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VEGETATION AND FLORA SURVEY

Lot 156 &157 Frenchman Bay Road, Albany.

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SUMMARY

- No Declared Rare Flora or Priority species were located or are known to occur within the survey area or adjacent areas.
- No Threatened Ecological Communities are known to occur in the vicinity of the survey area.
- The intact vegetation of the survey area is restricted to low lying areas and is dominated by *Melaleuca cuticularis* Low Closed Woodland and *Sarcocornia quinqueflora* Closed Herbland with small areas of *Juncus kraussii* Sedgeland. This vegetation occupies <1 hectare.
- *Melaleuca cuticularis* Low Closed Woodland is not common around Princess Royal Harbour. This vegetation is common in low-lying saline areas within the region but patches are usually very small. *Sarcocornia quinqueflora* Closed Herbland and *Juncus kraussii* Sedgeland are relatively common around the harbour and common within the region.
- Within 25-km radius of the survey area similar vegetation is present - around Princess Royal and Oyster Harbour and Torbay Inlet though it is unlikely much is conserved in A Class reserves. On a regional scale it unlikely that any of the vegetation is vulnerable.
- The intact vegetation present is in good to excellent condition though some weed encroachment is occurring around the margins.
- The vegetation of the survey area abuts a coastal strip of similar vegetation to the southeast and is surrounded by severely degraded lands on all other sides.
- The vegetation present would be described as "wetland" and "riparian vegetation" but not as a "defined wetland" or "ecologically sensitive area" as defined by *Environmental Protection Act 1986* and *Environmental Protection (Clearing of Native Vegetation Regulations) 2004*
- The long-term viability of the bushland remnant is likely to be low in the central and northern areas and uncertain elsewhere. This is due to narrow ecological parameters determining the distribution of the vegetation units and likely changes to these parameters resulting from recent soil in filling adjacent Lots 156 &157 and past and continuing urban development in the local area.
- It is unlikely development of the site will lead to "unacceptable environmental damage" however retention of some of the vegetation along the coastal boundary will provide a visual barrier from the bike track and protect some of the landscape values of the harbour.

BACKGROUND

Lot 156 & 157 Frenchman Bay Road lies west of Princess Royal Harbour, separated by a narrow vegetated coastal strip. Princess Royal Harbour has not been identified as a significant wetland or waterway but has been recognized as a waterscape and water resource asset of high value and under high threat (Gov. of WA 2003).

The owners - J. & F. Lembos and M. & J. Gillies. propose to subdivide Lots 156 & 157 Frenchman Bay Road. Currently these lots (hereafter referred to as the survey area) are predominately "parkland" cleared. Extant intact vegetation occurs on the low-lying areas of these lots and occupies of less than 1 hectare.

The bushland remnant in the survey area would be classified as a "wetland" and as "riparian vegetation" but not as a "defined wetland" or "environmentally sensitive area" as defined by the *Environmental Protection Act 1986* and *Environmental Protection (Clearing of Native Vegetation Regulations) 2004* (see Appendix 1). The vegetation has been classified as belonging to the Torndirrup Vegetation System within the Warren Sub-district of the Darling Botanical District, (Beard 1979).

Significant changes to drainage within and adjacent the survey area is likely to have occurred over a long period of time as a result of both land drainage and urbanization. Man made drains to the south and north of the property have been present for a long time as has the mounding associated with the water pipe running along the eastern boundary. It is likely this mound has restricted infrequent tidal movement associated with king tides. A bicycle track adjacent the pipeline has resulted in further soil compaction as has recent in filling of low-lying areas on adjacent lots.

This survey provides information on the vegetation and flora present on Lots 156 & 157 Frenchman Bay Road and adjacent public land.

METHODS

Lots 156 and 157 Frenchman Bay Road and adjacent public land was surveyed for plant species of high conservation value and vegetation type on 9/3/06. The area was traversed on foot, with regular recordings of plant structure, composition and condition made according to a modified Muirs Scale (Keighery 1994), (see Appendix 2). Mapping of vegetation was achieved by on ground surveying and aerial photo interpretation. Nomenclature follows current WA herbarium usage (CALM florabase 2005).

FLORA

No Declared Rare Flora or Priority species were located or are known to occur within or near the survey site (CALM Rare Flora data base searches).

27 indigenous native species were recorded within the survey area (see Appendix 3). Though this appears a low the species diversity is consistent with the types of vegetation present. All three vegetation units present are characterized by a low floristic diversity.

A high numbers of weeds were recorded within the survey area but weed presence was generally very low within the intact bushland and predominantly restricted to the margins of the remnant. No Declared Weeds or Weeds of National Significance were recorded, though several species recognized as serious environmental weeds on a local scale are present. These include **Acacia longifolia*, **Pelargonium capitatum*, **Cortaderia selloana*, and **Dittrichia viscosa* (City of Albany (2003), John Moore, Dept of Ag. WA, pers. comm.). Highest weed presence within the intact vegetation was recorded along the northern edge in the narrow strip of *Melaleuca cuticularis* Closed Woodland where **Chenopodium glaucum*, and **Solanum nigrum* are invading the understorey.

No evidence of disease was observed and with one small exception the vegetation has not been burnt recently.

VEGETATION

The intact native vegetation within the survey area is restricted to the low-lying areas in the southern parts of the survey area and occupies less than 1 hectare. The vegetation is dominated by *Melaleuca cuticularis* Low Closed Woodland and *Sarcocornia quinqueflora* Closed Herbland with small areas of *Juncus kraussii* Sedgeland present. Descriptions are provided below and the vegetation is mapped in Map 1.

Elsewhere the vegetation has been either completely removed or parkland cleared with common trees including *Eucalyptus cornuta* and *Agonis flexuosa*. These areas would originally have been dominated by *Eucalyptus cornuta* Tall Open Woodland over *Agonis flexuosa* Low Open Woodland or *Agonis flexuosa* Woodland over Open Shrubland. The presence of *Taxandria juniperina* along the northern boundary indicates the past presence of a natural drainage line originally vegetated by *Taxandria juniperina* Tall Closed Forest.

No Threatened Ecological Communities exist in the local area.

Intact vegetation units Lots 156 & 157 Frenchman's Bay Road:

> ***Melaleuca cuticularis* Low Closed Woodland over *Samolus repens* Herbland**. In the northern areas *Samolus repens* is the dominant native understorey species with introduced species **Chenopodium glaucum* and **Solanum nigrum* encroaching. The understorey in the southern areas is more diverse both structurally and floristically ranging from *Samolus repens* Herbland to Open Shrubland over Open Sedgeland and Herbland. Common species include *Rhagodia baccata, Gahnia trifida, Juncus kraussii, Atriplex hypoleuca, Baumea juncea* and *Ficinia nodosa*. This vegetation is the dominant extant vegetation present, occurring on the slightly higher ground than the *Sarcocornia quinqueflora* Closed Herbland

***Sarcocornia quinqueflora* Closed Herbland**
This vegetation is restricted to the lowest areas within the survey area. The dominant species is the samphire *Sarcocornia quinqueflora*. Other common species include *Hemichroa pentandra, Wilsonia backhousei, Triglochin striatum* and *Sporobolus virginicus* var. *australis*. The presence of this vegetation indicates highly saline soils.

***Juncus kraussii* Sedgeland**
Only small areas of this vegetation are present within the survey area. Typically it occurs between the two above vegetation types. Other common species include *Gahnia trifida, Atriplex hypoleuca* and *Sporobolus virginicus* var. *australis*.

Public land adjacent the survey area was also mapped to indicate the extent vegetation types present (see Map 1). Vegetation recorded in these areas includes:

***Melaleuca cuticularis* Low Closed Woodland over *Samolus repens* Herbland**
(See above)

***Sarcocornia quinqueflora* Closed Herbland** (see above)

***Juncus kraussii* Sedgeland** (see above)

Mixed Tall Open Shrubland over Open Sedgeland.
This vegetation is restricted to the sandy mound associated with the water pipe running along the bike track. Whilst the species present are predominately indigenous native species, this unit within the mapped area is artificial and resulting from the mounding of sand over the water pipe. Common species include *Acacia littorea, Spyridium globulosum, Lepidosperma gladiatum, Desmocladus flexuosus, Allocasuarina lehmanniana, Leucopogon revolutus* and *Leucopogon parviflorus*.

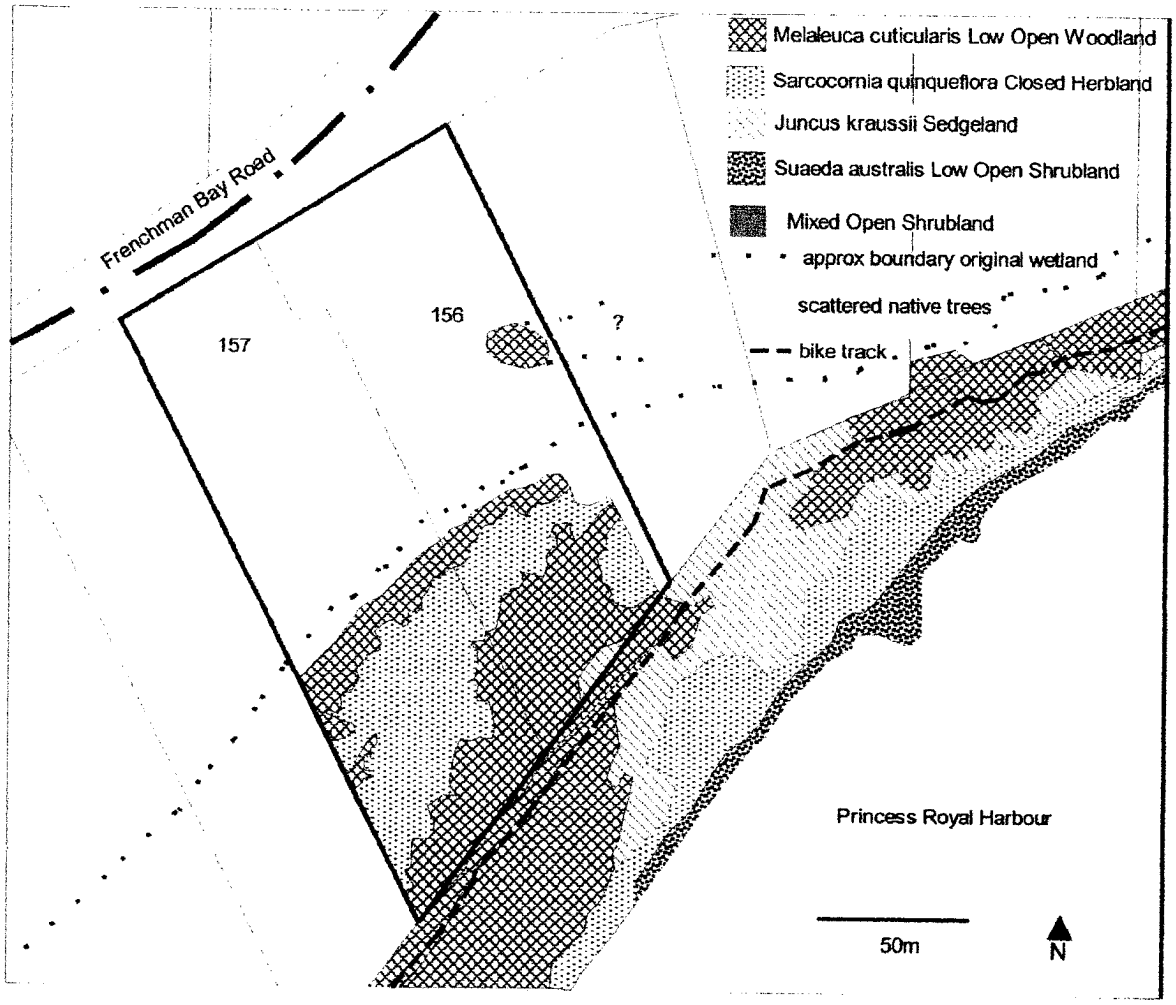
***Suaeda australis* Low Open Shrubland**
This vegetation is restricted to edge of the harbour occurring on the slightly raised sand ridge adjacent the water. Common species include *Atriplex hypoleuca* and *Sarcocornia quinqueflora*.

The patchiness and narrow banding of the vegetation units mapped reflects the very narrow ecological tolerances of these units. Factors affecting the distribution of these vegetation units include salinity and duration and depth of seasonal inundation.

CONDITION

Most of the survey area is in very degraded condition – being cleared of native vegetation or parkland cleared. The intact vegetation is generally in very good to excellent condition with the exception of some margins – particularly the northern edge where condition is good to very good due to weed invasion.

MAP 1 Vegetation Lot 156 & 157 Frenchman Bay Road, Albany



Private land either side of the survey area is in very degraded condition. Nearly all the privately owned low lying areas adjacent the survey area have been in filled with up to one metre depth of sand/soil and subsequently vegetated with introduced grasses.

The vegetation occurring on public land adjacent Princess Royal Harbour is in very good to excellent condition. Some weed invasion is occurring along the pipeline and bike track.

CONSERVATION STATUS

From a bio-diversity perspective it is recognized that the threshold below which species loss appears to accelerate exponentially at an ecosystem level is regarded as at a level of 30% pre clearing extent of that vegetation type (EPA 2000). The EPA Position Statement No 2 recommends no clearing take place in vegetation that is currently below or will fall below as a result of clearing the threshold (EPA 2000). No accurate quantitative data on the vegetation in question exists. Whilst the vegetation units present are not uncommon in coastal saline areas they naturally occur in very small patches or bands that can't be mapped on a regional scale. There is no quantitative data available for regional assessment of *Melaleuca cuticularis* Low Closed Woodland, *Sarcocornia quinqueflora* Closed Herbland or *Juncus kraussii* Sedgeland (Shepherd et al 2002) (CALM 2002).

All the vegetation types recorded within the survey area are present within a 25-km radius of the survey site occurring around Princess Royal and Oyster Harbour and Torbay Inlet. It is unlikely that significant areas are reserved within "A" class reserves in this area due to differences in landforms within such reserves.

Detailed mapping of the fringing vegetation around Princess Royal Harbour completed in 1992 by Luke Penn indicates that *Sarcocornia quinqueflora* Closed Herbland and *Juncus kraussii* Sedgeland were relatively common around the Harbour but that *Melaleuca cuticularis* Closed/Open Low Woodland was uncommon (Penn 1995). Penn records *M cuticularis* Closed/Open Woodland present in three locations. He notes this vegetation type occurs "at the upper end of the inter-tidal zone where freshwater input via ground water seepage is minimal" (Pen 1995). Inspection of these sites indicates that the area occupied by the *M. cuticularis* Open Woodland adjacent Little Grove is approximately twice as large as mapped by Penn with the unit extending in a band to near the tip of Rushy Point. Areas mapped on private land to the south west and north east of the survey area have been cleared since his survey and cleared areas filled in with soil.

The area of *M. cuticularis* Closed Woodland within the survey area occupies <20% of the current extent of this vegetation type around Princess Royal Harbour. No assessment has been made of the relative areas of *Sarcocornia quinqueflora* Closed Herbland and *Juncus kraussii* Sedgeland. A line on Map 1 indicates that the likely extent of the wetland vegetation in the immediate area of the survey area.

The long term viability of *Sarcocornia quinqueflora* Closed Herbland in the lowest lying areas of the survey area is likely to be poor. This is due to the naturally narrow ecological tolerances

of the vegetation present and likely changes occurring to some of the ecological parameters determining the distribution of this vegetation including depth and duration of inundation and seasonal salinity. These changes are likely to result from the large-scale soil in filling adjacent the survey area. The effect of ponding is likely to be compounded by the compacted soils associated with the pipeline and bike track that run the length of the harbour side boundary. The extent to which these factors will or have affected the vegetation is not known. Historically the survey area would have received some tidal influence.

The long term viability of the narrow strip of *M. cuticularis* Closed Woodland along the northern edge of the remnant is also poor due to the edging effects of weed encroachment and nutrient enhancement. This area already contains a high density of weeds.

The long-term viability of the remaining vegetation - the largest area of *M. cuticularis* Closed Woodland is uncertain. This vegetation is on higher ground than the *S. quinqueflora* Closed Herbland and can probably tolerate greater changes in salinity and inundation. Its effectiveness as a buffer between cleared land and the coastal vegetation is lessened to some degree by its size and presence of a bike track and man made mound between the two that acts as a conduit for weed dispersal. This vegetation currently forms a natural visual barrier from the bike track and to some degree from the harbour.

The bushland remnant occupies less than one hectare and abuts a significant area of similar native bushland that acts as a buffer and corridor along the shore of Princess Royal Harbour. The wetlands of Princess Royal Harbour have not been recognized as a significant wetland though the harbour has been recognized as a high value and with a high threat waterscape and water resource asset (Gov. of WA 2003).

The Western Australian Planning Commission Statement of Planning Policy No. 2 (WAPC 2003) states that planning decisions should avoid developments that "may result in unacceptable environmental damage" in line with one of the objectives – to protect, conserve and enhance the natural environment. The bushland remnant within the survey area is very small and abuts a significant area of similar vegetation along the harbour shore (see Map 1). Given that the long-term viability of the remnant is low to uncertain as a result of a long and ongoing history of local man made disturbance it is unlikely development will result in unacceptable environmental damage. Never the less the retention of some of the vegetation along the coastal boundary would provide a visual barrier from a public access way and protect some of landscape values of the harbour.

REFERENCES

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APPENDIX 1: Definitions according to the *Environmental Protection Act 1986* and *Environmental Protection (Clearing of Native Vegetation Regulations) 2004*

"**wetland**" = area of seasonally, intermittently or permanently waterlogged or inundated land, whether natural or otherwise and includes a lake, swamp, marsh, spring, dampland, tidal flat or estuary"

"**riparian vegetation** = distinctive vegetation associated with a wetland or watercourse;

"**defined wetland**" =

(a) a wetland included in the List of Wetlands on International Importance kept under the Ramsar Convention;
(b) a nationally important wetland as defined in "A Directory of Important Wetlands in Australia: (2001) 3rd edition, published by the Commonwealth Department of the Environment and Heritage, Canberra;
(c) a wetland designated as a conservation category wetland in the geomorphic wetland maps held by, and available from the Water and Rivers Commission:
(d) a wetland mapped in Pen, L. "A systematic Overview of Environmental Values o the Wetland, Rivers and Estuaries of the Busselton-Walpole Region" (1997) published by the Water and Rivers Commission, Pert; or
(e) a wetland mapped in V & C Semeniuk Research Group "Mapping and Classification of Wetlands from Augusta to Walpole in the South West of Western Australia" published by the Water and Rivers Commission, Perth.

"**environmentally sensitive areas**"=

(a) a declared World Heritage property as defined in section 13 of the *Environment Protection and Biodiversity Conservation Act 1999* of the Commonwealth;
(b) an area that is on the Registrar of the National Estate, because of its natural values, under the *Australian Heritage Commission Act 1975* of the Commonwealth.
(c) a defined wetland (see above) and the area within 50m of the wetland.
(d) the area covered by vegetation within 50m of rare flora, to the extent to which the vegetation is continuous with the vegetation in which the rare flora is located;
(e) the area covered by a threatened ecological community
(f) a Bush Forever site listed in "Bush Forever" Volumes 1 and 2 (2000), published by the Western Australian Planning Commission , except to the extent to which the site may be cleared under a decision of the Western Australian Planning Commission;
(g) the areas covered by the following policies-
    (i) the *Environmental Protection (Gnangara Mound Crown Land) Policy 1992*
    (ii) the *Environmental Protection (Western Swamp Tortoise) Policy 2002:*
(h) the areas covered by the lakes to which the *Environmental Protection (Swam Coastal Planning Lakes) Policy 1992* applies
(i) protected wetlands as defined in the *Environmental Protection (South West Agricultural Zone Wetlands) Policy 1998*);
(j) areas of fringing native vegetation in the policy area as defined in the *Environmental Protection (Swan and Canning Rivers) Policy 1998.*

APPENDIX 2 Structural Classification Keighery (1994)

Life form/height class	Canopy cover			
	100-70%	70-30%	30-10%	10-2%
Trees over 30 Trees 10-30m Trees under 10 m	Tall Closed Forest Closed Forest Low |Closed Forest	Open Forest Open Forest Low Open forest	Tall woodland Woodland Low Woodland	Tall Open Woodland Open Woodland Low Open Woodland
Tree Mallee Shrub Mallee	Closed Tree Mallee Closed Shrub Mallee	Tree mallee Shrub Mallee	Open Tree Mallee Open Shrub Mallee	Very Open Tree Mallee Very Open Shrub Mallee
Shrubs over 2m Shrubs 1-2m Shrubs under 1m	Closed Tall Scrub Closed Heath Closed Low Heath	Tall Open Scrub Open Heath Open Low Heath	Tall Shrubland Shrubland Low Shrubland	Tall Open Shrubland Open Shrubland Low Open Shrubland
Grasses	Closed Grassland	Grassland	Open Grassland	Very Open Grassland
Herbs	Closed Herbland	Herbland	Open Herbland	Very Open Herbland
Sedges	Closed Sedgeland	Sedgeland	Open Sedgeland	Very Open Sedgeland

Table 2 Vegetation Condition Scale

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. For example damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle tracks.

3 = Very Good
Vegetation structure altered, obvious signs of disturbance
For example disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.

4 = Good
Vegetation structure significantly altered by very obvious sings of multiple disturbance. Retains basic vegetation structure or ability to regenerate it. For example disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.

5 = Degraded
Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.

6 = Completely Degraded
The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as "parkland cleared" with the flora composing weed of crop species with isolated native trees or shrubs.

APPENDIX 3 Indigenous Native Species List, Lot 156 & 157 Frenchman Bay Road, Albany.

MONOCOTYLEDONS

ANTERICACEAE

CYPERACEAE
Baumea juncea
Ficinia nodosa
Gahnia trifida
Lepidosperma gladiatum
Lepidosperma squamatum

JUNCACEAE
Juncus kraussii

JUNCAGACEAE
Triglochin striatum

POACEAE
Sporobolus virginicus var. australis

RESTIONACEAE
Desmocladus flexuosus

DICOTYLEDONS

AIZOCEAE
Carpobrotus sp.

AMARANTHACEAE
Hemichroa pentandra

CHENOPODIACEAE
Atriplex hypoleuca
Rhagodia baccata
Sarcocornia quinqueflora
Suaeda australis

CASUARINIACEAE
Allocasuarina lehmanniana

CONVOLVULACEAE
Wilsonia backhousei

DILLENEACEAE
Hibbertia cuneiformis

MYOPORACEAE
Myoporum oppositifolium

MYRTACEAE
Agonis flexuosa
Eucalyptus cornuta
Melaleuca cuticularis
Melaleuca rhaphiophylla
Taxandria juniperina

PRIMULACEAE
Samolus repens

RUBIACEAE
Opercularia hispidula

THYMELIACEAE
Pimelea rosea