1	
M3-1	*Synaphea acutiloba*	yellow	30	10	P3
	Templetonia biloba		30	<1	
	Tetraria octandra		30	10	
	Thysanotus manglesianus		T	<1	
	Xanthorrhoea preissii		50	<1	

Quadrat M3

FLORA DATA SHEETS

Project: MFP -	Date: 10th July 2001	Surveyors: EB &JB

Location: To the north of Blanchard Road at the eastern end of the cemetery
M4

Aerial Photograph:N/A

DATUM:	Easting	Northing
Site 1	**50 409 895**	**647 2339**
Site 2		
Site 3		
Site 4		
Site 5		
Site 6		

Soil type:	**Rocks**: (average size)	**Outcropping**
Sand **5** :silt **5** : clay Colour Dark grey, sandy loam	**>10cm**	Type and percentage **Laterite**
Litter Bark **5** %; Leaves **60%** Twigs **5** %; Logs %	**Topography:** Br; R; **US**; MS; LS; DL; MIC; MAC **Aspect: WSW**	**Film No:** **Photo No. 33**

Percentage cover of strata (for quadrat)
Trees 45 %; Shrubs >2m %; Shrubs 1-2m %; Shrubs <1m 45 %;
Herbs 20 %; Grasses/sedges 35 %; Bare Ground %

Vegetation Description:
Eucalyptus wandoo subsp. wandoo with scattered marri over shrubs and sedges

Condition:
1-2

Rare or Priority Flora:

Other Notes: Dieback/Age since fire/ Predators/Erosion/Weeds/Tracks/Position in cemetery
Burnt recently.

Colln No	Species	Fl Colour	Ht (cm)	% Cover	Rare/1°
	Acacia pulchella var. *pulchella*		90	2	
	Briza maxima		10	<1	
	Calothamnus sanguineus		40	8	
	Chamaescilla corymbosa		5	8	
	Corymbia calophylla		1000	5	
	Daviesia horrida		55	1	
	Desmocladus fasciculatus		15	5	
M4-1	*Drosera macrantha*		T	<1	
	Dryandra armata var. armata	yellow	50	10	
	Dryandra lindleyana		30	10	
	Eucalyptus wandoo subsp. *wandoo*		1200	40	
	Gladiolus caryophyllaceus		15	2	
	Hakea lissocarpha	white/pink	70	15	
	Hakea trifurcata		250	10	
	Hibbertia hypericoides		45	2	
	Hypocalymma angustifolium		35	3	
	Lagenifera huegelii		5	<1	
	Laxmannia ramosa		25	10	
	Lepidosperma leptostachyum	blown	50	8	
	Lepidosperma squamatum		55	2	
	Lomandra caespitosa		10	1	
	Lomandra preissii	cream.purple	45	2	
M4-3	*Loxocarya cinereum*		15	5	
	Nemcia spathulata		55	2	
	Neurachne alopecuroides		5	5	
	Opercularia vaginata		10	<1	
	Phyllanthus calycinus		45	2	
M4-2	*Prasophyllum parvifolium*		25	<1	
	Pterostylis vittata		35	3	
	Ptilotus manglesii		10	1	
	Romulea rosea		15	5	
M4-4	*Sowerbaea laxiflora*		20	5	
	Stylidium affine		20	1	
	Stylidium bulbiferum		5	5	
	Tetraria octandra		45	15	
	Thelymitra sp.		20	<1	
	Thysanotus manglesianus		T	<1	
	Tricoryne elatior		10	<1	
	Xanthorrhoea preissii		70	6	
	Xanthosia candida		30	5	

Quadrat M4

FLORA DATA SHEETS

Project: MFP -	Date: 10th July 2001	Surveyors: EB &JB

Location: To the east of Myles Road at southwest end of Midland Cemetery M5

Aerial Photograph:N/A

DATUM:	Easting	Northing
Site 1	**50 409 414**	**647 2325**
Site 2		
Site 3		
Site 4		
Site 5		
Site 6		

Soil type:	**Rocks**: (average size)	**Outcropping**
Sand ✓ :silt : clay Colour Brownish grey	**N/A**	Type and percentage **N/A**
Litter Bark %; Leaves **60** % Twigs **3** %; Logs %	**Topography:** Br; R; US; MS; **LS**; DL; MIC; MAC **Aspect: Flat**	**Film No:** **Photo No. 15**

Percentage cover of strata (for quadrat)
Trees 45 %; Shrubs >2m %; Shrubs 1-2m 15 %; Shrubs <1m 35 %;
Herbs 10 %; Grasses/sedges 90 %; Bare Ground **5** %

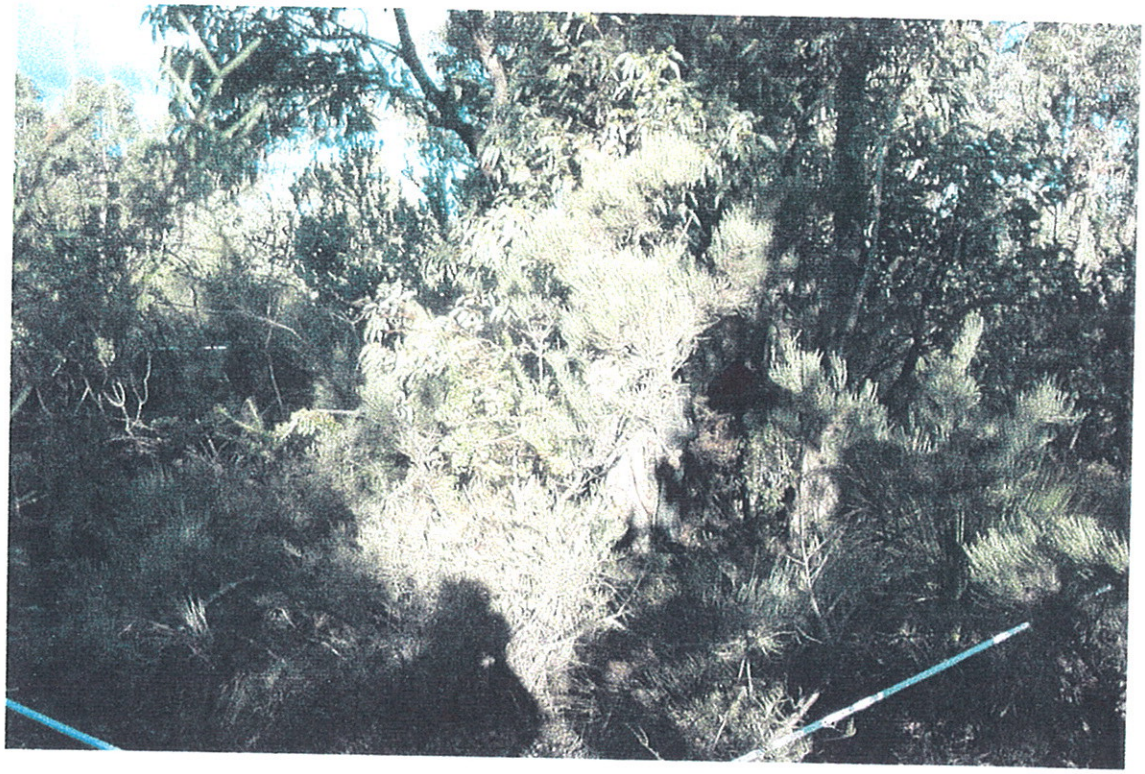
Vegetation Description:
Jarrah with scattered marri Woodland over tall shrubs and sedges

Condition:
3-4

Rare or Priority Flora:
Outside of the quadrat about 10 plants of *Lambertia multiflora* var. *darlingensis*

Other Notes: Dieback/Age since fire/ Predators/Erosion/Weeds/Tracks/Position in cemetery
One tall dead jarrah. Other trees appeared healthy

Colln No	Species	Fl Colour	Ht (cm)	% Cover	Rare/1°
	Acacia applanata		25	<1	
	Acacia huegelii		25	1	
	Allocasuarina humilis	brown and red	210	15	
	Anigozanthos manglesii subsp.*manglesii*		30	2	
	Bossiaea eriocarpa		45	2	
	Briza maxima		10	20	
	Calothamnus sanguineus		30	2	
	Calytrix flavescens		30	1	
	Conostylis serrulata		15	1	
	Dasypogon bromeliifolius		20	1	
	Dryandra lindleyana		10	5	
	Dryandra sessilis	cream	300	5	
	Ehrharta calycina		60	3	
	Ehrharta longiflora		10	20	
	Eremaea pauciflora		60	3	
	Eucalyptus marginata subsp. thalassica		1800	40	
	Gladiolus caryophyllaceus		10	2	
	Gompholobium tomentosum		25	1	
	Haemodorum laxum		50	1	
	Hakea ruscifolia		210	3	
	Hakea trifurcata		130	5	
	Hybanthus calycinus		25	<1	
	Hypolaena exsulca	brown	45	40	
	Kennedia prostrata		5	<1	
	Lomandra preissii	cream/purple	45	<1	
	Macrozamia riedlei		60	1	
	Mesomelaena pseudostygia		70	10	
	Nuytsia floribunda		30	1	
	Opercularia vaginata		30	2	
	Orchid		5	<1	
	Patersonia occidentalis		40	1	
	Petrophile linearis		45	1	
	Philotheca spicata		90	2	
	Pronaya fraseri var. fraseri		100	2	
	Scaevola canescens	white	5	3	
	Scaevola repens var. repens		10	1	
	Schoenus brevisetis		45	8	
	Stirlingia latifolia		50	1	
	Stylidium ? piliferum		5	<1	
	Stylidium repens		15	1	
	Tetraria octandra		30	5	
	Thysanotus manglesianus		35	1	
M5-1	Unknown Monocotyledon		5	<1	
	Ursinea anthemoides		5	5	
	Xanthorrhoea brunonis subsp. brunonis		120	8	
	Xanthorrhoea preissii		210	10	
	Xanthosia huegelii		5	1	



Quadrat M5 Photograph taken in the late afternoon

Degraded Area

**Amaryllis belladonna*
**Arctotheca calendula*
**Arundo donax*
**Avena barbata*
Banksia attenuata
**Chamaecytisus palmensis*
**Chasmanthe floribunda*
Corymbia calophylla
**Echium plantagineum*
**Ehrharta longiflora*
**Eragrostis curvula*
**Foeniculum vulgare*
**Fumaria capreolata*
**Lathyrus tingitanus*
**Leptospermum laevigatum*
**Lupinus angustifolius*
**Lupinus consentinii*
**Malva parviflora*
**Melia azedarach*
**Narcissus tazetta*
**Oxalis glabra*
**Oxalis pes-caprae*
**Parentucellia latifolia*
**Plantago lanceolata*
**Raphanus raphanistrum*
**Ricinus communis*
**Romulea rosea*
**Schinus terebinthifolia*
**Solanum nigrum*
**Trifolium angustifolium*
**Vicia sativa*

Old sand/gravel pit. General view of the degraded area

APPENDIX D

Priority and Significant Taxa Recorded from Midland Cemetery

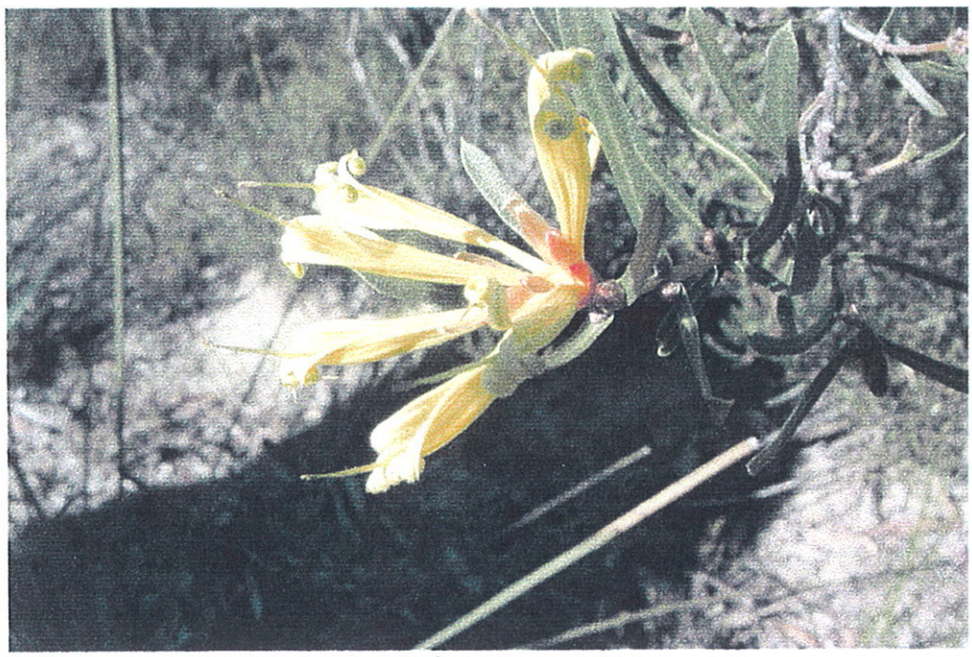
Isopogon drummondii – Priority 3 Taxon

Habit

Inflorescence

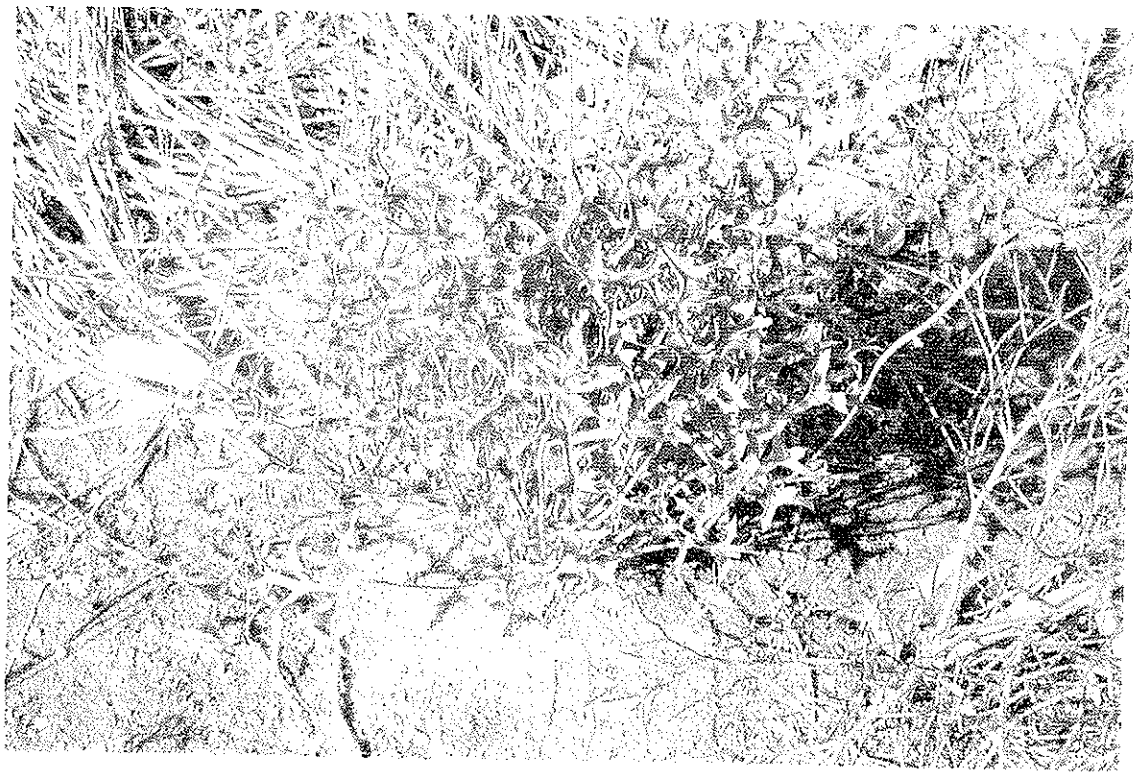
Lambertia multiflora subsp. *darlingensis*
Prioity 3 Taxon

Habit



Inflorescence

Synaphea acutiloba Priority 3 Taxon



Habit. The flowers were still in bud at the first survey.

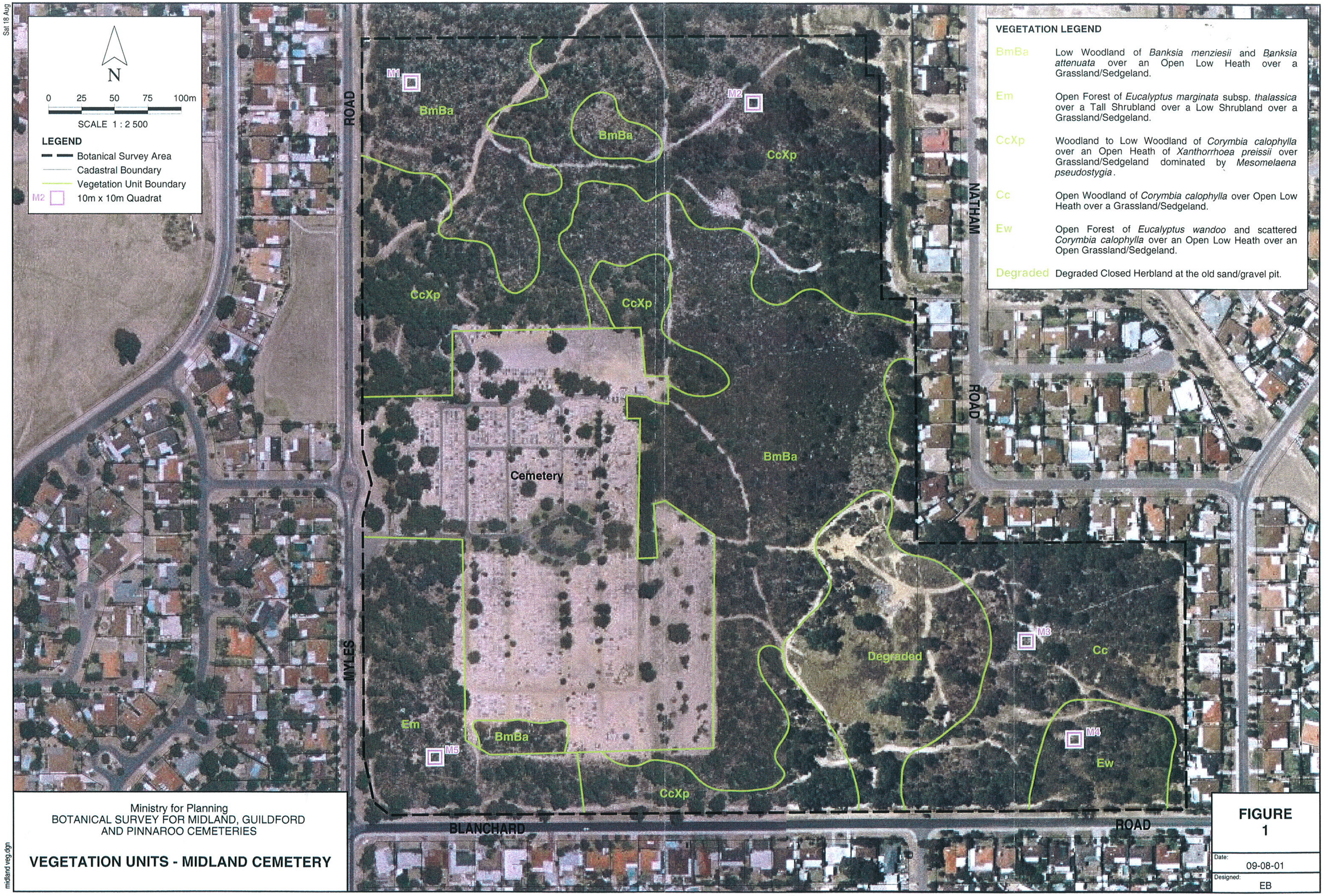
Hakea myrtoides Significant Taxon

Habit

Inflorescence

APPENDIX E

Maps


N
0 25 50 75 100m
SCALE 1 : 2 500
LEGEND
Botanical Survey Area
Cadastral Boundary
Vegetation Unit Boundary
M2 10m x 10m Quadrat
VEGETATION LEGEND
BmBa Low Woodland of Banksia menziesii and Banksia attenuata over an Open Low Heath over a Grassland/Sedgeland.
Em Open Forest of Eucalyptus marginata subsp. thalassica over a Tall Shrubland over a Low Shrubland over a Grassland/Sedgeland.
CcXp Woodland to Low Woodland of Corymbia calophylla over an Open Heath of Xanthorrhoea preissii over Grassland/Sedgeland dominated by Mesomelaena pseudostygia.
Cc Open Woodland of Corymbia calophylla over Open Low Heath over a Grassland/Sedgeland.
Ew Open Forest of Eucalyptus wandoo and scattered Corymbia calophylla over an Open Low Heath over an Open Grassland/Sedgeland.
Degraded Degraded Closed Herbland at the old sand/gravel pit.
M1
M2
M3
M4
M5
BmBa
CcXp
Cc
Ew
Em
Degraded
Cemetery
MYLES ROAD
NATHAM ROAD
BLANCHARD ROAD
Sat 18 Aug
midland veg.dgn

Ministry for Planning
BOTANICAL SURVEY FOR MIDLAND, GUILDFORD AND PINNAROO CEMETERIES

VEGETATION UNITS - MIDLAND CEMETERY

FIGURE 1

Date: 09-08-01

Designed: EB

Sat 18 Aug

N

0 25 50 75 100m

SCALE 1 : 2 500

LEGEND

- Botanical Survey Area
- Cadastral Boundary
- Protection Value Boundary

PROTECTION VALUES LEGEND

1 Includes Threatened Ecological Community by Environment Australia (EPBC Act) and/or CALM (English, 2001); Presence of Rare or Priority Flora; vegetation in Excellent to Pristine Condition.

2 Scale 1 but where vegetation is Good to Very Good; may include Significant Taxa.

3 Area degraded but can with effort be restored to a good or better condition. The vegetation community may be common but it is important as a buffer to Protection Value 1 and 2 areas.

4 Includes areas that are not necessary as a buffer and that are in Poor condition.

5 Developed. Vegetation severely altered.

ROAD

NATHAM

ROAD

MYLES

BLANCHARD

ROAD

Cemetery

Ministry for Planning
BOTANICAL SURVEY FOR MIDLAND, GUILDFORD AND PINNAROO CEMETERIES

PROTECTION VALUE - MIDLAND CEMETERY

FIGURE 5

Date: 09-08-01

Designed: EB

midland prot.dgn

Sat 18 Aug

N

0 25 50 75 100m

SCALE 1 : 2 500

LEGEND

- Botanical Survey Area
- Cadastral Boundary
- Theatened Community Boundary

Community Type 20c

Community Type 20c

Community Type 3c

Community Type 3c

Community Type 20c

Cemetery

Old Sand/Gravel Pit

Community Type 3c

Community Type 20c

MYLES ROAD

NATHAM ROAD

BLANCHARD ROAD

Ministry for Planning
BOTANICAL SURVEY FOR MIDLAND, GUILDFORD AND PINNAROO CEMETERIES

THREATENED ECOLOGICAL COMMUNITIES MIDLAND CEMETERY

FIGURE 4

Date: 09-08-01

Designed: EB

midland eco.dgn

Sat 18 Aug

N

0 25 50 75 100m

SCALE 1 : 2 500

LEGEND

- Botanical Survey Area
- Cadastral Boundary
- Significant Taxa Boundary

SIGNIFICANT PLANT TAXA LEGEND

- *Synaphea acutiloba*
- *Lambertia multiflora* supsp. *darlingensis*
- *Isopogon drummondi*
- *Hakea myrtoides*
- *Stylidium affine*
- *Isopogon drummondi Lambertia multiflora* subsp. *darlingensis*

ROAD

NATHAM

ROAD

Cemetery

MYLES

BLANCHARD

ROAD

Ministry for Planning
BOTANICAL SURVEY FOR MIDLAND, GUILDFORD AND PINNAROO CEMETERIES

SIGNIFICANT PLANT TAXA MIDLAND CEMETERY

FIGURE 3

Date: 09-08-01

Designed: EB

midland sig.dgn

Sat 18 Aug

N

0 25 50 75 100m

SCALE 1 : 2 500

LEGEND

- Botanical Survey Area
- Cadastral Boundary
- Vegetation Condition Boundary

CONDITION LEGEND

1	Pristine	Pristine or nearly so, no obvious signs of disturbance.
2	Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.
3	Very Good	Vegetation structure altered, obvious signs of disturbance.
4	Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it.
5	Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management.
6	Completely degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species.

ROAD

NATHAM

ROAD

MYLES

BLANCHARD

ROAD

Cemetery

midland cond.dgn

Ministry for Planning
BOTANICAL SURVEY FOR MIDLAND, GUILDFORD AND PINNAROO CEMETERIES

VEGETATION CONDITION - MIDLAND CEMETERY

FIGURE 2

Date: 09-08-01

Designed: EB

PB121

FLORA AND VEGETATION OF MIDLAND CEMETERY

Prepared for:
Ministry for Planning
Albert Facey House
469 Wellington Street
PERTH.

Prepared by:
Bennett Environmental Consulting Pty Ltd

21 Currawong Drive
GOOSEBERRY HILL 6076

February 2002

CONTENTS

i. SUMMARY

Bennett Environmental Consulting Pty Ltd was commissioned by the Ministry for Planning to undertake a Flora and Vegetation survey of the remnant bushland at Midland Cemetery. Two field surveys were undertaken, the first in July and the second in October 2001. During the first survey permanent 5, 10m x 10m ($100m^2$) quadrats, in accordance with Department of Environmental policy, were established, which were remonitored at the second survey.

Two vegetation complexes, Forrestfield Complex and Guildford Complex are represented at the Midland Cemetery bushland. The percentage of bushland remaining in these complexes is 9% and 6% respectively (Government of Western Australia, 2000), both below the 10% requirement set for retention, therefore the bushland at the Midland Cemetery is of conservation importance. The Talbot Road Bushland, including all the Midland Cemetery except for the landscaped part of the cemetery and the sand pit are included on the Register of the National Estate Database (Australian Heritage Commission 2001).

Two Floristic Community Types 3c and 20c were recorded from the cemetery bushland, both of which extend into the adjoining Talbot Road Bushland (Safstrom and Taman, 1999). Both these Floristic Community Types are listed as critically endangered by English (2001) indicating they are facing an extremely high risk of total destruction in the immediate future. These Floristic Community Types are also listed as Threatened Ecological Communities by Environment Australia under the Environment Protection and Biodiversity Conservation Act 1999. To undertake any development within either of these Floristic Community Types permission must be obtained from the Minister for the Environment at the State and Commonwealth level.

Typically the vegetation was in very good to excellent condition with the degraded area generally along tracks, the edges of the road and adjacent to buildings. The vegetation at the south west corner was in good to very good condition but does have the potential to be restored to an excellent condition.

A total of 283 taxa in 184 genera and 57 vascular plant families were recorded from the Midland Cemetery bushland. Four priority and four significant taxa were recorded. These are:

- *Tripterococcus paniculatus* – Priority 1 – a few plants were located in the Woodland of *Corymbia calophylla* on the north eastern side of the bushland.
- *Isopogon drummondii* and *Lambertia multiflora* var. *darlingensis* – Priority 3 – were abundant in the Low Woodland of *Banksia attenuata* and *B. menziesii* on the north western side of the bushland. *Lambertia multiflora* var. *darlingensis* was also scattered through this vegetation community to the east and south of the developed cemetery.
- *Synaphea acutiloba* – Priority 3 - many plants were located in the Woodland of *Corymbia calophylla* on the north eastern side and the Open Woodland of *Corymbia calophylla* on the south eastern side of the bushland.
- *Stylidium affine, Hakea myrtoides, Trichocline spathulata* – Significant taxa - were all recorded from the lateritic soils associated with the Open Forest of *Eucalyptus wandoo* subsp. *wandoo*.

- *Dasypogon obliquifolius* – Significant taxon – was recorded in the Low Woodland of *Banksia attenuata* and *B.* on the north western side of the bushland

A total of 60 weed taxa were recorded from the bushland, 15 of which were only recorded from the old sand pit. Seven of the weed taxa are rated as high by the Department of Conservation and Land Management, indicating these are the weeds to be targetted for removal. *Gladiolus caryophyllaceus* was the dominant weed taxon being recorded from all vegetation communities. *Ehrharta calycina,* a common weed in the metropolitan area, was not recorded from Open Forest of *Eucalyptus wandoo* subsp. *wandoo.*

Talbot Road Bushland is the only adjacent bushland to the cemetery. It is included as a part of Greenways 45 (Tingay, Alan and Associates, 1998) and as a regionally significant fragmented bushland/wetland linkage (Government of Western Australia, 2000).

As Midland Cemetery has survived many years of cemetery use, being in close proximity to housing and has retained a very good to excellent vegetation condition, it is anticipated that its viability has the potential to continue.

Threatening processes identified during the surveys include:

- proliferation of tracks through the bushland;
- wildfires;
- dieback; and
- long term use of the old sand pit.

The protection values of the bushland were assessed from information in the literature and from the surveys. Factors taken into account when these were developed included:

- Threatened Ecological Communities;
- presence of Priority and significant taxa; and
- condition of the vegetation.

A list of vegetation management issues was developed to assist with the long term viability of the bushland. In addition suggestions were made on action plans that should be developed.

1 INTRODUCTION

1.1 General Introduction

The Ministry for Planning commissioned Bennett Environmental Consulting Pty Ltd to prepare a report on the flora and vegetation of the remnant vegetation at Midland Cemetery. Midland Cemetery is part of Talbot Road Bushland, Stratton/Swan View, the Bush Forever Site 306 (Government of Western Australia, 2000).

Planning for the cemetery requires the development of additional areas of the site for burials and memorials. The undeveloped areas are bushland. This requires that a survey of these bushland areas be undertaken.

1.2 Location

Midland Cemetery is located in the eastern sector of the Perth metropolitan Region, 3km northeast of Midland and just over 20km northeast of Perth centre, located within an established suburban district. The only entrance is from Myles Road. Blanchard Road and Myles Road form the southern and western boundaries respectively. Talbot Road Bushland is on the northern edge and houses back onto the cemetery bushland on the eastern side. Houses face onto the cemetery across Blanchard and Myles Roads.

1.3 Land Tenure

Midland Cemetery lies within a public reserve designated for cemetery purposes. On survey plan 17552 it is Location 11313, Reserve 6855. On the northern boundary is vacant crown land, Location 11314, an area of 10.95ha of bushland through which runs Blackadder Creek. Adjacent to the northern boundary and at the head of the Blackadder Creek is a compensation basin, Location 10477, Reserve 37939. Adjacent to the southeast corner of the cemetery reserve is Vacant Crown Land, Location 11764, bushland and the site of an old sand/gravel quarry. Talbot Road Bushland Location 23953 is to the north of Location 11314.

1.4 Objectives of the Current Survey

There are several objectives for the current survey. These include:

- vegetation communities and their associated flora;
- presence of any threatened ecological communities;
- regional assessment of the area;
- linkage to other bushland areas;
- any relevance to the Commonwealth Biodiversity Legislation;
- vegetation community viability;
- assessment of protection values and
- vegetation management issues.

The above information was to be obtained by undertaking a vegetation and flora survey of the area in June – July with a second survey to be undertaken during the spring. The second survey should record plants flowering, especially orchid species, many of which were observed in leaf during the first survey.
Each of the above topics will be discussed in the report.

2 PHYSICAL ENVIRONMENT

2.1 Climate

The area has a dry Mediterranean climate with 98 rain days, an average rainfall of 737mm per year, a mean maximum temperature of 25.4°C and a mean minimum temperature of 10.9°C.
Midland cemetery is situated at the base of the Darling Scarp, slightly elevated above the coastal plain and is therefore affected by localised climate influences. Rainfall is slightly higher and the summer temperatures a few degrees higher than nearer the coast. The cooling sea breezes come later in the afternoon, but the slightly elevated position of the site allows capture of any local cooling breezes.

2.2 Geology

Midland cemetery is included in the Yonganup Formation (Biggs and Wilde, 1980), which consists of basal conglomerate overlain by a unit of sand containing lenticular beds of clay. It occurs along the ancient shorelines at the foot of the present Darling Scarp and contains localised concentrations of heavy minerals. The yellow sand probably accumulated as a fore-dune or beach ridge under active surf conditions. The formation occurs at elevations of 45m to 75m above present sea level and is commonly lateritised.

2.3 Soils

The Talbot Road Bushland, including Midland Cemetery, is located on the Ridge Hill Shelf of the Swan Coastal Plain. This is a strip of lateritised low relief spurs along the base of the Darling Scarp between Bullsbrook and Harvey. It is a narrow, dissected strip 1-3km wide and slopes gently to the west to form the foothills of the Darling Scarp.
The soils are deep, rapidly draining, siliceous yellow brown sands; well drained yellow or brown duplex soils, with a sandy top soil; lateritic outcrops with shallow moderately well-drained brownish sands; poorly drained areas of bleached grey sands over an iron organic hardpan and variants of the above. The soils are an important determinant of the location and diversity of the plant communities.
Within the cemetery the sand deposits extend over the existing site to at least 4m in depth. The overlay sand is shallow and begins to mix with pea gravel and weathered lateritic alluvial clays along the cemetery's northern boundary. Pea gravel and conglomerate soils are recorded in the Vacant Crown Land along the ridge to the east. The cemetery soils are free draining, generally low in fertility with poor moisture holding properties. The sandy pea gravel and the weathered lateritic soils are poor in quality and lack moisture. Much of the pea gravel in Location 11764 adjacent to the southeast corner has been mined out along with some yellow sand.

2.4 Landforms

Midland Cemetery is located at the base of the Darling Scarp and south of the Blackadder Creek on a gently rising ridge. The lowest point in the cemetery is 40m above the Coastal Plain and land continues to rise gently to 55m in the vacant crown land adjacent to the southeast corner before ascending the nearby Darling Scarp.

2.5 Flora and Vegetation

Heddle et al. (1980) lists two vegetation complexes for the Talbot Road Bushland:

- The Forrestfield Complex varying from open forest of *Corymbia calophylla, Eucalyptus wandoo* subsp. *wandoo* and *E. marginata* to open forest of *E. marginata, C. calophylla, Allocasuarina fraseriana* and *Banksia* species. 9% is remaining, (Government of Western Australia, 2000).
- The Guildford Complex being a mixture of open forest to tall open forest of *Corymbia calophylla, Eucalyptus wandoo* subsp. *wandoo, E. marginata* and woodland of *E. wandoo* subsp. *wandoo*. 6% remaining (Government of Western Australia, 2000).

In Bush Forever (Government of Western Australia, 2000) the above was further subdivided into Floristic Community Types as below.

Supergroup 1: Foothills/Pinjarra Plain

3c. *Corymbia calophylla – Xanthorrhoea preissii* woodlands and shrubland.

Supergroup 3: Uplands centered on Bassendean Dunes and Dandaragan Plateau

20c: Eastern shrublands and woodlands.

Through Talbot Road Bushland there is also a creek that is not included in the Midland cemetery.

Keighery and Keighery (1993) mapped the vegetation of the Talbot Road Bushland. They recognised four principal plant communities:

- Wandoo (*Eucalyptus wandoo* subsp. *wandoo*) Open Woodland, Marri (*Corymbia calophylla*) and Wandoo and Lateritic Heath, on the lateritic areas with shallow moderately well drained gravelly brownish soils.
- Marri Open Woodland to Woodland and Marri and Jarrah (*Eucalyptus marginata*) Woodland, on well drained gravelly yellow or brown duplex soils with a sandy topsoil.
- Banksia Open Low Woodland to Low Woodland and a highly variable Sand Shrubland of *Adenanthos cygnorum* subsp. *cygnorum* and *Allocasuarina humilis* on open draining siliceous yellow brown sands of varying depth.
- Marri Woodland in the drainage channel on poorly drained gravelly yellow or brown duplex soils and *Hakea varia* and *Hakea trifurcata* Heath on the adjacent clays.

Within the woodlands, small patches of shrubland and heath occur. These were too small to be mapped.

Within the Midland Cemetery three plants communities have been mapped (Figure 5 in Safstrom and Taman, 1999). These are:

- Wandoo Low Open Woodland
- Marri and Wandoo Low Open Woodland and
- Marri/Jarrah Woodland.

The first two are recorded from the Vacant Crown Land, Location 11764. The vegetation of the Midland Cemetery is therefore Marri/Jarrah Woodland.

Van Der Moezel (2000b) in correspondence to the Metropolitan Cemeteries Board, stated the vegetation is more diverse than indicated above. He recognised three units within the cemetery (not including Location 11764). These are:

- Jarrah/Marri Woodland
- Marri Woodland

- Banksia Low Woodland.

Van Der Moezel concluded that the vegetation of the entire cemetery belongs to the Floristic Community Type 20C (Gibson et al, 1994), which also covers a large portion of the Talbot Road Reserve. This community type is listed as Critically Endangered by English (2000).

3 SURVEY METHODOLOGY

The whole cemetery site, as defined in the information provided by the Ministry for Planning (Appendix E, Figure 1), was surveyed on foot to assess the different vegetation units present. In each vegetation unit a permanent, 10m x 10m ($100m^2$) quadrat was placed in a N,S,E,W orientation selecting the quadrat site for the best vegetation condition. This is consistent with the requirements of the Department of Environmental Protection. A star picket was placed at the NW corner and metal droppers placed at the remaining three corners. A metal tag with the quadrat number was attached to the star picket. A GPS reading was made and a photograph taken at the NW corner.
In addition to the placement of each permanent quadrat the whole of the vegetation unit was traversed on foot to record additional taxa for the unit not represented in the quadrat. By recording these opportunistic species the total species list for each vegetation unit was increased considerably.

3.1 Vegetation

The vegetation of the area was defined for the whole unit, not just for the quadrat. The quadrat was placed in a characteristic section of the community but often it was only possible to include the dominant tree species within the 10m x 10m quadrat. Where tree taxa occurred outside of the quadrat these taxa were recorded separately and built into the vegetation classification. The descriptions were prepared using the vegetation layers as listed in Table 1.
Changes in vegetation structure at Midland included variation in the:

tree layer, eg. Banksia spp, Jarrah and Marri,
shrub layer, eg. Proteaceae, Myrtaceae and Papilionaceae species, and
understorey layer, eg. sedges, herbs, grasses.

Table 1. Vegetation layers. Adapted from: Bush Forever (Government of Western Australia 2000)

Life Form/ Height Class	Canopy Cover			
	100-70%	70-30%	30-10%	10-2%
Trees over 30m	Tall Closed Forest	Tall Open Forest	Tall Woodland	Tall Open Woodland
Trees 10-30m	Closed Forest	Open Forest	Woodland	Open Woodland
Trees under 10m	Low Closed Forest	Low Open Forest	Low Woodland	Low Open Woodland
Tree mallee/Mallee	Closed Tree Mallee	Tree Mallee	Open Tree Mallee	Very Open Tree Mallee
Shrub mallee	Closed Shrub Mallee	Shrub Mallee	Open Shrub Mallee	Very Open Shrub Mallee
Shrubs over 2m	Closed Tall Scrub	Tall Open Scrub	Tall Shrubland	Tall Open Shrubland
Shrubs 1-2m	Closed Heath	Open Heath	Shrubland	Open Shrubland
Shrubs under 1m	Closed Low Heath	Open Low Heath	Low Shrubland	Low Open Shrubland
Grasses	Closed Grassland	Grassland	Open Grassland	Very Open Grassland
Herbs	Closed Herbland	Herbland	Open Herbland	Very Open Herbland

3.2 Taxa Present

For each quadrat all taxa were recorded, together, where applicable, with their flower colour, average height, percentage cover and if the taxa were rare or endangered. Time was spent locating additional species within the same vegetation unit but outside of the

quadrat. Where the same vegetation unit occurred in different areas these were also searched to increase the taxa for the unit. Taxa were recorded in the field, but where the identity was unknown or uncertain these were collected and pressed, then later identified using keys and by comparison with the specimens housed at the Western Australian Herbarium. Current nomenclature was checked using FloraBase (Western Australian Herbarium, 2001a) and MAX (Western Australian Herbarium, 2001b).

3.3 Vegetation Condition

The vegetation condition of each quadrat and the vegetation community as a whole were recorded using the 6-scale condition rating as appeared in Bush Forever Vol 2, p. 48 (Government of Western Australia, 2000).

Table 2: Condition rating scale from Bush Forever (Government of Western Australia 2000)

Rating	Description	Explanation
1	Pristine	Pristine or nearly so, no obvious signs of disturbance.
2	Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.
3	Very Good	Vegetation structure altered, obvious signs of disturbance.
4	Good	Vegetation structure significantly altered by very obvious signs of multiple disturbance. Retains basic vegetation structure or ability to regenerate it.
5	Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management.
6	Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species.

If the description as given in Table 2 is used, it gives the impression that the bushland is in better condition than it really is. The classification after Trudgen (1991) gives a better indication of the true bushland condition. Categories 4 and above would be better described using the Trudgen method rather than Bush Forever. As an example, category 4, where the bushland is significantly altered, often with many weeds, would be better termed "Poor" rather than "Good". For this report the Vegetation Condition as illustrated in Table 2 will be used.

Table 3: Comparison between the Condition descriptions in Bush Forever and Trudgen (1991)

Description Bush Forever	Description Trudgen (1991)
Pristine	Excellent
Excellent	Very Good
Very Good	Good
Good	Poor
Degraded	Very Poor
Completely Degraded	Completely Degraded

3.4 Significant Flora

Known Rare and Priority flora for the Talbot Road Bushland are listed in Bush Forever, together with any other significant taxa. Where possible Priority taxa were included in the 10m x 10m quadrats.

Table 4. Rare and Priority Flora listed for Talbot Road Bushland in Bush Forever (Government of Western Australia, 2000)

Significant Flora	Comments
Isopogon drummondii	Priority 3 taxon
Synaphea acutiloba	Priority 3 taxon
Synaphea pinnata	Priority 3 taxon
Lambertia multiflora var. *darlingensis*	Priority 3 taxon
Thysanotus glaucus	Priority 4 taxon

Table 5. Code and description of Rare and Priority Flora categories

Code	Code Declared Rare and Priority Flora Categories
R	DRF (Declared Rare Flora) -Extant Taxa. Taxa, which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection.
X	DRF (Declared Rare Flora) -Presumed Extinct Taxa. Taxa which have not been collected, or otherwise verified, over the past 50 years despite thorough searching, or of which all known wild populations have been destroyed more recently.
1	Priority One -Poorly Known Taxa. Taxa, which are known from one or a few (generally <5) populations, which are under threat.
2	Priority Two -Poorly Known Taxa. Taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat.
3	Priority Three -Poorly Known Taxa. Taxa which are known from several populations, at least some of which are not believed to be under immediate threat.
4	Priority Four -Rare Taxa. Taxa which are considered to have been adequately surveyed and which whilst being rare, are not currently threatened by any identifiable factors.

3.5 GPS Measurements

At the north west corner of each quadrat the GPS reading was recorded in UTM and latitude and longitude. In addition a photograph taken from this same corner recorded the quadrat. These measurements will be used to locate the quadrats on the maps produced from the survey.
Where rare or priority flora were located outside the quadrat a GPS reading was recorded for these taxa.

3.6 Soil Assessment

A simple soil assessment was undertaken at each quadrat. This recorded the colour of the soil and its structure. Where rocks were observed these were also recorded.

3.7 Topography

The Ministry for Planning provided maps with contours for the area prior to undertaking the field work. Field notes also included the positions of the quadrats and vegetation units in relation to the topography.

4 RESULTS

Field work was undertaken on 10th July 2001. The perimeter roads were driven prior to undertaking any field work to determine the variation in vegetation present and its condition. This was compared to the vegetation map produced by Van Der Moezel (2000b). As it was known that Priority Flora had been located, several transects were walked through the cemetery bushland. All quadrats were placed as far away from tracks as was possible for two reasons. The first was to ensure that pegs would not be visible to the public using the many tracks and secondly to avoid the highly degraded verges along the track perimeters. Additional opportunistic taxa were recorded by walking the vegetation units, firstly that surrounding the quadrat, and then other areas with the same unit. A spring survey was undertaken on 9th October 2001.
The active cemetery site was not surveyed as it had been cleared and several exotic trees planted in the area.

4.1 Vegetation and Flora

4.1.1 Quadrats

Five permanent 10m x 10m ($100m^2$) quadrats, in accordance with the Department of Environmental Protection policy, were established in the bushland. These correlated with the vegetation mapping of Van Der Moezel (2000b) and Keighery and Keighery (1993).
The positions of the permanent quadrats are given in Table 6 and marked on Appendix E, Figure 1.

Table 6: GPS position of quadrats at Midland Cemetery

Quadrat Number	UTM Easting	UTM Northing	Latitude	Longitude
M1	50 409 397	647 2832	S 31°52'36.1"	E 116°02'31.6"
M2	50 409 654	647 2817	S 31°52'36.7"	E 116°02'41.3"
M3	50 409 859	647 2413	S 31°52'49.9"	E 116°02'49.0"
M4	50 409 895	647 2339	S 31°52'52.3"	E 116°02'50.4"
M5	50 409 414	647 2325	S 31°52'52.6"	E 116°02'32.0"

In addition to these permanent quadrats the degraded sand/gravel pit was recorded and the taxa present listed. No permanent quadrat was established in the degraded area.

4.1.2 Vegetation

In Section 2.5 the different past surveys undertaken at Talbot Road Bushland and Midland Cemetery are listed. The survey identified five different vegetation units. These are identified in Appendix E, Figure 1 and the taxa present listed in Appendix B. The Floristic Community Types are inferred from the species present in the vegetation unit and by comparision with the dominant taxa for each Floristic Vegetation Community listed in Gibson *et al.* (1994). The different vegetation units are described below followed by the quadrat number and abbreviation used in the vegetation map, Appendix E, Figure 1.

Floristic Community Type 20c: Eastern shrublands and woodlands
This Floristic Community type was located on the western side of the cemetery through to the houses backing onto the cemetery from Natham Road. Two vegetation units were identified and mapped within this Floristic Community Type.

- **Low Woodland of *Banksia attenuata* and *Banksia menziesii* over an Open Low Heath over a Grassland/Sedgeland** on sand. (Quadrat M1) **BaBm**
  Dominant trees: *Banksia attenuata, B. menziesii, Corymbia calophylla* (Cover 30%)
  Dominant shrubs: *Allocasuarina humilis, Bossiaea eriocarpa, Burtonia conferta, Calothamnus sanguineus, Dryandra lindleyana* subsp. *lindleyana, Eremaea pauciflora, Gompholobium confertum* (Cover 55%)
  Dominant herbs: *Anigozanthos manglesii* subsp. *manglesii, Dasypogon obliquifolius, Drosera erythrorhiza, Chamaescilla corymbosa, Conostylis aurea, Patersonia occidentalis* (Cover 30%)
  Dominant grasses/sedges: *Amphipogon turbinatus, Cyathochaeta avenacea, Desmocladus fasciculatus, Mesomelaena pseudostygia* (Cover 40%)

This vegetation unit was dominant in the north western section of the bushland. Several red flowered forms, as well as the typical red and green flowered forms, of *Angiozanthos manglesii* subsp. *manglesii* were flowering at the spring survey.

- **Open Forest of *Eucalyptus marginata* subsp. *thalassica* over a Tall Shrubland over a Low Shrubland over a Grassland/Sedgeland** on sand. (Quadrat M5) **(Em)**
  Dominant trees: *Corymbia calophylla, Eucalyptus marginata* subsp. *thalassica, Nuytsia floribunda* (Cover 45%)
  Dominant tall shrubs: *Allocasuarina humilis, Dryandra sessilis* subsp. *sessilis, Hakea ruscifolia, Xanthorrhoea preissii* (Cover 15%)
  Dominant shrubs: *Bossiaea eriocarpa, Calothamnus sanguineus, Dryandra lindleyana* subsp. *lindleyana, Eremaea pauciflorus, Hakea trifurcata, Xanthorrhoea brunonis* subsp. *brunonis* (Cover 35%0
  Dominant herbs: *Anigozanthos manglesii* subsp. *manglesii, Opercularia vaginata, *Ursinia anthemoides* (Cover 10%)
  Dominant grasses/sedges: *Briza maxima, Ehrharta longiflora, Hypolaena exsulca, Mesomelaena pseudostygia, Schoenus brevisetis, Tetraria octandra* (Cover 90%)

This vegetation unit was restricted to the southwest corner of the cemetery, although Van Der Moezel (2000) stated that it continued on the western side up to the Low Woodland of *Banksia attenuata* and *Banksia menziesii.*

Floristic Community Type 3c: *Corymbia calophylla – Xanthorrhoea preissii* woodlands and shrubland.
The remainder of the bushland, except for the degraded sand/gravel pit was this Floristic Community Type.

- **Woodland to Low Woodland of *Corymbia calophylla* over an Open Heath of *Xanthorrhoea preissii* over Grassland/Sedgeland dominated by *Mesomelaena pseudostygia*** on sandy loam soil. (Quadrat M2) **(CcXp)**
  Dominant trees: *Corymbia calophylla* (Cover 0-15%)
  Dominant shrubs: *Allocasuarina humilis, Daviesia incrassata* subsp. *incrassata, Dryandra lindleyana, Hakea prostrata, Hibbertia hypericoides, Jacksonia sternbergiana, Xanthorrhoea brunonis* subsp. *brunonis, X. preissii* (Cover 55%)
  Dominant herbs: *Anigozanthos manglesii, Conostylis aculeata* subsp. *aculeata, *Romulea rosea, *Ursinia anthemoides* (Cover 23%)
  Dominant grasses/sedges: *Desmocladus fasciculatus, *Ehrharta calycina, Hypolaena exsulca, Mesomelaena pseudostygia, M. tetragona, Tetraria octandra* (Cover 57%)

This vegetation unit was dominant on the southeastern side of the area surveyed. There was also an area from the southwestern side through to the southeastern side to the compensation basin.

- **Open Woodland of *Corymbia calophylla* over Open Low Heath over a Grassland/Sedgeland** in loamy soil with pea gravel on the surface. (Quadrat M3) **(Cc)**
  Dominant trees: *Corymbia calophylla* (Cover 10%)
  Dominant shrubs: *Beaufortia purpurea, Gompholobium aristatum, Hakea auriculata, H. lissocarpha, H. trifurcata, Hibbertia hypericoides, Kingia australis, Synaphea acutiloba* (Cover 42%)
  Dominant herbs: **Freesia* hybrid, *Laxmannia squarrosa, *Oxalis purpurea, *Romulea rosea* (Cover 50%)
  Dominant grasses/sedges: *Desmocladus fasciculatus, Lepidosperma leptostachyum, Mesomelaena tetragona, Neurachne alopecuroidea, Tetraria octandra* (Cover 47%)

Occurred on the northern side of Location 11764.

- **Open Forest of *Eucalyptus wandoo* subsp. *wandoo* and scattered *Corymbia calophylla* over an Open Low Heath over an Open Grassland/Sedgeland** in loam soil with laterite. (Quadrat M4) **(Ew)**
  Dominant trees: *Corymbia calophylla, Eucalyptus wandoo* subsp. *wandoo* (Cover 45%)
  Dominant shrubs: *Calothamnus sanguineus, Dryandra armata* var. *armata, D. lindleyana* subsp. *lindleyana, Hakea lissocarpha, H. trifurcata, Hypocalymma angustifolia, Nemcia spathulata, Xanthorrhoea preissii* (Cover 45%)
  Dominant herbs: *Chamaescilla corymbosa, Pterostylis vittata, *Romulea rosea, Stylidium bulbiferum, Xanthosia candida* (Cover 20%)
  Dominant grasses/sedges: *Desmocladus fasciculatus, Lepidosperma leptostachyum, Loxocarya cinerea, Neurachne alopecuroidea, Tetraria octandra* (Cover 35%)

Occurred on the southern side of Location 11764.

Degraded Sand/Gravel Pit

Closed Herbland at the old sand/gravel pit.
Dominant trees: *Banksia attenuata, *Chamaecytisus palmensis, Corymbia calophylla, *Melia azedarach, *Tamarix aphylla, *Ricinus communis* (Cover <5%)
Dominant herbs: **Arctotheca calendula, *Chasmanthe floribunda, *Echium plantagineum, *Fumaria capreolata, *Lathyrus tingitanus, *Lupinus angustifolium, *L. consentinium, *Raphanus raphanistrum* (Cover 90%)
Dominant grasses: **Arundo donax, *Ehrharta longiflora, *Eragrostis curvula* (Cover 10%)

In addition, this degraded area is used as a dumping ground for excess soil, stone etc from the cemetery and in the past by local people for dumping cars.

4.1.3 Vegetation Condition

Each of the quadrats was placed in an area where the vegetation was in the best available condition. The overall condition of the Midland Cemetery bushland is indicated in Appendix E, Figure 2. Generally the bushland was in very good to excellent condition. The areas of degradation were confined to the edges of tracks through the bushland, to the old sand/gravel pit area and the northwest corner of the graves areas and Myles Road. The bushland edges of the older section of the cemetery also had weed infestation but generally it did not extend in far.

Table 7. Vegetation condition of each quadrat

Quadrat Number	Vegetation Condition	Safstrom & Taman (1999)
M1	1-2	Very good condition
M2	1	Very good condition
M3	3	Good condition
M4	1-2	Good condition
M5	3-4	Not assessed
Degraded	6	Degraded special treatment

Safstrom and Taman (1999) classified the vegetation at Talbot Road Bushland into 4 conditions: very good, good, grassy weeds and degraded requiring special treatment. This classification correlates well with the condition recognised in the field.

4.1.4 Flora

A total of 366 taxa have been recorded for the Talbot Road Bushland, Stratton/Swan View (Bush Forever, 2000). The two surveys recorded a total of 283 taxa in 184 genera and 57 families (Appendix A). The dominant families are listed in Table 8.

Table 8. Dominant Plant families (>10 taxa) recorded from Midland Cemetery

Vascular Plant Family	Number of Genera	Number of Native Taxa	Number of Weed Taxa	Total Number Taxa
Papilionaceae	20	23	12	35
Proteaceae	13	30	0	30
Poaceae	16	7	13	20
Myrtaceae	14	16	1	17
Cyperaceae	8	14	0	14
Anthericaceae	10	14	0	14
TOTAL	**81**	**104**	**26**	**130**

These six vascular plant families represent 10% of the vascular plant families, 44% of the genera and 46.6% of the taxa recorded at Midland Cemetery. Woodland to Low Woodland of *Corymbia calophylla* over an Open Heath of *Xanthorrhoea preissii* recorded 132 taxa, the Low Woodland of *Banksia attenuata* and *Banksia menziesii* and, the Open Woodland of *Corymbia calophylla* 110 and 111 taxa respectively. The Open Forest of *Eucalyptus marginata* subsp. *thalassica* and Open Forest of *Eucalyptus wandoo* subsp. *wandoo* and scattered *Corymbia calophylla* recorded 97 and 73 taxa respectively.

4.1.5 Rare, Priority and Significant Flora

Four priority and four significant taxa were recorded from the Midland Cemetery bushland. These are listed in Table 9 and mapped in Appendix E, Figure 3.
Isopogon drummondii and *Lambertia multiflora* var. *darlingensis* were numerous and distributed throughout the Low Woodland of *Banksia attenuata* and *Banksia menziesii* in the northwest area to the north of the main entrance to the cemetery. *Dasypogon obliquifolius* occurred in the same vegetation unit but was not as common as these two taxa.
A few plants of *Lambertia multiflora* var. *darlingensis* were also recorded in the Open Forest of *Eucalyptus marginata* subsp. *thalassica* adjacent to current graves in the southwest corner. Several groups of up to 50 plants of *Synaphea acutiloba* were recorded from the Woodland to Low Woodland of *Corymbia calophylla* over an Open Heath of *Xanthorrhoea preissii.* The few plants located by Van Der Moezel (2000) were relocated but most were dead. However this taxon was very common in the Open Woodland of *Corymbia calophylla* over Open Low Heath in loamy soil with pea gravel on the surface where more than 100 plants were counted.
Less than 5 plants of *Tripterococcus paniculatus* were recorded from the Woodland to Low Woodland of *Corymbia calophylla* over an Open Heath of *Xanthorrhoea preissii.*

Table 9. Significant Flora recorded in Bush Forever (Government of Western Australia, 2000), during surveys and for Talbot Road Bushland

Taxon	Significance Code	Community Unit	Quadrat Number	Talbot Road Bushland
Tripterococcus paniculatus	Priority 1 taxon	CcXp		
Isopogon drummondii	Priority 3 taxon	BaBm	M1	✓
Synaphea acutiloba	Priority 3 taxon	CcXp, Cc	M3, near M2	✓
Synaphea pinnata	Priority 3 taxon	Not recorded		✓
Lambertia multiflora var. *darlingensis*	Priority 3 taxon	BaBm, Em	M1,M5	✓
Stylidium affine	Not listed	Ew	M4	✓
Thysanotus glaucus	Priority 4 taxon	Not recorded		✓
Hakea myrtoides	p,s	Ew	M4	✓
Trichocline spathulata	s	Ew		
Dasypogon obliquifolius	s,d	BaBm	M1	
Lomandra spartea	r,s	Not recorded		✓
Haemodorum brevisepalum	p	Not recorded		✓
Aristida contorta	Not listed most western population	Not recorded		✓
Grevillea endlicheriana	Not listed mainly on Darling Scarp	Not recorded		✓
Grevillea glabrata var. *glabrata*	Not listed restricted to moist soils on Darling Range	Not recorded as occurs along streams.		✓
Conospermum incurvum	Most southern population in reserve - Perth Region	Not recorded		✓
Melaleuca tuberculata var. *tuberculata*	d	Not recorded		✓
Eremaea fimbriata	r,s	Not recorded		✓

Geographical variation
d = populations disjunct from their known geographical range
r = populations at the northern or southern limit of their known geographical range
s = significant populations
p = considered to be poorly reserved

4.1.6 Weed Taxa

A total of 60 weed taxa were recorded from the cemetery bushland representing 21.8% of all taxa recorded. The dominant weed families are; Poaceae with 13 weeds, Papilionaceae with 12, Iridaceae with 6 and Asteraceae with 5, totalling 36 taxa. These four families represent 60% of the weed taxa recorded. The gravel/sand pit site was the only area surveyed that recorded 49 weed taxa (83.6% of all weeds at the cemetery) of which 15 (25% of all weeds) were only recorded from this site. This is lower than the 26% of alien taxa recorded in the Flora of the Perth Region (Marchant *et.al.*, 1987).
All these taxa have all been determined as weeds by CALM (1999) and the Western Australian Herbarium (2001) and their rating is given below in Table 10.
The distribution of the weeds within the different vegetation units is given in Appendix B. Seven of the weed taxa are rated as High on both invasivenss and impacts, indicating that these environmental weeds should be targeted for removal.

The rating allocated to each weed by Department of Conservation and Land Management (1999) is based on three criteria:

- **Invasiveness** – ability to invade natural bushland in good to excellent condition or ability to invade waterways.
- **Distribution** – wide current or potential distribution including consideration of known history of wide spread distribution elsewhere in the world.
- **Environmental impacts** – Ability to change the structure, composition and function of ecosystems. In particular an ability to form a monoculture in a vegetation community.

Ratings indicate the following:

- **High** indicates this weed is prioritised for control and/or research ie prioritising funding to it.
- **Moderate** indicates control or research effort should be directed to it if funds are available, however it should be monitored (possibly a reasonably high level of monitoring).
- **Mild** indicates monitoring of the weed and control where appropriate.
- **Low** indicates that this species would require a low level of monitoring.

Table 10. List of Weed Taxa recorded from Midland Cemetery

Scientific Name	Common Name	CALM Rating		
		Rating	Invasiveness	Impacts
**Ehrharta calycina*	Perennial veldt grass	High	✓	✓
**Eragrostis curvula*	African lovegrass	High	✓	✓
**Freesia* hybrid	Freesia	High	✓	✓
**Leptospermum laevigatum*	Victorian teatree	High	✓	✓
**Lupinus consentinii*	Western Australian blue lupin	High	✓	✓
**Moraea flaccida*	Oneleaf cape tulip	High	✓	✓
**Romulea rosea*	Guildford grass	High	✓	
**Aira caryophyllea*	Silvery hairgrass	Moderate	✓	
**Anagallis arvensis var. arvensis*	Pimpernel	Moderate	✓	
**Arctotheca calendula*	Cape weed	Moderate	✓	
**Avena barbata*	Bearded oats	Moderate	✓	
**Briza maxima*	Blowfly grass	Moderate	✓	
**Briza minor*	Shivery grass	Moderate	✓	
**Bromus diandrus*	Great brome	Moderate	✓	
**Disa bracteata*	South African orchid	Moderate	✓	
**Ehrharta longiflora*	Annual veldt grass	Moderate	✓	
**Gladiolus caryophyllaceus*	Pink galdiolus	Moderate	✓	
**Hesperantha falcata*		Moderate	✓	
**Hypochaeris glabra*	Flat weed	Moderate	✓	
**Lolium rigidum*	Annual ryegrass	Moderate	✓	
**Parentucellia latifolia*	Red bartsia	Moderate	✓	
**Parentucellia viscosa*	Sticky bartsia	Moderate	✓	
**Schinus terebinthifolia*	Japanese peppercorn tree	Moderate	✓	
**Solanum nigrum*	Black berry nightshade	Moderate	✓	
**Sonchus oleraceus*	Sowthistle	Moderate	✓	
**Tamarix aphylla*	Tamarix	Moderate	✓	
**Trifolium arvense*	Hares foot clover	Moderate	✓	
**Trifolium campestre*	Hop clover	Moderate	✓	
**Trifolium dubium*	Suckling clover	Moderate	✓	

Scientific Name	Common Name	CALM Rating		
		Rating	Invasiveness	Impacts
**Ursinia anthemoides*	Ursinia	Moderate	✓	
**Vicia sativa*	Common vetch	Moderate	✓	
**Vulpia myuros*	Rats tail fescue	Moderate	✓	
**Wahlenbergia capensis*	Cape bluebell	Moderate	✓	
**Chamaecytisus palmensis*	Tree lucerne	Mild	✓	
**Fumaria muralis*	Wall fumitory	Mild		
**Lupinus angustifolius*	Narrowleaf lupin	Mild		
**Medicago polymorpha*	Burr medic	Mild		
**Melinis repens*	Natal redtop	Mild		
**Oxalis glabra*	Finger leaf oxalis	Mild		
**Oxalis pes-caprae*	Soursob	Mild		
**Pennisetum setaceum*	Fountain grass	Mild		
**Petrorhagia velutinea*	Velvet pink	Mild		
**Amaryllis belladonna*	Belladonna lily	Low		
**Arundo donax*	Giant Reed	Low		
**Babiana angustifolia*	Baboon flower	Low		
**Conyza bonariensis*	Flaxleaf fleabane	Low		
**Lathyrus tingitanus*	Tangier pea	Low		
**Malva parviflora*	Small flowered mallow	Low		
**Narcissus tazetta*	Jonquil	Low		
**Oxalis purpurea*	Four o'clock	Low		
**Plantago lanceolata*	Ribwort plantain	Low		
**Raphanus raphanistrum*	Wild radish	Low		
**Ricinus communis*	Castor oil tree	Low		
**Silene gallica*	French catchfly	Low		
**Trifolium angustifolium*	Narrowleaf clover	Low		
**Vicia benghalensis*	Purple vetch	Low		
**Echium plantagineum*	Paterson's curse+	Declared Plant+		
**Melia azedarach*	Cape lilac	Not Listed[1]		
**Foeniculum vulgare*	Fennel	TBA		
**Fumaria capreolata*	White fumitory	TBA		

+ Declared Plant – landowners with these plants on their properties are obliged to remove them.
[1] This taxon is native in the Kimberley Region of WA
TBA = To be assessed

Gladiolus caryophyllaceus was recorded from all vegetation units; *Briza maxima* and *Romulea rosea* from 4 vegetation units; *Ehrharta longiflora, Eragrostis curvula* and *Ursinia anthemoides* from 3 vegetation units, including the degraded area.
Pinus radiata has been planted on the eastern side of the cemetery adjacent to the bushland but there appears to be no invasion into the surrounding bushland although CALM list it as having a moderate rating and as being invasive. Other exotic taxa are planted in the cemetery, often in formal beds or as avenues through the cemetery but none are near bushland. At the entrance *Agonis flexuosa* has been planted as an avenue. This taxon is native to Western Australia but not this area, its seedlings are not invading the adjacent bushland.

4.2 Threatened Ecological Communities

Ecological communities are naturally occurring biological assemblages that occur in a particular type of habitat (English, 2001) but as the current survey was botanical this is the only aspect addressed in this report. Threatened Ecological Communties are communities that have been assigned to one of seven categories related to the status of threat to the community; presumed totally destroyed, critically endangered, endangered, vulnerable, data deficient, not evaluated and lower risk.

Two of the ecological communities recorded for the Talbot Road Bushland in Bush Forever (Government of Western Australia, 2000) are critically endangered (English, 2001). A critically endangered ecological community is found to be facing an extremely high risk of total destruction in the immediate future.

The two critically endangered communities are the Floristic Community Types 3c and 20c (Gibson *et al.*, 1994).

Floristic Community Type 3c – *Corymbia calophylla – Xanthorrhoea preissii* woodlands and shrublands. Safstrom and Taman (1999) estimate that this community occupied 27ha in Location 23953. In addition it occurs in Location 6955 and Location 11764. The dominant plants are *Corymbia calophylla* with occurrences of *Eucalyptus wandoo* subsp. *wandoo* and *Xanthorrhoea preissii.* This community occurs on soil defined by the intersection of the Guildford and Forrestfield Units of the Ridge Hill Shelf.

Floristic Community Type 20c – Eastern shrublands and woodlands. Safstrom and Taman (1999) estimate that 40ha of the 66.77ha in reserve 23953 is of this community. In addition it extends into Location 11314 and the cemetery reserve 6955. It also includes taxa more common on the scarp, *Templetonia biloba* and *Neurachne alopecuroidea*, a taxon more typical of the marri-wandoo woodlands of the heavy soils (Gibson *et al.*, 1994). This community is identified by the presence of *Banksia attenuata* and *B. menziesii* and is located in the Forrestfield Unit of the Ridge Hill Shelf. This community includes the following vegetation units identified during the survey:

Low Woodland of *Banksia menziesii* and *Banksia attenuata*; and

Open Forest of *Eucalyptus marginata* subsp. *thalassica.*

1,023ha remains of the original 11,367ha (9%) Forrestfield Complex. Therefore any vegetation community within this landform should be retained, as the target to be achieved is at least 10% of the original extent of the vegetation although the proposed protection in Bush Forever is 5% (Bush Forever, Government of Western Australia, 2000).

4.3 Regional Assessment

Floristic Community Type 20c comprises most of the bushland of the Midland Cemetery. This community type is known from two areas, the Talbot Road Bushland and Bushmead Rifle Range. About 96.93ha $\pm$ 23.464ha of this community type is known to remain, none of which is in conservation reserves. About 38ha is vested with the Commonwealth of Australia (Bushmead Rifle Range), 36ha is vested with the Shire of Swan and about 5ha is unvested. Regionally it is extremely significant. Floristic Community Type 3c is more widespread although it is estimated there is approximately 116.3ha $\pm$ 23.9ha of the community remaining on twenty widely separated remnants, one of which is a Nature

Reserve. The remaining 19 remnants occur in Non-CALM Act Reserve, Vacant Crown Land and Freehold Non-CALM (M. Hoskins, pers. comm.[1]).
Department of Conservation and Land Management (English, 2001) and Environment Australia (2001) list both of the communities as Threatened Ecological Communities.

4.4 Linkage to Other Bushland Areas

There is no adjacent bushland to this area. Talbot Road Bushland is included as part of the regionally significant fragmented bushland/wetland linkage. This linkage extends from the bushland corridor at the base of the foothills, past Talbot Road Bushland to the largely contiguous bushland corridor along the Great Northern Highway. It is therefore an important part/link of this corridor. It is also part of Greenways 45 (Tingay, Alan and Associates, 1998) linking with lower Jane Brook and Whiteman Park.
Consideration should therefore be given to extending the Talbot Road Bushland to include the cemetery bushland and adjacent vacant crown land thus conserving this total, restricted bushland.

4.5 Commonwealth Biodiversity Legislation

None of the taxa recorded in the Midland Cemetery bushland are listed by Environment Australia as endangered.
Two of the Floristic Community Types (Appendix E, Figure 4) recorded at Midland Cemetery are listed as Threatened Ecological Communities by Environment Australia under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) (Environment Australia, 2001). Prior to the establishment of the EPBC Act threatened species and ecological communities were listed under the Endangered Species Protection Act 1992. Taxa or Communities listed under the original act will retain their classification, although vulnerable and extinct have now been added under the 1999 Act to the original endangered under the 1992 Act. As both these Floristic Community Types were listed in Schedule 2 of the Endangered Species Protection Act they are classified as "Endangered".
In this schedule the listing is as below:

- ***Corymbia calophylla – Xanthorrhoea preissii* Woodlands and Shrublands of the Swan Coastal Plain.** It is characterised by woodlands with common taxa including *Corymbia calophylla, Xanthorrhoea preissii* and *Dryandra nivea* with *Eucalyptus wandoo* subsp. *wandoo* as an occasional dominant. It occurs on the driest soils and on sites with lowest rainfall compared to the other three *Corymbia calophylla* communities that occur on the heavy soils of the eastern Swan Coastal Plain. Introduced species include *Briza maxima* and *Romulea rosea* but weed levels in most are quite low. The mean richness for the plots surveyed is 48 taxa per $100m^2$. The remaining seven patches are threatened by clearing, weed invasion, too frequent fires, hydrological changes due to clearing and draining. Originally this community would have extended from Bullsbrook to Waterloo but has been reduced by at least 97%.
- **Shrubland and Woodlands of the eastern Swan Coastal Plain.** It is characterised by shrubland or woodland of *Banksia attenuata* and *B. menziesii*, sometimes with *Allocasuarina fraseriana*, over diverse shrub and herb layers. It

[1] WA Threatened Species and Communities Unit, Department of Conservation and Land Management

occurs on soils mapped as the Forrestfield Unit of the Ridge Hill Shelf, which occur as undulating spurs at the foot of the scarp, and is dominated by gravelly and sandy soils. The mean richness for the plots surveyed is 64 taxa per 100 m^2. The two remaining patches are under threat by weed invasion, hydrological changes due to clearing and draining, too frequent fires and dieback resulting from *Phytophthora cinnamomi*. The Forrestfield Unit consists of a one to three kilometre wide belt between the Darling and Gingin Scarps and Darling Fault, from Walyunga National Park to Harvey, so it likely to have always been rare prior to human intervention.

All ecological communities classified by English (2001) as 'critically endangered' and some as 'endangered' are listed under the EPBC Act as 'endangered'.
If development of the cemetery is to be continued a referral will need to be made to Environment Australia on a special form. If it is determined there will be a significant impact on the viability of the Threatened Ecological Community a Commonwealth environmental impact assessment and approval will be required.
In addition the Talbot Road Natural Bushland, comprising Reserve A23953 Swan Location 5524, Reserve 6955 Location 11313 and Swan Location 11314 and 11764 is included on the Register of the National Estate Database (Australian Heritage Commission, 2001). Two areas were excluded:

- the landscaped part of the cemetery and
- the degraded sand/gravel pit.

Owners of registered places are not required to change the way in which they manage, maintain, or dispose of their property. The Talbot Road bushland is listed by the National Trust (WA), which carries no legal requirements for owners.

4.6 Vegetation Community Viability

Midland Cemetery has been used for decades. It is surrounded by houses on three sides and the tracks appear to be well used by local residents. Most of the remnant vegetation is in excellent condition so the vegetation has already existed with development for many years.

4.6.1 Important Vegetation Communities

All of the Midland Cemetery bushland, except for the old sand/gravel pit has vegetation communities listed as Threatened Ecological Communities by Environment Australia under the Environment Protection and Biodiversity Conservation Act 1999 (Environment Australia, 2001). Therefore the bushland at Midland cemetery is extremely important. In addition one Priority 1 taxon, three Priority 3 taxa (Government of Western Australia, 2000) were recorded from the bushland and two taxa regarded as significant in Bush Forever (Government of Western Australia, 2001).

4.6.2 Size of Communities

The communities are of reasonable size but if combined with Talbot Road Bushland the total area of both Floristic Community Types would be enhanced and increased to an even larger area.

4.6.3 Condition of Communities

The vegetation units described for the Midland Cemetery bushland are predominantly in very good to excellent condition. The edges of tracks and roads are degraded but has the potential to be restored to a very good condition. The sections of vegetation units bounding the degraded sand/gravel pit recorded more disturbance than further away but again this "edge effect" should be readily restored once a decision is made on the final use of the old pit.

Although there is an avenue of *Pinus radiata* on the eastern side of the current cemetery adjacent to the bushland, there were no seedlings or younger plants of this taxon recorded in the bushland. However *P. radiata* is rated by the Department of Conservation and Land Management (1999) as a moderate environmental weed that can invade into the bushland so monitoring should occur and any young plants seen should be removed.

Nearly 84% of the total of 60 weed taxa recorded in the surveys were found at the old sand pit. Fifteen were only recorded from the sand pit, with the remaining 45 scattered in the bushland. Although 7 weed taxa are listed as high category environmental weeds, as having invasive and impacts on the vegetation these are scattered except along the tracks and not dominant through the bushland.

4.6.4 Threatening Processes

Only the large sand pit fragments the vegetation communities. Children have made a BMX trail through the pit, which appears well used. The first vegetation survey was undertaken during the school holidays and a group of about 10 children under the supervision of an adult were riding in the area. It is now used by cemetery staff as a dump as several old headstones, surplus sand and prunings were dumped and by local residents for the dumping of rubbish. As the area is beyond rehabilitation to the original vegetation it would be better suited to burials/memorials after levelling.

Two cubbies, presumably built by children, were seen during the spring survey in the bushland. One had used the starpicket and droppers from Quadrat 5 for their building and destroyed several shrubs to develop the shelter (Appendix C, p17). Both the cubbies were close to Miles Road.

Tracks also dissect the bushland allowing weeds to be introduced into the area. The number of tracks should be rationalised although when the survey was undertaken several people were enjoying using them for walking. The tracks that are closed, must be rehabilitated using seed collected from the adjacent bushland and appropriate for the vegetation unit. Safstrom and Taman (1999) have a track rationalisation plan which should be followed as it still allows access through the bushland to and from all areas.

Fires are a threatening process as the natural vegetation cover is opened allowing weeds to become established. The north west corner had been burnt within the last 5 years, yet the vegetation had recovered very well with few weed taxa persisting. If the vegetation is kept in good condition weeds will be reduced considerably.

Dieback is present in the area although it did not appear to be active. Safstrom and Taman (1999) have mapped the presence of dieback in the area from information sourced in a CALM survey undertaken in 1998. All of the Floristic Community Type 20c, Eastern shrublands and woodlands, were recorded as being infested with dieback and Floristic Community Type 3c as uninterpretable. Taxa in the family Proteaceae are

susceptible to dieback as well as jarrah and *Xanthorrhoea* species. There were a few tall dead jarrah trees noted on the south west corner but most appeared quite healthy. Very few *Banksia attenuata* and *B. menziesii* were recorded dead, but most of the deaths could be put down to fire. Also throughout metropolitan Perth there have been many deaths of trees, including those not susceptible to dieback (e.g. marri) due to the recent, long dry and hot summer. However, as dieback has been recorded, a dieback management plan should be prepared and tracks which pass through the low-lying wetter areas should be closed. If it is not feasible to close tracks then signs should be erected informing those who walk the tracks about the presence of dieback and how it will affect the bushland. In addition signs should inform those using the tracks on the care they should take to ensure minimal spread of dieback Dieback is a major threat to this bushland.
The formal cemetery is placed close to the southern boundary of the reserve. There is a naturally vegetated strip acting as a buffer between the formal cemetery and residences, 40m wide along Blanchard Road and approximately 60m wide along Myles Road. This should be retained as it provides an aesthetic setting for the residents in both these roads and also for the cemetery visitors.

4.7 Assessment of Protection Values

The assessment of protection values takes into account several factors including:

- presence of Threatened Ecological Communities;
- presence of rare, priority or signficant flora;
- vegetation condition as assessed in the report;
- variation in the vegetation units recorded; and
- the potential to rehabilitate degraded areas.

Table 11. Assessment of Protection Values for Vegetation at Midland Cemetery

SCALE	DESCRIPTION
1	Includes Threatened Ecological Community by Environment Australia (EPBC Act) and/or CALM (English, 2001); Presence of Rare or Priority Flora; vegetation in excellent to pristine condition.
2	Scale 1 but where vegetation is good; includes Significant Taxa.
3	Vegetation degraded but has the potential to be restored to a better condition.
4	Vegetation in poor condition.
5	Developed. Vegetation severely altered.

All the bushland, except the sand/gravel pit at Midland Cemetery, is regarded as having the highest protection value due to all the vegetation being listed as Threatened Ecological Communities by Environment Australia under the Environment Protection and Biodiversity Conservation Act 1999. The bushland at Midland Cemetery includes only small areas that are so degraded as not to be considered important. The protection values at Midland cemetery are described in Table 11 and illustrated in Appendix E, Figure 5.

4.7.1 Protection Value 1

At Midland Cemetery all the area is realistically of high protection value due to the two ecological communities present being listed as Threatened Ecological Communities by

Environment Australia under the Environment Protection and Biodiversity Conservation Act 1999. This indicates that the vegetation communities are rare and threatened and therefore essential to be conserved.
Other considerations are the presence of rare and priority flora, condition of the bushland, linkage with other bushland areas and distribution within the cemetery. The north west and north east corners need to be protected due to the presence of Priority 3 flora, *Isopogon drummondii, Lambertia multiflora* var. *darlingensis* and *Synaphea acutiloba*.
Edges of the tracks and the roads are typically degraded but the remainder of the vegetation is very good to excellent and all should be readily rehabilitated.

4.7.2 Protection Value 2

The vegetation indicated as Protection Value 2 is Floristic Community Type 20c so is protected under the Environment Protection and Biodiversity Conservation Act 1999. It includes several plants of the Priority 3 taxon, *Lambertia multiflora* subsp. *darlingensis* but was determined to have a vegetation condition of 4-5.

4.7.3 Protection Value 3

The south west corner of the Open Forest of *Eucalyptus marginata* subsp. *thalassica* over a Tall Shrubland over a Low Shrubland is degraded. The remainder of the vegetation unit is in good condition. Although this area is more degraded than the areas included in Protection Values 1 and 2 there is only a limited amount of this vegetation unit in the cemetery bushland and it should be considered for retention. It also acts as a very important buffer between the road and the cemetery and forms a pleasant backdrop for the graves. Consideration could be given to using this area for memorials, rather than burials.
The other areas nominated also require rehabilitation. There is a good tree canopy but the understorey is degraded. Most of the weeds are readily removed with a selective herbicide, but once this occurs the area must be seeded with appropriate species for that particular vegetation unit.

4.7.4 Protection Value 4

These areas are highly degraded with very few or no native understorey taxa present. They do have the potential with effort to be restored to a reasonable vegetation condition but it will require time and persistent effort. However it is recommended that this be considered.

4.7.5 Protection Value 5

The degraded area of the old sand/gravel pit, which is reasonably extensive in area and the cemetery, are the only sections of low protection. An area to the east of the current graves has recently been cleared and pegged out for burials allowing for limited expansion.

4.8 Vegetation Management Issues

Vegetation Management Issues are discussed below on the assumption that only the old sand/gravel pit and the current burial area undergo further development pending approval of any application to the Commonwealth Minister for the Environment to utilise parts of the bushland that is a trigger under the EPBC Act (1999).

4.8.1 General Issues

- Obtain permission from the Commonwealth Minister of the Environment if any of the vegetation is to be disturbed as both the Floristic Community Types in the Midland Cemetery bushland are listed as Endangered by Environment Australia.
- Dieback will continue to be an issue so monitoring of the area must occur on a regular basis. Training some of the volunteers involved with The Friends of Talbot Road Bushland and enlisting their assistance could achieve this.
- Ensure that no further exotic plants are planted in the areas adjacent to the bushland. Exotic plants include all plants not naturally occurring within that particular vegetation unit.

4.8.2 Short Term issues

- Commence the closure of unnecessary tracks through the bushland as illustrated in Safstrom and Taman (1999). This can be achieved by the placement of bollards across the closed tracks. An article in the local paper explaining the importance of the vegetation and why the tracks are to be closed should occur. The Friends of Talbot Road Bushland should be approached for agreement on these closures. This group often has publicity in the local paper.
- Treat the edges of the closed tracks for weeds, using acceptable techniques and preferably undertaken by someone who has sympathy for the vegetation.
- Undertake maintenance of the fence around Midland Cemetery on Blanchard and Myles Roads.
- Remove or crush car bodies and other rubbish from the pit prior to landscaping.
- Ensure all staff undertake training in the fire management plan and are efficient with its implementation.
- Develop a dieback management plan and ensure all staff understand the importance of the plan and its management.

4.8.3 Medium Term Issues

- Removal of weeds and rehabilitation of degraded areas around the perimeter of the vegetation backing on to the houses especially adjacent to the compensation basin in Natham Road.
- Continue to close and rehabilitate tracks.
- Manage the bushland to be protected at the Midland Cemetery and Talbot Road Bushland as a single entity.
- Consider the tenure of the bushland and its possible transfer to CALM for management as an A-Class Reserve.
- Commence the landscaping or rehabilitation of the old sand/gravel pit.

4.8.4 Long Term Issues

- Continue weed removal and ensure full rationalisation of tracks.

- Continue monitoring for spread of dieback. If additional dieback areas identified, ensure immediate treatment.
- Prepare information on the vegetation to be distributed to adjacent residences and visitors to the bushland.

5 DISCUSSION

The bushland at the Midland Cemetery is restricted and in excellent condition (Government of Western Australia, 2000) with only the current cemetery and the old sand pit being completely degraded. The perimeter edges, adjacent to residences, tracks and roads, are also degraded and could be rehabilitated back to the original vegetation unit.

Both the Floristic Community Types, 3c and 20c are listed as Threatened Ecological Communities under the EPBC Act (1999). Further clearing of the Midland Cemetery bushland should be avoided. An area to the east of the current cemetery was recently cleared and pegged for burial sites. Permission must be obtained from the Commonwealth Minister for the Environment before any clearing.

Dieback has been identified as a major issue for the bushland. A survey undertaken by CALM in 1998 indicated that all of Floristic Community Type 20c is infected and that Floristic Community Type 3c could not be assessed. Monitoring for dieback should occur on a regular basis to ensure that any new infections are noted and treated.

The presence of one Priority 1 taxon, *Tripterococcus paniculata*, three Priority 3 taxa, *Lambertia multiflora* var. *darlingness, Isopogon drummondii* and *Synaphea acutiloba* further adds to the biological asset of the area. The latter three taxa belong to the family Proteaceae, a family very susceptible to dieback, so monitoring of these taxa should occur. This should be undertaken each time the area is monitored for dieback.

A Friends of Talbot Road Bushland is already active with work being undertaken on the frogs in the area. By seeking support from this group it is likely that funds could be attracted to rehabilitate tracks, undertake weed removal, conduct dieback monitoring and treatment etc.

Consideration should be given to combining the Midland Cemetery bushland with the Talbot Road Bushland as one entity. Consideration should be given to the tenure of this combined bushland with a possible transfer to CALM for management as an A-class Reserve. This would ensure the continuation of this rare bushland and may encourage the members of the Friends of Talbot Road Bushland to become involved in the monitoring and rehabilitation of the area.

Tracks should be rationalised using the plan suggested by Safstrom and Taman (1999). This will ensure that access through the bushland is available to all. Vehicle tracks are essential for maintenance and fire management and these have also been considered in that plan. Once the tracks are closed weeds should be removed and the area rehabilitated with seed collected from the Midland Cemetery bushland and relevant to that particular vegetation unit.

Fire will continue to be a problem in the area. An education program for all the residents within a 1km radius of the bushland should be provided with information on the destructive effect of fire on the vegetation. A fire management plan has been prepared and staff at the cemetery should be educated in its implementation.

Dogs must be kept on a leash when walked through the bushland and notices stating this should be erected at all bushland entrances.

As the old sand/gravel pit is degraded and it would be an impossible task to rehabilitate back to the natural vegetation, it is recommended that this area be utilised for additional cemetery purposes.

Informative signs and/or literature should be available on aspects of the vegetation communities present, the flora and fauna of the area. The Friends of Talbot Road Bushland often have articles in the local paper on the work they are doing and the assistance provided by fauna specialists in monitoring the fauna of the area. If they are encouraged to assist with aspects of the Midland Cemetery bushland they should be encouraged and assisted by Cemetery and Shire of Swan staff with the publication of similar articles.

6 RECOMMENDATIONS

Due to the very good to excellent condition and rareness of this bushland the main recommendation is that consideration be given to managing the bushland of the Talbot Road Bushland and the Midland Cemetery as one entity. This combined bushland should be given A-class classification, and vested in the Conservation Commission (Markey, 1997) and managed by CALM. However the excision of the old sand/gravel pit occurs linkage should be maintained between Location 11314 and the remainder of the bushland. This can be achieved by a corridor at least 40m wide, which is rehabilitated with the appropriate taxa along Blanchard Road.

The edge of the cemetery that abuts with the bushland must only have taxa native to that vegetation community planted, however gardens with exotic taxa can be planted away from the boundaries, as is the current situation with the old cemetery.

The bushland must be managed and maintained for its;

- endangered vegetation communities
- priority taxa within the area and
- as one entity, either by the City of Swan or CALM.

Continued monitoring on a regular basis must occur;

- of the permanent quadrats established during this and previous surveys and
- for the presence of new dieback occurrences by professional dieback qualified personnel.

Interpretation should be developed;

- for major entrances as at other bushland reserves,
- stating all dogs must be on leads,
- as informative signposting as occurs at CALM areas,
- as interpretative information and sent to schools for their use prior to visiting the reserve and
- as regular media stories about the importance of the area and the continuing conservation work being undertaken.

Action plans should be developed and regularly reviewed for;

- weed control techniques and methods in conjunction with a professional practitioner to ensure the correct spray and/or techniques are applied,
- rehabilitation methods, including ground preparation, seeding and planting techniques,
- fire protection and management;
- seed collection and storage as well as
- monitoring and accepted treatment methods for dieback.

After a fire, the permanent quadrats in the fire devastated area(s) should be monitored for the plants germinating or regrowing especially the weed taxa. These results should then be compared to the original data collected when the quadrats were established.

The Friends of Talbot Road Bushland must be encouraged in their activities and assistance provided where appropriate.

7 REFERENCES

Australian Heritage Commission (2001). http://www.ea.gov.au

Beard, J.S. (1981). *Vegetation Survey of Western Australia, Swan.* University of Western Australia Press, Crawley

Bennett, E.M. (1993). *Common and Aboriginal Names of Western Australian Plant Species.* Wildflower Society of WA, Eastern Hills Branch, Glen Forrest

Biggs, E.R. and Wilde, S.A. (1980). *Geology, Mineral Resources and Hydrology of the Darling System, Western Australia.* Department of Conservation and Environment, Perth, Western Australia

Churchward, H.M. and McArthur, W.M. (1980). *Landform and Soils of the Darling System* In *Atlas of Natural Resources, Darling System, Western Australia.* Department of Conservation and Environment, Perth, Western Australia

Department of Conservation and Land Management (1999). *Environmental Weed Strategy for Western Australia*

English, V. (2001). List of Communities on CALM's Threatened Ecological Community data base

Environment Australia. (2001). http://www.erin.gov.au

Gibson, N., Keighery, B.J., Keighery, G.J., Burbidge, A.H., Lyons, M.N. (1994). *A Floristic Survey of the Southern Swan Coastal Plain.* Unpublished report for the Australian Heritage Commission prepared by the Department of Conservation and Land Management and the Conservation Council of Western Australia (Inc.)

Government of Western Australia. (2000). *Bush Forever.* Department of Environmental Protection

Grieve, B.J. (1998). *How to Know Western Austalian Wildflowers – Part II.* Univserity of Western Australia Press, Crawley

Government of Western Australia. (1998). *Perth's Bushplan.* Western Australian Planning Commission

Government of Western Australia.. (2000). *Bush Forever.* Department of Environmental Protection

Heddle, E.M., Loneragan, O.W., Havell, J.J. (1980). *Vegetation of the Darling System* In *Atlas of Natural Resources, Darling System, Western Australia.* Department of Conservation and Environment, Perth, Western Australia

Hussey, B.M.J., Keighery, G.J., Cousens, R.D., Dodd, J., Lloyd, S.G. (1997). *Western Weeds – A guide to the weeds of Western Australia.* Plant Protection Society of Western Australia

Keighery, G.J. and Keighery, B.J. (1993). *Floristics of Reserves and Bushland Areas of the Perth Region (System 6), Parts V-IX.* Wildflower Society of WA (Inc.), Nedlands

Keighery, B.J. and Trudgen, M.E. (1992). *The Remnant Vegetationof the Eastern Side of the Swan Coastal Plain.* Unpublished report to the Department of Conservation and Land Management for the National Estate Grants Program

Marchant, N.G., Wheeler, J.R., Rye, B.L., Bennett, E.M., Lander, N.S., Macfarlane, T.D. (1987). *Flora of the Perth Region.* Western Australian Herbarium

Markey, A. (1997). *A Floristic Survey of the Northern Darling Scarp.* Unpublished report to the Western Australian Department of Conservation and Land Management, Department of Environmental Protection and the Cosnervation Council of Western Australia (Inc.) for the Australian Heritage Commission, Canberra, ACT.

Meney, K.A. and Pate, J.S. (1999). *Australian Rushes.* University of Western Australia Press, Crawley

Peter Cala and Associates. (1997). *Midland Cemeteries, Master Planning Review.* Metropolitan Cemeteries Board

Safstrom, R. and Taman, L (1999). *Talbot Road Bushland Management Plan.* Unpublished report for the Friends of Talbot Road Reserve, Shire of Swan and Department of Conservation and Land Management

Tingay, Alan and Associates. (1998). *A Strategic Plan for Perth's Greenways – Final Report.* Prepared for Environment Australia, Ministry for Planning

Trudgen, M.E. (1991). *Vegetation Classification Scale* In National Trust (WA) 1003 Urban Bushland Policy. National Trust of Australia (WA), Wildflower Society of Western Australia (Inc.) and the Treee Society (Inc.) Perth, Western Australia

Van Der Moezel, P. (2000a) Correspondence in July 2000 to Metropolitan Cemeteries Board

Van Der Moezel, P. (2000b) Correspondence in November 2000 to Metropolitan Cemeteries Board

Western Australian Herbarium (2001). *FloraBase.* Department of Conservation and Land Management. http://www.calm.wa.gov.au/science/florabase.html

Western Australian Herbarium. (2001). *Max*. Department of Conservation and Land Management

APPENDIX A

List of taxa recorded from the Midland cemetery bushland

FAMILY	SCIENTIFIC NAME	COMMON NAME
ZAMIACEAE	*Macrozamia riedlei*	Zamia
POACEAE	**Aira caryophyllea*	
	Amphipogon turbinatus	
	**Arundo donax*	Giant reed (Bamboo)
	Austrodanthonia occidentalis	
	Austrostipa compressa	
	Austrostipa pycnostachya.	
	**Avena barbata*	Bearded oat
	**Briza maxima*	Blowfly grass
	**Briza minor*	
	**Bromus diandrus*	
	**Ehrharta calycina*	Perennial veldt grass
	**Ehrharta longiflora*	Annual veldt grass
	**Eragrostis curvula*	African lovegrass
	**Lolium rigidum*	
	**Pennisetum setaceum*	Fountain grass
	Poa drummondiana	
	Poa serpentum	
	**Melinis repens*	Natal redtop
	Neurachne alopecuroidea	Foxtail mulga grass
	**Vulpia myuros*	
CYPERACEAE	*Cyathotheca avenacea*	
	Isolepis marginata	
	Lepidosperma angustatum	
	Lepidosperma leptostachyum	
	Lepidosperma scabrum	
	Lepidosperma squamatum	
	Lyginia barbata	
	Mesomelaena pseudostygia	
	Mesomelaena tetragona	Semphore sedge
	Schoenus brevisetis	
	Schoenus curvifolius	
	Schoenus unispiculatus	
	Tetraria octandra	
	Tricostularia neesii	
RESTIONACEAE	*Chordifex sinuosus*	
	Desmocladus fasciculatus	
	Desmocladus flexuosum	
	Hypolaena exsulca	
	Loxocarya cinerea	
CENTROLEPIDACEAE	*Centrolepis mutica*	
ANTHERICACEAE	*Agrostocrinum scabrum*	
	Dichopogon preissii	
	Borya sphaerocephala	Pincushion plant
	Caesia parviflora	
	Chamaescilla corymbosa	
	Johnsonia pubescens	Pipe lily
	Laxmannia ramosa	Branching lily

FAMILY	SCIENTIFIC NAME	COMMON NAME
ANTHERICACEAE (cont.)	*Laxmannia sessiliflora* subsp. *australis*	
	Laxmannia squarrosa	
	Sowerbaea laxiflora	
	Thysanotus manglesianus	
	Thysanotus multiflorus	
	Thysanotus thyrsoideus	
	Thysanotus sparteus	
	Tricoryne elatior	
COLCHICACEAE	*Burchardia multiflora*	
	Burchardia umbellata	
DASYPOGONACEAE	*Calectasia narragara*	
	Chamaexeros serra	
	Dasypogon bromeliifolius	Pineapple bush
	Dasypogon obliquifolius	
	Kingia australis	Black gin
	Lomandra caespitosa	
	Lomandra preissii	
	Lomandra sericea	
XANTHORRHOEACEAE	*Xanthorrhoea brunonis* subsp. *brunonis*	Grasstree
	Xanthorrhoea preissii	Balga
HAEMODORACEAE	*Anigozanthos humilis* subsp. *humilis*	Cats paw
	Anigozanthos manglesii subsp.*manglesii*	Red and green kangaroo paw
	Conostylis aculeata subsp. *aculeata*	Prickly conostylis
	Conostylis aurea	Golden conostylis
	Conostylis serrulata	
	Conostylis setigera subsp. *setigera*	
	Haemodorum laxum	Blood root
	Haemodorum simplex	
	Haemodorum spicatum	
AMARYLLIDACEAE	**Amaryllis belladonna*	Belladonna lily
	**Narcissus tazetta*	Jonquil
IRIDACEAE	**Babiana angustifolia*	Baboon flower
	**Freesia* hybrid	Freesia
	**Gladiolus caryophyllaceus*	Pink gladiolus
	**Hesperantha falcata*	
	**Moraea flaccida*	One leaf cape tulip
	**Romulea rosea*	Guildford grass
	Patersonia juncea	
	Patersonia occidentalis	Purple flag
ORCHIDACEAE	*Caladenia flava*	
	Caladenia longicauda subsp. *longicauda*	
	Cyanicula deformis	Blue orchid
	**Disa bracteata*	South African orchid
	Diuris corymbosa	
	Prasophyllum fimbria	Fringed leek orchid
	Prasophyllum parvifolium	Autumn leek orchid
	Prasophyllum sp	Greenhood
	Pterostylis vittata	Banded greenhood
	Thelymitra sp.	Sun orchid

FAMILY	SCIENTIFIC NAME	COMMON NAME
CASUARINACEAE	*Allocasuarina humilis*	Scrub sheoak
	Allocasuarina thuyoides	
PROTEACEAE	*Adenanthos cygnorum subsp. cygnorum*	Woolly bush
	Banksia attenuata	Slender banksia
	Banksia menziesii	Firewood banksia
	Conospermum stoechadis subsp. *sclerophyllum.*	Smoke bush
	Dryandra armata var. *armata*	Prickly dryandra
	Dryandra lindleyana	Couch honeypot
	Dryandra sessilis subsp. sessilis	Parrot bush
	Grevillea bipinnatifida subsp. *bipinnatifida*	Native Fuschia
	Hakea auriculata	
	Hakea erinacea	Hedgehog hakea
	Hakea incrassata	Marble hakea
	Hakea lissocarpha	Honey bush
	Hakea myrtoides	Myrtle hakea
	Hakea prostrata	Harsh hakea
	Hakea ruscifolia	Candle hakea
	Hakea stenocarpa	Narrow fruited hakea
	Hakea sulcata	
	Hakea trifurcata	Two leaf hakea
	Hakea undulata	Wavy leaf hakea
	Hakea varia	Variable leaved hakea
	Isopogon asper	
	Isopogon drummondii	
	Lambertia multiflora subsp. *darlingensis*	Many flowered honeysuckle
	Persoonia angustiflora	
	Petrophile linearis	Pixie mops
	Petrophile macrostachya	
	Stirlingia latifolia	Blueboy
	Synaphea acutiloba	
	Synaphea gracillima	
	Xylomelum occidentale	Woody pear
LORANTHACEAE	*Nuytsia floribunda*	Christmas tree
AMARANTHACEAE	*Ptilotus gaudichaudii*	
	Ptilotus manglesii	Pompoms
MOLLUGINACEAE	*Macarthuria australis*	
PORTULACACEAE	*Calandrinia corrigioloides*	
CARYOPHYLLACEAE	**Petrorhagia velutinea*	
	**Silene gallica*	French catchfly
LAURACEAE	*Cassytha flava*	Dodder laurel
	Cassytha racemosa	
FUMARIACEAE	**Fumaria capreolata*	White fumitory
	**Fumaria muralis*	
BRASSICACEAE	**Raphanus raphanistrum*	Turnip weed
	**Ricinus communis*	Castor oil tree
	Stenopetalum filifolium	
DROSERACEAE	*Drosera erythrorhiza*	Red ink sundew

FAMILY	SCIENTIFIC NAME	COMMON NAME
DROSERACEAE (cont)	*Drosera glanduligera*	
	Drosera macrantha	Bridal rainbow
	Drosera menziesii	Pink rainbow
	Drosera nitidula	
	Drosera pallida	Pale rainbow
CRASSULACEAE	*Crassula colorata* var. *colorata*	
PITTOSPORACEAE	*Pronaya fraseri* var. *fraseri*	Eleagant pronaya
MIMOSACEAE	*Acacia applanata*	
	Acacia auronitens	
	Acacia huegelii	
	Acacia pulchella var. *pulchella*	Prickly moses
	Acacia saligna	Orange wattle
	Acacia sessilis	
	Acacia teretifolia	
PAPILIONACEAE	*Bossiaea eriocarpa*	Common brown pea
	**Chamaecytisus palmensis*	Tagasaste
	Chorizema dicksonii	Yellow eyed flame pea
	Daviesia angulata	
	Daviesia horrida	Prickly bitter pea
	Daviesia incrassata subsp. *incrassata*	
	Daviesia triflora	
	Dillwynia sp. A Flora Perth Region	
	Gompholobium aristatum	
	Gompholobium confertum	
	Gompholobium marginatum	
	Gompholobium tomentosum	Hairy yellow pea
	Hovea trisperma var. *trisperma*	Common hovea
	Isotropis cuneifolia	
	Jacksonia alata	
	Jacksonia angulata	
	Jacksonia floribunda	Holly pea
	Jacksonia restioides	
	Jacksonia sternbergiana	Stinkwood
	Kennedia prostrata	Red runner
	**Lathyrus tingitanus*	Tangier pea
	**Lupinus angustifolius*	Narrowleaf lupin
	**Lupinus consentinii*	Western Australian blue lupin
	**Medicago polymorpha*	
	**Melinis repens*	
	Nemcia spathulata	
	Pultenaea ericifolia	
	Sphaerolobium medium	
	Templetonia biloba	Horned templetonia
	**Trifolium angustifolium*	Narrowleaf clover
	**Trifolium arvense*	
	**Trifolium campestre*	
	**Trifolium dubium*	
	**Vicia benghalensis*	
	**Vicia sativa*	Common vetch

FAMILY	SCIENTIFIC NAME	COMMON NAME
OXALIDACEAE	**Oxalis glabra*	Finger leaf oxalis
	**Oxalis pes-caprae*	Soursob
	**Oxalis purpurea*	Four o'clock
RUTACEAE	*Boronia ramosa* subsp. *anethifolia*	
	Philotheca spicata	Pepper and salt
MELIACEAE	**Melia azedarach*	Cape lilac
POLYGALACEAE	*Comesperma calymega*	
EUPHORBIACEAE	*Monotaxis grandiflora*	
	Phyllanthus calycinus	False boronia
STACKHOUSIACEAE	*Tripterococcus brunonis*	
	Tripterococcus paniculatus	
ANACARDIACEAE	**Schinus terebinthifolia*	Japanese pepper
RHAMNACEAE	*Cryptandra arbutiflora*	
	Stenanthemum notiale subsp. *chamelum*	
MALVACEAE	**Malva parviflora*	Small flowered mallow
DILLENIACEAE	*Hibbertia acerosa*	
	Hibbertia commutata	
	Hibbertia huegelii	
	Hibbertia hypericoides	Yellow buttercups
TAMARICACEAE	**Tamarix aphylla*	Tamarix
VIOLACEAE	*Hybanthus calycinus*	Wild violet
THYMELAEACEAE	*Pimelea imbricata*	
MYRTACEAE	*Baeckea camphorosmae*	Camphor myrtle
	Beaufortia purpurea	
	Calothamnus sanguineus	Silky leaved blood flower
	Calytrix flavescens	Summer starflower
	Corymbia calophylla	Marri
	Eremaea asterocarpa var. *asterocarpa*	
	Eremaea pauciflora	
	Eucalyptus marginata subsp. *thalassica*	Blue leaved jarrah
	Eucalyptus wandoo subsp. *wandoo*	Wandoo
	Hypocalymma angustifolium	Coconut ice
	Kunzea recurva	
	Leptospermum erubescens	
	**Leptospermum laevigatum*	Victorian teatree
	Melaleuca parviceps	
	Regelia ciliata	
	Scholtzia involucrata	Spiked scholtzia
	Verticordia huegelii	
HALORAGACEAE	*Glischrocaryon* sp.	Pop flower
	Gonocarpus cordiger	
APIACEAE	**Foeniculum vulgare*	Fennel
	Homalosciadium homalocarpum	
	Trachymene pilosa	Native parsnip
	Xanthosia candida	
	Xanthosia huegelii	
EPACRIDACEAE	*Andersonia lehmanniana*	
	Conostephium pendulum	Pearl flower
	Leucopogon polymorphus	

FAMILY	SCIENTIFIC NAME	COMMON NAME
EPACRIDACEAE (cont)	*Leucopogon propinquus*	
	Leucopogon pulchellus	Beard heath
	Leucopogon sprengelioides	
	Lysinema ciliatum	Curry flower
PRIMULACEAE	*Anagallis arvensis* var. *arvensis*	Pimpernel
	Phyllangium paradoxum	
BORAGINACEAE	**Echium plantagineum*	Paterson's curse
LAMIACEAE	*Hemiandra pungens*	Snake plant
SOLANACEAE	**Solanum nigrum*	Black berry nightshade
SCROPHULARIACEAE	**Parentucellia latifolia*	Red bartsia
	**Parentucellia viscosa*	
PLANTAGINACEAE	**Plantago lanceolata*	Ribwort plantain
RUBIACEAE	*Opercularia vaginata*	Dog weed
CAMPANULACEAE	**Wahlenbergia capensis*	
	Wahlenbergia multicaulis	
LOBELIACEAE	*Lobelia rhytidosperma*	
GOODENIACEAE	*Dampiera linearis*	
	Goodenia caerulea	
	Lechenaultia biloba	Blue leschenaultia
	Scaevola canescens	Grey scaevola
	Scaevola repens var. *repens*	
STYLIDIACEAE	*Stylidium affine*	Queen triggerplant
	Stylidium amoenum	Lovely triggerplant
	Stylidium brunonianum	
	Stylidium bulbiferum	Circus triggerplant
	Stylidium piliferum	Common butterfly triggerplant
	Stylidium repens	Matted triggerplant
	Stylidium ? piliferum	
ASTERACEAE	**Arctotheca calendula*	Capeweed
	Blennospora drummondii	
	Brachyscome iberidifolia	
	**Conyza bonariensis*	Flaxleaf fleabane
	**Hypochaeris glabra*	Flatweed
	Lagenifera huegelii	Coarse lagenifera
	Olearia paucidentata	Autumn scrub daisy
	Pithocarpa pulchella	Beautiful pithocarpa
	Podolepis gracilis	
	Pterochaeta paniculata	
	**Sonchus oleraceus*	
	Trichocline spathulata	Native gerbera
	**Ursinia anthemoides*	Ursinia
	Waitzia suaveolens	

APPENDIX B

Taxa recorded from vegetation units

Abbreviation	Vegetation Description
BmBa	Low Woodland of *Banksia menziesii* and *Banksia attenuata* over an Open Low Heath over a Grassland/Sedgeland
Em	Open Forest of *Eucalyptus marginata* subsp. *thalassica* over a Tall Shrubland over a Low Shrubland over a Grassland/Sedgeland
CcXp	Woodland to Low Woodland of *Corymbia calophylla* over an Open Heath of *Xanthorrhoea preissii* over Grassland/Sedgeland dominated by *Mesomelaena pseudostygia*
Cc	Open Woodland of *Corymbia calophylla* over Open Low Heath over a Grassland/Sedgeland
Ew	Open Forest of *Eucalyptus wandoo* subsp. *wandoo* and scattered *Corymbia calophylla* over an Open Low Heath over an Open Grassland/Sedgeland
Degraded	Degraded Closed Herbland at the old sand/gravel pit.

Species	FLORISTIC COMMUNITY TYPE					Degraded
	20c		3c			
	BaBm	Em	CcXp	Cc	Ew	
Acacia applanata	✓	✓		✓		
Acacia auronitens	✓					
Acacia huegelii		✓				
Acacia pulchella var. *pulchella*	✓		✓	✓	✓	
Acacia saligna			✓			
Acacia sessilis	✓	✓	✓			
Acacia teretifolia				✓	✓	
Adenanthos cygnorum subsp. *cygnorum*	✓	✓				
Agrostocrinum scabrum		✓	✓		✓	
**Aira caryophyllea*		✓		✓		
Allocasuarina humilis	✓	✓	✓	✓	✓	
Allocasuarina thuyoides	✓	✓				
**Amaryllis belladonna*						✓
Amphipogon turbinatus	✓	✓	✓	✓		
Anagallis arvensis var. *arvensis*			✓			✓
Andersonia lehmanniana subsp. *lehmanniana*			✓	✓		
Anigozanthos humilis subsp. *humilis*			✓	✓		
Anigozanthos manglesii subsp. *manglesii*	✓	✓	✓	✓		
**Arctotheca calendula*				✓		✓
**Arundo donax* var. *donax*						✓
Austrodanthonia occidentalis	✓		✓			
Austrostipa compressa		✓	✓	✓		
Austrostipa pycnostachya				✓		
**Avena barbata*			✓			✓
**Babiana angustifolia*		✓				
Baeckea camphorosmae				✓		
Banksia attenuata	✓					✓
Banksia menziesii	✓					
Beaufortia purpurea				✓		
Blennospora drummondii				✓		
Boronia ramosa subsp. *anethifolia*		✓	✓			
Borya sphaerocephala			✓	✓	✓	
Bossiaea eriocarpa	✓	✓	✓	✓		
Brachyscome iberidifolia	✓		✓			
**Briza maxima*	✓	✓	✓	✓	✓	✓
**Briza minor*						✓
**Bromus diandrus*			✓			✓
Burchardia multiflora			✓	✓		
Burchardia umbellata	✓		✓			
Caesia parviflora			✓		✓	
Caladenia flava	✓	✓	✓			
Caladenia longicauda subsp. *longicauda*	✓					
Caladenia sp.				✓		
Calandrinia corrigioloides	✓	✓				
Calectasia narragara	✓		✓	✓		

Species	FLORISTIC COMMUNITY TYPE					Degraded
	20c		3c			
	BaBm	Em	CcXp	Cc	Ew	
Calothamnus sanguineus	✓	✓	✓	✓	✓	
Calytrix flavescens	✓	✓	✓			
Cassytha flava	✓	✓		✓		
Cassytha racemosa forma racemosa				✓	✓	
Centrolepis mutica		✓				
**Chamaecytisus palmensis*		✓			✓	✓
Chamaescilla corymbosa	✓		✓		✓	
Chamaexeros serra					✓	
Chordifex sinuosus	✓	✓	✓			
Chorizema dicksonii			✓	✓	✓	
Comesperma calymega	✓		✓			
Conospermum stoechadis subsp. *sclerophyllum*	✓	✓				
Conostephium pendulum	✓	✓				
Conostylis aculeata subsp. *aculeata*		✓	✓			
Conostylis aurea	✓					
Conostylis serrulata		✓				
Conostylis setigera subsp. *setigera*		✓	✓	✓		
**Conyza bonariensis*				✓		✓
Corymbia calophylla	✓	✓	✓	✓	✓	✓
Crassula colorata				✓		
Cryptandra arbutiflora					✓	
Cyanicula deformis				✓		
Cyathochaeta avenacea	✓		✓	✓		
Dampiera linearis			✓			
Dasypogon bromeliifolius	✓	✓	✓			
Dasypogon obliquifolius	✓					
Daviesia angulata	✓					
Daviesia incrassata subsp. *incrassata*	✓		✓	✓		
Daviesia horrida					✓	
Daviesia triflora	✓					
Desmocladus fasciculatus			✓	✓	✓	
Desmocladus flexuosus	✓					
Dichopogon preissii				✓	✓	
Dillwynia sp A. Flora Perth Region			✓			
**Disa bracteata*	✓		✓			
Diuris corymbosa			✓			
Drosera erythrorhiza	✓			✓		
Drosera glanduligera			✓	✓		
Drosera macrantha	✓			✓	✓	
Drosera menziesii			✓			
Drosera nitidula				✓		
Drosera pallida		✓	✓			
Dryandra armata var. armata					✓	
Dryandra lindleyana var. *lindleyana*	✓	✓	✓	✓	✓	
Dryandra sessilis		✓		✓		

Species	FLORISTIC COMMUNITY TYPE					Degraded
	20c		3c			
	BaBm	Em	CcXp	Cc	Ew	
**Echium plantagineum*		✓	✓			✓
**Ehrharta calycina*	✓	✓	✓	✓		✓
**Ehrharta longiflora*		✓		✓		✓
**Eragrostis curvula*		✓	✓	✓	✓	✓
Eremaea asterocarpa var. *asterocarpa*	✓					
Eremaea pauciflora var. *pauciflora*	✓	✓	✓			
Philotheca spicatus	✓	✓	✓			
Eucalyptus marginata subsp. *thalassica*		✓				
Eucalyptus wandoo subsp. *wandoo*					✓	
**Foeniculum vulgare*						✓
**Freesia* hybrid		✓		✓		✓
**Fumaria capreolata*						✓
**Fumaria muralis*						✓
**Gladiolus caryophyllaceus*	✓	✓	✓	✓	✓	✓
Glischrocaryon sp.	✓					
Gompholobium aristatum var. aristatum		✓	✓	✓		
Gompholobium confertum	✓					
Gompholobium marginatum			✓	✓		
Gompholobium tomentosum	✓	✓	✓			
Gonocarpus cordiger			✓	✓		
Goodenia caerulea			✓	✓		
Grevillea bipinnatifida subsp. *bipinnatifida*					✓	
Haemodorum laxum	✓	✓	✓	✓	✓	
Haemodorum paniculatum	✓					
Haemodorum simplex			✓			
Haemodorum spicatum		✓				
Hakea auriculata				✓		
Hakea erinacea			✓		✓	
Hakea incrassata				✓		
Hakea lissocarpha				✓	✓	
Hakea myrtoides					✓	
Hakea prostrata	✓		✓			
Hakea ruscifolia	✓	✓	✓			
Hakea stenocarpa			✓			
Hakea sulcata				✓		
Hakea trifurcata	✓	✓	✓	✓	✓	
Hakea undulata				✓	✓	
Hakea varia			✓			
Hemiandra pungens	✓		✓			
**Hesperantha falcata*	✓			✓		✓
Hibbertia acerosa			✓			
Hibbertia commutata			✓			
Hibbertia huegelii	✓	✓				
Hibbertia hypericoides			✓	✓	✓	
Homalosciadium homalocarpum			✓			

Species	FLORISTIC COMMUNITY TYPE					Degraded
	20c		3c			
	BaBm	Em	CcXp	Cc	Ew	
**Homeria flaccida*			✓			✓
Hovea trisperma var. *trisperma*		✓				
Hybanthus calycinus	✓	✓				
Hypocalymma angustifolium			✓	✓	✓	
**Hypochaeris glabra*	✓	✓	✓			✓
Hypolaena exsulca	✓	✓	✓			
Isolepis marginata		✓				
Isopogon asper			✓			
Isopogon drummondii	✓					
Isotropis cuneifolia	✓					
Jacksonia alata				✓		
Jacksonia angulata	✓					
Jacksonia floribunda	✓	✓		✓		
Jacksonia restioides	✓			✓		
Jacksonia sternbergiana			✓			
Johnsonia pubescens				✓		
Kennedia prostrata	✓	✓	✓	✓		
Kingia australis			✓	✓		
Kunzea recurva	✓					
Lagenophora huegelii					✓	
Lambertia multiflora var. *darlingensis*	✓		✓			
**Lathyrus tingitanus*				✓	✓	✓
Laxmannia ramosa subsp. *ramosa*					✓	
Laxmannia sessiliflora subsp. *australis*	✓	✓		✓		
Laxmannia squarrosa			✓	✓		
Lechenaultia biloba	✓		✓	✓	✓	
Lepidosperma leptostachyum	✓		✓	✓	✓	
Lepidosperma scabrum		✓				
Lepidosperma squamatum		✓	✓	✓	✓	
Leptospermum erubescens	✓					
**Leptospermum laevigatum*						✓
Leucopogon polymorphus			✓			
Leucopogon propinquus		✓				
Leucopogon pulchellus				✓		
Leucopogon sprengelioides			✓			
Lobelia rhytidosperma		✓				
**Lolium rigidum*						✓
Lomandra caespitosa			✓		✓	
Lomandra preissii		✓	✓	✓	✓	
Lomandra sericea			✓			
Loxocarya cinerea		✓			✓	
**Lupinus angustifolius*	✓			✓	✓	✓
**Lupinus consentinii*			✓			✓
Lyginia barbata	✓	✓				
Lysinema ciliatum	✓					

Species	FLORISTIC COMMUNITY TYPE					Degraded
	20c		3c			
	BaBm	Em	CcXp	Cc	Ew	
Macarthuria australis	✓					
Macrozamia riedlei	✓	✓				
**Malva parviflora*						✓
**Medicago polymorpha*			✓			✓
Melaleuca parviceps				✓	✓	
**Melia azedarach*						✓
**Melinis repens*			✓			✓
Mesomelaena pseudostygia	✓	✓	✓	✓		
Mesomelaena tetragona			✓	✓		
Monotaxia grandiflora	✓		✓			
**Narcissus tazetta*						✓
Nemcia spathulata					✓	
Neurachne alopecuroides	✓	✓	✓	✓	✓	
Nuytsia floribunda	✓	✓	✓			
Olearia paucidentata	✓		✓	✓		
Opercularia vaginata		✓			✓	
Orchid					✓	
**Oxalis glabra*						✓
**Oxalis pes-caprae*						✓
**Oxalis purpurea*				✓		✓
**Parentucellia latifolia*						✓
**Parentucellia viscosa*					✓	
Patersonia juncea				✓		
Patersonia occidentalis	✓	✓	✓			
**Pennisetum setaceum*					✓	✓
Persoonia angustiflora	✓					
Petrophile linearis	✓	✓				
Petrophile macrostegia				✓		
**Petrorhagia velutinea*			✓			✓
Philotheca spicata	✓		✓	✓		
Phyllangium paradoxum	✓					
Phyllanthus calycinus					✓	
Pimelea imbricata				✓	✓	
Pithocarpa pulchella				✓	✓	
**Plantago lanceolata*						✓
Poa drummondiana			✓			
Poa serpentum			✓			
Podolepis gracilis	✓	✓	✓			
Prasophyllum fimbria	✓					
Prasophyllum parvifolium					✓	
Prasophyllum sp.		✓				
Pronaya fraseri var. *fraseri*		✓	✓	✓		
Pterochaeta paniculata				✓		
Pterostylis vittata				✓	✓	
Ptilotus gaudichaudii			✓			

Species	FLORISTIC COMMUNITY TYPE					Degraded
	20c		3c			
	BaBm	Em	CcXp	Cc	Ew	
Ptilotus manglesii					✓	
Pultenaea ericifolia					✓	
**Raphanus raphanistrum*						✓
Regelia ciliata			✓			
**Ricinus communis*						✓
**Romulea rosea*			✓	✓	✓	✓
Scaevola canescens	✓	✓		✓		
Scaevola repens var. *repens*	✓	✓				
**Schinus terebinthifolia*						✓
Schoenus brevisetis	✓	✓	✓			
Schoenus curvifolius	✓		✓			
Schoenus unispiculatus				✓		
Scholtzia involucrata	✓	✓	✓			
**Silene gallica*		✓				✓
**Solanum nigrum*						✓
**Sonchus oleraceus*				✓		✓
Sowerbaea laxiflora			✓		✓	
Sphaerolobium medium			✓	✓		
Stenanthemum notiale subsp. *chamelum*	✓					
Stenopetalum filifolium			✓			
Stirlingia latifolia	✓	✓	✓		✓	
Stylidium affine				✓	✓	
Stylidium brunonianum	✓	✓		✓		
Stylidium bulbiferum				✓	✓	
Stylidium piliferum		✓	✓	✓		
Stylidium repens		✓		✓		
Synaphea acutiloba			✓	✓		
Synaphea gracillima			✓			
**Tamarix aphylla*						✓
Templetonia biloba	✓	✓	✓	✓	✓	
Tetraria octandra	✓	✓	✓	✓	✓	
Thelymitra affin. *holmesii*			✓			
Thelymitra sp.				✓	✓	
Thysanotus manglesianus	✓	✓	✓	✓	✓	
Thysanotus multiflorus				✓		
Thysanotus thyrsoideus			✓			
Thysanotus sparteus	✓					
Trachymene pilosa	✓	✓	✓			
Trichocline spathulata					✓	
Tricoryne elatior		✓	✓	✓	✓	
Tricostularia neesii	✓					
**Trifolium angustifolium*			✓	✓	✓	✓
**Trifolium arvense*			✓			
**Trifolium campestre*				✓		✓
**Trifolium dubium*			✓			

Species	FLORISTIC COMMUNITY TYPE					Degraded
	20c		3c			
	BaBm	Em	CcXp	Cc	Ew	
Tripterococcus brunonis	✓					
Tripterococcus paniculatus			✓			
**Ursinia anthemoides*	✓	✓	✓	✓		✓
Verticordia huegelii				✓		
**Vicia benghalensis*					✓	✓
**Vicia sativa*	✓					✓
**Vulpia myuros*		✓				✓
**Wahlenbergia capensis*		✓				
Wahlenbergia multicaulis		✓				
Waitzia suaveolens		✓	✓			
**Watsonia meriana* subsp. *bulbillifera*		✓	✓		✓	✓
Xanthorrhoea brunonis subsp. *brunonis*	✓	✓	✓			
Xanthorrhoea preissii	✓	✓	✓	✓	✓	
Xanthosia candida					✓	
Xanthosia huegelii	✓	✓		✓		
Xylomelum occidentale	✓					
Total	110	97	132	111	73	56

APPENDIX C

Quadrat Data

FLORA DATA SHEETS

Project: MFP -	Date: 10/7/01 and 9/10/01	Surveyors: EB &JB

Location: To the east of Myles Road at northern end of Midland Cemetery
M1

Aerial Photograph:N/A

DATUM:	Easting	Northing
Site 1	**50 409 397**	**647 2832**
Site 2		
Site 3		
Site 4		
Site 5		
Site 6		

Soil type:	**Rocks**: (average size)	**Outcropping**
Sand ✓ :silt : clay Colour Grey	**N/A**	Type and percentage **N/A**
Litter Bark %; Leaves 5 % Twigs 5 %; Logs %	**Topography:** Br; R; US; MS; LS; DL; MIC; MAC **Aspect: Mid slope**	**Film No:** **Photo No. 15**

Percentage cover of strata (for quadrat)
Trees 30 %; Shrubs >2m %; Shrubs 1-2m %; Shrubs <1m 55 %;
Herbs 30 %; Grasses/sedges 40 %; Bare Ground %

Vegetation Description:
Banksia Woodland with occasional marri over low shrubs, herbs and sedges

Condition:
1-2

Rare or Priority Flora:
Isopogon drummondii
Lambertia multiflora var. *darlingensis*

Other Notes: Dieback/Age since fire/ Predators/Erosion/Weeds/Tracks/Position in cemetery
Fire through the area about 2 years ago. Isopogon drummondii regrows from underground stock
Vegetation dense in very good condition

Colln No	Species	Fl Colour	Ht (cm)	% Cover	Rare/1°
	Acacia applanata		20	1	
M1-5	*Acacia sessilis*	yellow	45	1	
	Allocasuarina humilis	brown	210	15	
	Amphipogon turbinatus	fawn	50	5	
	Anigozanthos manglesii subsp.*manglesii*	red/green	15	1	
	Banksia menziesii	pink	800	15	
	Bossiaea eriocarpa	brown/yellow	55	5	
	Burchardia umbellata	white	50	<1	
	Caladenia sp.		15	<1	
M1-13	*Calothmanus sanguineus*	red	50	10	
	Chamaescilla corymbosa	blue	5	3	
M1-12	*Chordifex sinuosus*	black	15	4	
	Conospermum stoechadis subsp. *sclerophyllum*	white	45	1	
M1-6	*Conostylis aurea*	yellow	30	5	
	Conostylis setigera subsp. *setigera*	yellow			
	Cyathotheca avenacea	brown	120	20	
	Dasypogon bromeliifolius	cream	15	<1	
	Dasypogon obliquifolius	cream	50	15	
	Daviesia triflora	yellow/orange	50	1	
	Desmodium flexuosum		10	10	
	Drosera erythrorhiza		T	3	
M1-9	*Drosera macrantha*	white	T	<1	
	Drosera menziesii	pink			
	Dryandra lindleyana	yellow	10	5	
M1-4	*Eremaea pauciflora*	orange	50	15	
	Gladiolus caryophyllaceus	pink	30	<1	
	Glischrocaryon sp.		30	<1	
	Gompholobium confertum		30	5	
	Gompholobium tomentosum	yellow	50	<1	
	Haemodorum laxum	brown	40	1	
	Hakea prostrata	white	30	1	
	Hakea ruscifolia	white	120	5	
	Hesperantha falcata	white			
	Hibbertia huegelii	yellow			
	Hypolaena exsulca	blown	50	1	
	Isopogon drummondii	yellow	70	3	P3
M1-7	*Jacksonia floribunda*		35	1	
M1-10	*Jacksonia restioides*	yellow/red	25	1	
	Lechenaultia biloba	blue	40	3	
	Macarthuria australis	white	30	<1	
	Mesomelaena pseudostygia	black	50	20	
	Neurachne alopecuroidea	grey			
	Patersonia occidentalis	purple	30	5	
	Petrophile linearis	pink	50	2	
	Philotheca spicata	pink	50	1	
	Phyllangium paradoxum	white			
	Podolepis gracilis	white			
	Scaevola canescens	white	10	5	
	Scholtzia involucrata		50	1	
M1-8	*Stenanthemum notiale*	green/yellow	15	1	
	Stirlingia latifolia	yellow	50	1	
	Stylidium brunonianum	pink			
	Stylidium piliferum	cream			

Colln No	Species	Fl Colour	Ht (cm)	% Cover	Rare/1°
M1-2	*Thysanotus manglesianus*	mauve	T	<1	
	Trachymene pilosa	white			
M1-3	*Xanthosia huegelii*	green	30	1	

Quadrat M1

FLORA DATA SHEETS

Project: MFP -	**Date:** 10/7/01 and 9/10/01	**Surveyors:** EB &JB

Location: To the east of M1
M2
Aerial Photograph:N/A

DATUM:	Easting	Northing
Site 1	**50 409 654**	**647 2817**
Site 2		
Site 3		
Site 4		
Site 5		
Site 6		

Soil type:	**Rocks**: (average size)	**Outcropping**
Sand **5** :silt **5** : clay Colour Grey	**N/A**	Type and percentage **N/A**
Litter Bark %; Leaves 60% Twigs %; Logs %	**Topography:** Br; R; US; MS; LS; DL; MIC; MAC **Aspect: Flat**	**Film No:** **Photo No. 26,27**

Percentage cover of strata (for quadrat)
Trees 0-15 %; Shrubs >2m %; Shrubs 1-2m %; Shrubs <1m 55 %;
Herbs 23 %; Grasses/sedges 57 %; Bare Ground 5 %

Vegetation Description:
Dense marri Woodland with occasional open areas. Dominant mid level Xanthorrhoea preissii over sedges

Condition:
1 Excellent

Rare or Priority Flora:
***Synaphea acutiloba* located to the NE of the quadrat**

Other Notes: Dieback/Age since fire/ Predators/Erosion/Weeds/Tracks/Position in cemetery Beside a major track on the north side of the cemetery. Placed away from the track on the edge of dense marri and an open area. Area has had frequent fires as the marris were short.

Colln No	Species	Fl Colour	Ht (cm)	% Cover	Rare/1°
M1-21	*Acacia pulchella* var. *pulchella*	yellow	40	2	
	Acacia sessilis	yellow	40	3	
	Allocasuarina humilis	yellow	90	1	
	Angianthus manglesii	red/green	30	3	
	Austrodanthonia sp.	green	60	<1	
	Briza maxima	green	10	<1	
	Burchardia umbellata	white	70	<1	
	Caesia parviflora	grey	40	<1	
	Calectasia cyanea	blue	30	1	
M2-1	*Conostylis aculeata* subsp. *aculeata*	yellow	40	5	
	Cordifex sinuosus	black	30	5	
	Corymbia calophylla		800	15	
	Cyathotheca avenacea	fawn	130	3	
	Daviesia decurrens	orange-red	50	5	
	Desmodium fasciculatus		15	5	
	Dryandra lindleyana	yellow	40	5	
	Ehrharta calycina	pink	10	2	
	Gladiolus caryophyllaceus	pink	30	1	
M2-4	*Gompholobium aristatum*	yellow	25	2	
	Gompholobium tomentosum	yellow	45	1	
	Haemodorum laxum	brown	30	1	
	Hakea prostrata	cream	50	3	
	Hesperantha falcata	white/pink	40	5	
	Hibbertia hypericoides	yellow	50	5	
	Hypochaeris glabra	yellow	2	<1	
	Hypolaena exsulca	brown	45	2	
	Jacksonia sternbergiana	yellow	500	1	
	Kingia australis		30	<1	
M2-3	*Laxmannia squarrosa*	white	15	1	
M2-2	*Lepidosperma leptostachya*	brown	30	1	
	Lepidosperma squamatum	brown	70	2	
	Lomandra caespitosa		15	1	
	Mesomelaena pseudostygia	black	55	35	
	Mesomelaena tetragona	black	55	2	
	Podolepis gracilis	white	30	1	
	Prasophyllum M2 collection	blue	10	<1	
	Romulea rosea	pink	20	5	
	Sowerbaea laxiflora	purple	45	<1	
	Tetraria octandra	black	50	15	
	Thysanotus manglesianus	mauve	T	<1	
	Thysanotus sparteus		60	<1	
	Ursinia anthemoides	yellow	5	10	
	Xanthorrhoea brunonis subsp. *brunonis*		120	3	
	Xanthorrhoea preissii		150	30	

Quadrat M2

FLORA DATA SHEETS

Project: MFP -	**Date:** 10/7/01 and 9/10/01	**Surveyors:** EB &JB

Location: On the south east of the Midland cemetery, behind the degraded area M3

Aerial Photograph:N/A

DATUM:	Easting	Northing
Site 1	**50 409 859**	**647 2413**
Site 2		
Site 3		
Site 4		
Site 5		
Site 6		

Soil type:	**Rocks**: (average size)	**Outcropping**
Sand ✓ :silt : clay Colour Grey over laterite	**<10cm**	Type and percentage **Laterite**
Litter Bark %; Leaves **10** % Twigs **20** %; Logs %	**Topography:** Br; R; US; MS; LS; DL; MIC; MAC **Aspect: W**	**Film No:** **Photo No. 32**

Percentage cover of strata (for quadrat)

Trees 10 %; Shrubs >2m %; Shrubs 1-2m %; Shrubs <1m 42 %; Herbs 50 %; Grasses/sedges 47 %; Bare Ground **10** %

Vegetation Description:

Open marri woodland over shrubs on sand over laterite

Condition:

3. Near the edge of the degraded area between a track and sand pit.

Rare or Priority Flora:

Synaphea acutiloba

Other Notes: Dieback/Age since fire/ Predators/Erosion/Weeds/Tracks/Position in cemetery

Scattered rubbish through the area. to the east of the degraded area.

Burnt within the last 3 years.

Colln No	Species	Fl Colour	Ht (cm)	% Cover	Rare/1°
	Acacia pulchella var. *pulchella*	yellow	110	3	
	Amphipogon turbinatus	fawn	20	2	
	Angianthus manglesii	red/green	20	<1	
M3-9	*Austrostipa sp.*		45	1	
	Baeckea camphorosmae		40	1	
M3-2	*Beaufortia purpurea*		60	2	
	Blennospora drummondii	gren	15	<1	
	Boronia ramosa subsp. anethifolia	blue	40	<1	
	Briza maxima	green	20	<1	
	Caladenia sp.		5	<1	
	Chorizema dicksonii	red/yellow	40	1	
M2-1	*Conostylis aculeata* subsp. *aculeata*	yellow	15	1	
	Corymbia calophylla		1000	10	
	Desmocladus fasciculatus		20	5	
	Drosera erythrorhiza		2	<1	
	Ehrharta longiflora	pink	5	1	
	Eragrostis curvula	green	70	1	
	Freesia hybrid	white	10	30	
M2-4	*Gompholobium aristatum*	yellow	70	30	
	Gompholobium confertum	yellow	20	5	
	Gompholobium marginatum	yellow	30	<1	
	Haemodorum laxum	brown	20	1	
	Hakea lissocarpha	white/pink	80	1	
	Hakea trifurcata	cream	120	10	
	Hibbertia hypericoides	yellow	40	2	
	Hypocalymma angustifolium	white	60	1	
	Hypochaeris glabra	yellow	35	2	
M3-7	*Johnsonia pubescens*	pink/white	20	<1	
	Kennedia prostrata	red	T	<1	
	Lathyrus tingitanus	purple	T	<1	
M3-3	*Laxmannia ramosa*	white	30	10	
M3-8	*Laxmannia squarrosa*	white	15	1	
M3-6	*Lepidosperma leptostachyum*	brown	30	5	
M3-5	*Leucopogon pulchellus*	white	45	<1	
	Lomandra preissii	white/purple	40	1	
	Mesomelaena pseudostygia	black	70	2	
	Mesomelaena tetragona	black	50	15	
	Neurachne alopecuroides	grey	10	15	
	Oxalis purpurea	pink	5	10	
	Philotheca spicata	pink	110	1	
M3-4	*Pimelea imbricata*		45	1	
	Podolepis gracilis	white/pink	25	8	
	Romulea rosea	pink	40	2	
	Stylidium brunonianum	pink	5	<1	
	Stylidium bulbiferum	orange	5	<1	
	Stylidium piliferum	cream	5	<1	
M3-1	*Synaphea acutiloba*	yellow	30	10	P3
	Templetonia biloba	brown/yellow	30	<1	
	Tetraria octandra	brown	30	10	
	Thysanotus manglesianus	purple	T	<1	
	Thysanotus sparteus		45	<1	
	Trachymene pilosa	white	30	5	
	Xanthorrhoea preissii		50	<1	

Quadrat M3

FLORA DATA SHEETS

Project: MFP -	**Date:** 10/7/01 and 9/10/01	**Surveyors:** EB &JB

Location: To the north of Blanchard Road at the eastern end of the cemetery
M4

Aerial Photograph:N/A

DATUM:	Easting	Northing
Site 1	**50 409 895**	**647 2339**
Site 2		
Site 3		
Site 4		
Site 5		
Site 6		

Soil type:	**Rocks**: (average size)	**Outcropping**
Sand **5** :silt **5** : clay Colour Dark grey, sandy loam	**>10cm**	Type and percentage **Laterite**
Litter Bark **5** %; Leaves **60%** Twigs **5** %; Logs %	**Topography:** Br; R; **US**; MS; LS; DL; MIC; MAC **Aspect: WSW**	**Film No:** **Photo No. 33**

Percentage cover of strata (for quadrat)
Trees 45 %; Shrubs >2m %; Shrubs 1-2m %; Shrubs <1m 45 %;
Herbs 20 %; Grasses/sedges 35 %; Bare Ground %

Vegetation Description:
Eucalyptus wandoo subsp. wandoo with scattered marri over shrubs and sedges

Condition:
1-2

Rare or Priority Flora:

Other Notes: Dieback/Age since fire/ Predators/Erosion/Weeds/Tracks/Position in cemetery
Burnt recently.

Colln No	Species	Fl Colour	Ht (cm)	% Cover	Rare/1°
	Acacia pulchella var. *pulchella*	yellow	90	2	
	Briza maxima	green	10	10	
	Calothamnus sanguineus	red	40	8	
	Chamaescilla corymbosa	blue	5	8	
	Corymbia calophylla		1000	5	
	Daviesia horrida	yellow	55	1	
	Desmocladus fasciculatus		15	5	
M4-1	*Drosera macrantha*	white	T	<1	
	Dryandra armata var. armata	yellow	50	10	
	Dryandra lindleyana	yellow	30	10	
	Eryngium pinnatifidum	blue	30	<1	
	Eucalyptus wandoo subsp. *wandoo*		1200	40	
	Gladiolus caryophyllaceus	pink	15	2	
	Hakea lissocarpha	white/pink	70	15	
	Hakea trifurcata	cream	250	10	
	Hesperantha falcata	white	45	5	
	Hibbertia hypericoides	yellow	45	2	
	Hypocalymma angustifolium	white	35	3	
	Lagenifera huegelii	white	5	<1	
	Laxmannia ramosa	white	25	10	
	Lepidosperma leptostachyum	brown	50	8	
	Lepidosperma squamatum	brown	55	2	
	Lomandra caespitosa		10	1	
	Lomandra preissii	cream.purple	45	2	
M4-3	*Loxocarya cinereum*	yellow	15	5	
	Melaleuca parviceps		45	<1	
	Nemcia spathulata	yellow/orange	55	2	
	Neurachne alopecuroides	grey	5	5	
	Opercularia vaginata	green	10	<1	
	Phyllanthus calycinus	cream	45	5	
M4-2	*Prasophyllum parvifolium*	green	25	<1	
	Pterostylis vittata		35	3	
	Romulea rosea	pink	15	5	
M4-4	*Sowerbaea laxiflora*	mauve	20	5	
	Stylidium affine	pink	20	1	
	Stylidium brunonianum	pink	5	5	
	Tetraria octandra	black	45	15	
	Thelymitra sp.		20	<1	
	Thysanotus manglesianus	mauve	T	<1	
	Trichocline spathulata		10	1	
	Tricoryne elatior	yellow	10	<1	
	Xanthorrhoea preissii		70	6	
	Xanthosia candida	green	30	5	

Quadrat M4

FLORA DATA SHEETS

Project: MFP -	**Date:** 10/7/01 and 9/10/01	**Surveyors:** EB &JB

Location: To the east of Myles Road at southwest end of Midland Cemetery M5

Aerial Photograph:N/A

DATUM:	Easting	Northing
Site 1	**50 409 414**	**647 2325**
Site 2		
Site 3		
Site 4		
Site 5		
Site 6		

Soil type:	**Rocks**: (average size)	**Outcropping**
Sand ✓ :silt : clay	**N/A**	Type and percentage **N/A**
Colour Brownish grey		
Litter	**Topography:** Br; R; US; MS;	**Film No:**
Bark %; Leaves **60** %	**LS**; DL; MIC; MAC	
Twigs **3** %; Logs %	**Aspect: Flat**	**Photo No. 15**

Percentage cover of strata (for quadrat)

Trees 45 %; Shrubs >2m %; Shrubs 1-2m 15 %; Shrubs <1m 35 %;
Herbs 10 %; Grasses/sedges 90 %; Bare Ground **5** %

Vegetation Description:
Jarrah with scattered marri Woodland over tall shrubs and sedges

Condition:
3-4

Rare or Priority Flora:
Outside of the quadrat about 10 plants of *Lambertia multiflora* var. *darlingensis*

Other Notes: Dieback/Age since fire/ Predators/Erosion/Weeds/Tracks/Position in cemetery
One tall dead jarrah. Other trees appeared healthy

Colln No	Species	Fl Colour	Ht (cm)	% Cover	Rare/1°
	Acacia applanata	yellow	25	<1	
	Acacia huegelii	cream	25	1	
	Allocasuarina humilis	brown and red	210	15	
	Anigozanthos manglesii subsp.*manglesii*	red/green	30	2	
	Bossiaea eriocarpa	yellow/brown	45	2	
	Briza maxima	green	10	20	
	Calothamnus sanguineus	red	30	2	
	Calytrix flavescens	pink	30	1	
	Conostylis serrulata	yellow	15	1	
	Dasypogon bromeliifolius	white	20	1	
	Dryandra lindleyana subsp. *lindleyana*	yelow/pink	10	5	
	Dryandra sessilis	cream	300	5	
	Ehrharta calycina	pink	60	3	
	Ehrharta longiflora	green	10	20	
	Eremaea pauciflora	orange	60	3	
	Eucalyptus marginata subsp. thalassica	white	1800	40	
	Gladiolus caryophyllaceus	pink	10	2	
	Gompholobium tomentosum	yellow	25	1	
	Haemodorum laxum	brown	50	1	
	Hakea ruscifolia		210	3	
	Hakea trifurcata	cream	130	5	
	Hybanthus calycinus	purple	25	<1	
	Hypolaena exsulca	brown	45	40	
	Kennedia prostrata	red	5	<1	
	Lomandra preissii	cream/purple	45	<1	
	Macrozamia riedlei		60	1	
	Mesomelaena pseudostygia	black	70	10	
	Neurachne alopecuroidea	grey	35		
	Nuytsia floribunda		30	1	
	Opercularia vaginata	green	30	2	
	Orchid		5	<1	
	Patersonia occidentalis	blue	40	1	
	Petrophile linearis	pink	45	1	
	Philotheca spicata	pink	90	2	
	Podolepis gracilis	white	35		
	Pronaya fraseri var. fraseri		100	2	
	Scaevola canescens	white	5	3	
	Scaevola repens var. repens	white	10	1	
	Schoenus brevisetis	brown	45	8	
	Stirlingia latifolia	orange	50	1	
	Stylidium piliferum	cream	5	<1	
	Stylidium repens	white	15	1	
	Tetraria octandra	brown/green	30	5	
	Thysanotus manglesianus	purple	35	1	
	Ursinea anthemoides	yellow	5	5	
	Xanthorrhoea brunonis subsp. brunonis		120	8	
	Xanthorrhoea preissii		210	10	

	Xanthosia huegelii	white	5	1	

Quadrat M5 Photograph taken in the late afternoon

Quadrat 5 photographed on 9th October 2001.

Star picket and droppers removed from **Quadrat 5** to build a cubby beside the quadrat.

Degraded Area

TAXA RECORDED

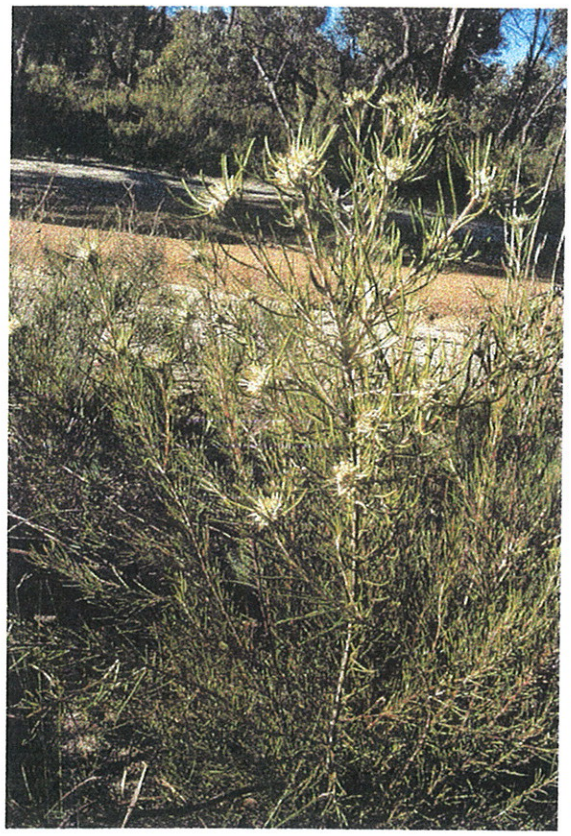
**Amaryllis belladonna*
**Arctotheca calendula*
**Arundo donax*
**Avena barbata*
Banksia attenuata
**Chamaecytisus palmensis*
**Briza maxima*
**Briza minor*
**Bromus diandrus*
**Conyza bonariensis*
Corymbia calophylla
**Echium plantagineum*
**Ehrharta calycina*
**Ehrharta longiflora*
**Eragrostis curvula*
**Foeniculum vulgare*
**Fumaria capreolata*
**Fumaria muralis*
**Hesperantha falcata*
**Homeria flaccida*
**Hypochaeris glabra*
**Lathyrus tingitanus*
**Leptospermum laevigatum*
**Lolium rigidum*
**Lupinus angustifolius*
**Lupinus consentinii*
**Malva parviflora*
**Medicago polymorpha*
**Melia azedarach*
**Melinis repens*
**Narcissus tazetta*
**Oxalis glabra*
**Oxalis pes-caprae*
**Oxalis purpurea*
**Parentucellia latifolia*
**Pennisetum setaceum*
**Petrorhagia velutinea*
**Plantago lanceolata*
**Raphanus raphanistrum*
**Ricinus communis*
**Romulea rosea*
**Schinus terebinthifolia*
**Silene gallica*
**Solanum nigrum*
**Sonchus oleraceus*
**Tamarix aphylla*
**Trifolium angustifolium*
**Ursinia anthemoides*
**Vicia benghalensis*
**Vicia sativa*
**Watsonia meriana* subsp. *bulbillifera*

Old sand/gravel pit. General view of the degraded area (July 2001)

APPENDIX D

Priority and Significant Taxa Recorded from Midland Cemetery

Isopogon drummondii – Priority 3 Taxon

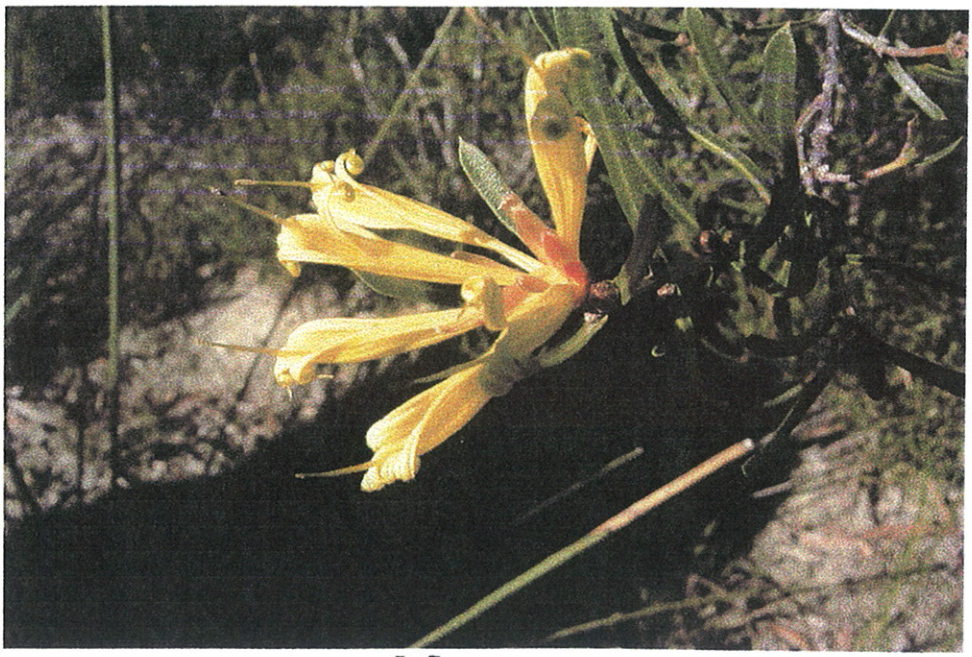


Habit

Inflorescence

Lambertia multiflora subsp. *darlingensis*
Prioity 3 Taxon

Habit



Inflorescence

Synaphea acutiloba Priority 3 Taxon

Habit. The flowers were still in bud at the first survey.

Hakea myrtoides Significant Taxon

Habit

Inflorescence

APPENDIX E

Figures

Fri 01 Feb

N

0 25 50 75 100m

SCALE 1 : 2 500

LEGEND

- Botanical Survey Area
- Cadastral Boundary
- Vegetation Unit Boundary
- M2 10m x 10m Quadrat

VEGETATION LEGEND

BmBa	Low Woodland of *Banksia menziesii* and *Banksia attenuata* over an Open Low Heath over a Grassland/Sedgeland.
Em	Open Forest of *Eucalyptus marginata* subsp. *thalassica* over a Tall Shrubland over a Low Shrubland over a Grassland/Sedgeland.
CcXp	Woodland to Low Woodland of *Corymbia calophylla* over an Open Heath of *Xanthorrhoea preissii* over Grassland/Sedgeland dominated by *Mesomelaena pseudostygia*.
Cc	Open Woodland of *Corymbia calophylla* over Open Low Heath over a Grassland/Sedgeland.
Ew	Open Forest of *Eucalyptus wandoo* and scattered *Corymbia calophylla* over an Open Low Heath over an Open Grassland/Sedgeland.
Degraded	Degraded Closed Herbland at the old sand/gravel pit.

ROAD

NATHAM ROAD

MYLES ROAD

BLANCHARD ROAD

Cemetery

M1 M2 M3 M4 M5

BmBa CcXp Em Cc Ew Degraded

Ministry for Planning
BOTANICAL SURVEY FOR MIDLAND, GUILDFORD AND PINNAROO CEMETERIES

VEGETATION UNITS - MIDLAND CEMETERY

FIGURE 1

Date: 09-08-01

Designed: EB

midland veg.dgn

Fri 01 Feb

N

0 25 50 75 100m

SCALE 1 : 2 500

LEGEND

- Botanical Survey Area
- Cadastral Boundary
- Vegetation Condition Boundary

CONDITION LEGEND

1	Pristine	Pristine or nearly so, no obvious signs of disturbance.
2	Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.
3	Very Good	Vegetation structure altered, obvious signs of disturbance.
4	Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it.
5	Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management.
6	Completely degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species.

ROAD

NATHAM ROAD

MYLES ROAD

BLANCHARD ROAD

Cemetery

midland cond.dgn

Ministry for Planning
BOTANICAL SURVEY FOR MIDLAND, GUILDFORD AND PINNAROO CEMETERIES

VEGETATION CONDITION - MIDLAND CEMETERY

FIGURE 2

Date: 09-08-01

Designed: EB

Fri 01 Feb

N

0 25 50 75 100m

SCALE 1 : 2 500

LEGEND

- Botanical Survey Area
- Cadastral Boundary
- Significant Taxa Boundary

SIGNIFICANT PLANT TAXA LEGEND

- *Lambertia multiflora* supsp. *darlingensis*
- *Isopogon drummondi*
- *Hakea myrtoides*
- *Stylidium affine*
- *Tripterococcus paniculatus*
- *Trichocline spathulata*
- *Synaphea acutiloba*
- *Isopogon drummondi Lambertia multiflora* subsp. *darlingensis, Dasypogon obliquifolius*

ROAD

NATHAM ROAD

Cemetery

MYLES

BLANCHARD ROAD

Ministry for Planning
BOTANICAL SURVEY FOR MIDLAND, GUILDFORD AND PINNAROO CEMETERIES

SIGNIFICANT PLANT TAXA MIDLAND CEMETERY

FIGURE 3

Date: 09-08-01

Designed: EB

midland sig.dgn

Fri 01 Feb

N

0 25 50 75 100m

SCALE 1 : 2 500

LEGEND

- Botanical Survey Area
- Cadastral Boundary
- Theatened Community Boundary

ROAD

Community Type 20c

Community Type 20c

Community Type 3c

NATHAM

ROAD

Community Type 3c

Community Type 20c

Cemetery

MYLES

Old Sand/Gravel Pit

Community Type 3c

Community Type 20c

BLANCHARD

ROAD

Ministry for Planning
BOTANICAL SURVEY FOR MIDLAND, GUILDFORD AND PINNAROO CEMETERIES

THREATENED ECOLOGICAL COMMUNITIES MIDLAND CEMETERY

FIGURE 4

Date: 09-08-01

Designed: EB

midland eco.dgn

Mon 04 Feb

N

0 25 50 75 100m

SCALE 1 : 2 500

LEGEND

- Botanical Survey Area
- Cadastral Boundary
- Protection Value Boundary

PROTECTION VALUES LEGEND

1 Includes Threatened Ecological Community by Environment Australia (EPBC Act) and/or CALM (English, 2001); Presence of Rare or Priority Flora; vegetation in excellent to pristine condition.

2 Scale 1 but where vegetation is good; includes Significant Taxa.

3 Vegetation degraded but has the potential to be restored to a better condition.

4 Vegetation in poor condition.

5 Developed. Vegetation severely altered.

ROAD

NATHAM

ROAD

Cemetery

MYLES

BLANCHARD

ROAD

Ministry for Planning
BOTANICAL SURVEY FOR MIDLAND, GUILDFORD AND PINNAROO CEMETERIES

PROTECTION VALUE - MIDLAND CEMETERY

FIGURE 5

Date: 09-08-01

Designed: EB

midland prot.dgn