



FLORA, VEGETATION AND FAUNA SURVEY BROOME GOLF CLUB REDEVELOPMENT JANUARY 2019

Table of Contents

Summary

1. Introduction
 - 1.1 Background
 - 1.2 Location
 - 1.3 Objectives
2. Existing Environment
 - 2.1 IBRA Regions
 - 2.2 Vegetation
3. Legislative Framework
 - 3.1 EPBC Act
 - 3.1.1 Matters of National Environmental Significance
 - 3.1.2 Vegetation Communities Federal
 - 3.1.3 Vegetation Communities State
4. Methodology
 - 4.1 Desktop Assessment
 - 4.2 Flora and Vegetation
 - 4.2.1 Vegetation Mapping
5. Desktop assessment
 - 5.1 Environmentally Sensitive Areas
 - 5.2 Wetlands
 - 5.3 Vegetation
 - 5.4 Conservation Significant Flora
6. Field Survey Results
 - 6.1 Vegetation
 - 6.1.1 Threatened and Priority Ecological Communities
 - 6.1.2 Vegetation Communities
 - 6.1.3 Inventory of Flora Species
 - 6.1.4 Weed Species
 - 6.2 Fauna
 - 6.2.1 Fauna species
7. Conclusion and Recommendations
8. References

Summary

Broome Golf Club commissioned Phil Docherty to complete a flora and fauna survey at the Broome Golf Club in the vicinity of the Broome townsite Port Drive. The survey area (see below) included a 7500 square metre area of approximately which one third is native vegetation that may potentially be cleared as part of the project.

Phil completed a detailed flora and vegetation assessment. These assessments included a desktop review of available information including database searches, a field survey component (comprising three two hour visits traversing the area on foot), and a technical reporting component.

The objective of the project was to record, quantify and map conservation significant flora, fauna and communities, and describe the existing environment that enables a likelihood assessment of the presence of significant species. This information can then be used to liaise with government agencies and support the environmental approval process that has already commenced for this project.

The survey area was traversed on foot walking meandering transects. This allowed facilitation of Priority flora considered likely to occur. Two closely related vegetation types were observed within the immediate vicinity of the proposed site.

The only limitation that may have impacted on the survey was that the time given to complete the survey was not optimal as the wet season had not commenced and plants were not displaying flowering or fruiting parts (that allow easy identification) of plant species. It also didn't allow sufficient time to do a detailed fauna survey of the site also this is not seen as an issue due to the relatively small area

BROOME GOLF CLUB Proposed Redevelopment

LOT 1197 - 223 Port Drive BROOME WA 5th NOVEMBER 2018

EXISTING SITE PLAN (1:500 SCALE)



1.0 Introduction

1.1 Background

Broome Golf Club required a biological survey for an area of approximately 7500 square metres within Lots 1197, (223) Port Drive Broome, for the purpose of redevelopment and extending the existing carpark.

Phil Docherty was commissioned to undertake a flora and fauna survey of the redevelopment area including a vegetation assessment of the surrounding area deemed to be affected by the proposed development.

The purpose of the survey is to provide an appropriate examination and description of the local environment to ensure that all aspects of ecological significance are identified and recorded. The results of the biological assessment will assist Broome Golf Club in obtaining relevant approvals from the Department of Environmental Regulation.

1.2 Location

The survey area is located in the Kimberley region of Western Australia in the Shire of Broome. The survey area on Port Drive is approximately 4.5 km from the Broome townsite.

1.3 Objectives

The objective of this biological assessment is to survey the relevant environmental factors of the survey area, including vegetation and flora. The specific objectives of the assessment were to conduct:

- a detailed (single-phase) fauna, flora and vegetation assessment in accordance with the EPA (2016a) Flora Survey Technical Guide
- targeted searches for the following species that may occur within the local area: *Jacquemontia* sp. Broome (Priority 1), *Aphyllodium parvifolium* (Priority 1), *Corymbia paractia* (Priority 1), *Seringia exastia* (Threatened), *Pittosporum mollucum* (Priority 4), *Polymeria* sp. Broome (K.F.Kenneally 9759), *Phyllanthus eremicus* (Priority 3) and *Tribulopsis marliesiae* (Priority 3)

This technical document describes the methodology, desktop and field results and provides a preliminary discussion of results.

2.0 Existing Environment

2.1 IBRA Regions

The largest regional vegetation classification scheme recognised by EPA is the Interim Biogeographical Region of Australia (IBRA). The IBRA regions provide the planning framework for the systematic development of a comprehensive, adequate and representative (CAR) national reserve system. There are 89 recognised IBRA regions across Australia that have been defined based on climate, geology, landforms and characteristic vegetation and fauna (Department of Conservation and Land Management [CALM], 2002).

The survey area lies within the Pindanland subregion of the broader Dampierland IBRA region. Dampierland, described by Cotching (2005), is located in the Kimberley region and has a semi-arid monsoonal climate where rainfall occurs predominantly between December and April. The area includes the Canning Basin with dunefields and intermittent swales. The surface of Canning Basin is gently undulating Aeolian sand plains that slope gently towards the coast. Isolated mesas and hills feature in the landscape as do dunefields of long linear sand dunes. Dampierland is divided into two subregions, the Fitzroy Trough and Pindanland.

The Pindanland subregion, described by Graham (2001), is the coastal semi-arid north-western margin of the Canning Basin comprised of Quaternary sandplains mantling Jurassic and Mesozoic sandstones. The subregion includes:

- sandplains with hummock grasslands
- marine deposits on coastal plains with mangroves and Samphire grass
- alluvial plains of tree savannahs and ribbon grass with riparian forests fringing the drainage channels.

The dominant land use is grazing and crown Reserve. Rare features include patches of rainforest found behind the coastal primary dune system, extensive mudflats of Roebuck Bay and Eighty Mile Beach, migratory birds of Roebuck Bay and Eighty Mile Beach, rare flora, vast grasslands of Roebuck Plains, coastal swamps adjacent to Eighty Mile Beach and, claypans supporting uncommon aquatic plants.

2.2 Vegetation

Beard (1979) mapping is used to determine the current extent of remnant vegetation remaining when compared to pre-European vegetation extent. EPA's objective is to retain at least 30% of all pre-European ecological communities, which is consistent with recognised retention levels (EPA 2015).

The area surrounding the survey site was mapped by Beard (1979) as two units:

- "pindan woodland and monotonous sandplain comprising *Eucalyptus tectifica* and *Corymbia grandifolia* woodland over *Acacia tumida* shrubland over *Chrysopogon* and *Triodia* grasslands" (Beard's unit 750), dominating the sandy plains: and
- "bare areas of drift sand" (Beard's unit 129), mapped in narrow bands along the coast.

Given the necessarily broad scale of Beard's mapping (1:100 000 in order to map the entire Kimberley) these units are only of general relevance to the area and subsequent mapping by Environs Kimberley Nature Project (2013) has mapped the survey area as fragmented coastal monsoon vine thickets on Holocene sand dunes. See Figure 1 below.

Figure 1

Map of the Broome Peninsula tip with outer boundary of the two large Monsoon Vine Thicket Patches. The yellow letters correspond to different sections, see Discussion.



3.0 Legislative Framework

3.1 EPBC Act

3.1.1 Matters of National Environmental Significance

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the main piece of Federal legislation protecting biodiversity in Australia. All matters of national environmental significance (MNES) are listed under the EPBC Act. These include:

- listed threatened species and ecological communities
- migratory species protected under international agreements
- Ramsar wetlands of international importance
- the Commonwealth marine environment
- world Heritage properties
- national Heritage places
- Great Barrier Reef Marine Park
- a water resource, in relation to coal seam gas development and large coal mining development
- nuclear actions.

If an action is likely to have a significant impact on a MNES this action must be referred to the Minister for the Environment for a decision on whether assessment and approval is required under the EPBC Act.

3.1.2 Vegetation Communities (Federal)

Communities can be classified as Threatened Ecological Communities (TECs) under the EPBC Act. The EPBC Act protects Australia's ecological communities by providing for:

- identification and listing of ecological communities as threatened
- development of conservation advice and recovery plans for listed ecological communities
- recognition of key threatening processes
- reduction of the impact of these processes through threat abatement plans.

Categories of federally listed TECs are described in Table 1.

Table 1 Categories of TECs that are listed under the EPBC Act

Conservation Code	Category
CE	Critically Endangered If, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future.
E	Endangered If, at that time, it is not critically endangered and is facing a very high risk of extinction in the wild in the near future.
V	Vulnerable If, at that time, it is not critically endangered or endangered, and is facing a high risk of extinction in the wild in the medium-term future.

3.1.3 Vegetation Communities (State)

Threatened Ecological Communities (TECs) are naturally occurring biological assemblages that occur in a particular type of habitat and that may be subject to processes that threaten to destroy or significantly modify the assemblage across its range. TECs are listed by both state and commonwealth legislation.

Vegetation communities in Western Australia are described as TECs if they have been endorsed by the Western Australian Minister for Environment following recommendations made by the TEC Scientific Committee. Categories of TECs are defined in Table 3.

Department of Biodiversity Conservation and Attractions (DBCA) maintains a database of state listed TECs which is available for online searches via their website. Possible TECs that do not meet survey criteria or are not adequately defined are listed as Priority Ecological Communities (PECs) under Priorities 1, 2 and 3. Ecological communities that are adequately known and are rare but not threatened, or meet criteria for Near Threatened, or that have been recently removed from the threatened list, are placed in Priority 4. Conservation dependent communities are classified as Priority 5. PECs are endorsed by the Minister for Environment are categories are described in Table 4.

DBCA requires that all Priority and Threatened ecological communities are considered during environmental impact assessments and clearing permit applications. There is currently no formal protection afforded to TECs listed at the state level however clearing permits may trigger the Federal EPBC act.

Table 2 Conservation codes for State listed Threatened Ecological Communities

Conservation Code	Category
PD	Presumed Totally Destroyed
CR	Critically Endangered
EN	Endangered
VU	Vulnerable

Table 3 Categories for Priority Ecological Communities

Conservation	Code Category
P1	Priority One: poorly-known ecological communities
P2	Priority Two: poorly-known ecological communities
P3	Priority Three: poorly known ecological communities
P4	Priority Four: ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list.
P5	Priority Five: Conservation Dependent ecological communities.

4.0 Methodology

The biological assessments incorporated three tasks: a desktop assessment, field survey, and a reporting component. These are described in detail below.

4.1 Desktop Assessment

The desktop assessment involved gathering background information for the local area. The objective of the desktop assessment is to:

- identify significant environmental values likely to be present in the survey area (including flora, fauna, soil, groundwater and surface water)
- identify the location of any conservation estates or reserves within or near the survey area
- identify broad vegetation types present using pre-European types

Desktop database searches were requested from government databases (including a 40 km buffer from survey area boundary):

- DBCA Threatened and Priority Flora List and WA Herbarium records
- DBCA Threatened and Priority Ecological Communities database
- Naturemap
- *Environment Protection and Biodiversity Conservation Act* (EPBC Act) Protected Matters database

Literature was consulted to identify broad vegetation types and describe the existing environment. References included Beard (1981) vegetation mapping, Geological Survey of Western Australia and Geoscience (2008), Bureau of Meteorology climate data (2017) and WA Atlas (Landgate 2017). The search results were reviewed to assess the potential presence of conservation significant environmental values.

4.2 Flora and Vegetation

The field survey was undertaken by Phil Docherty on 20th December, January 11th and 25th. Data collected included the presence of plant species, structural composition of vegetation, physical environment, and presence/absence of disturbance.

Two flora specimens were collected which were unable to be accurately identified due to lack of fruit or flowers that may distinguish them from closely related species.

Specimens were dried and pressed as per the WA Herbarium guidelines. These specimens are awaiting identification.

4.2.1 Vegetation mapping

Delineation of vegetation communities was supported by analysing floristic data collected within the survey area. Quantitative flora species data were used to define the vegetation communities. Vegetation communities were described and mapped based on changes in dominant species composition and landform. Vegetation condition was determined using the scale developed by Trudgen (1988) for the northern botanical province (Table 5), as recommended in the Flora Survey Technical Guide (EPA, 2016a). The scale is based on disturbance (e.g. grazing, erosion), degree of alteration to community and habitat structure and site ecology.

Table 4 Bushland condition ratings

Descriptor	Northern Botanical Provinces Scale (Trudgen, 1988)
Pristine	NA
Excellent	Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement.
Very Good	Some relatively slight signs of damage caused by human activities since European settlement. For example, some signs of damage to tree trunks caused by repeated fire, the presence of some relatively non-aggressive weeds, or occasional vehicle tracks.
Good	Most obvious signs of damage caused by human activity since European settlement, including some obvious impact on the vegetation structure such as that caused by low levels of grazing or slightly aggressive weeds.
Poor	Still retains basic vegetation structure or ability to regenerate it after very obvious impacts of human activities since European settlement, such as grazing, partial clearing, frequent fires or aggressive weeds.
Degraded	Severely impacted by grazing, very frequent fires, clearing or a combination of these Activities. Scope for some regeneration but not to a state approaching good condition without intensive management. Usually with a number of weed species present including very aggressive species.
Completely Degraded	Areas that are completely or almost completely without native species in the structure of their vegetation; i.e. areas that are cleared or 'parkland cleared' with their flora comprising weed or crop species with isolated native trees or shrubs.

5.0 Desktop Assessment Results

5.1 Environmentally Sensitive Areas

The proposed site for the extension of the Golf Club carpark is surrounded by environmentally sensitive areas that have been recorded in close proximity to the survey area including areas of Wetland and Vegetation.

There is one Public Drinking Water Source located approximately 10km northwest of the survey area.

5.2 Wetlands

Roebuck Bay is the only wetland found in the area and is a Ramsar listed site and is of international importance, Roebuck is an intertidal mud and sand flat that supports vast flora and fauna in the area.

The site is a superb example of a tropical marine embayment within the Northwest bioregion. It is one of only a dozen intertidal flats worldwide where benthic food sources are found in sufficient densities that they regularly support internationally significant numbers of waders (Bennelongia 2009).

5.3 Vegetation

5.3.1 Threatened and Priority Ecological Communities

There are two TECs of which the buffer occurs within 200m of the survey area. These include:

- EPBC Act listed Endangered TEC: Monsoon vine thickets
- WC Act listed Vulnerable TEC: Roebuck Bay mudflats.

TEC (Endangered): Monsoon vine thickets

The Monsoon Vine Thickets are considered a rainforest subset ranging from semi-deciduous vine thickets to closed semi-deciduous vine forest and are restricted in the West Kimberley to an area of less than 1000 ha or less than 0.01% of Dampierland. The community contains deciduous, semi-deciduous and evergreen perennial flora species and provides an important habitat for a number of restricted or rare plant species. This includes *Parsonsia kimberleyensis* (P1) which is at the southern-most limit of its range within the ecological community. The ecological community is predominantly restricted to the coastlines of the Dampier Peninsula from Broome in the south to One Arm Point in the north and on the north-eastern coast of the Peninsula from One Arm Point to Goodenough Bay. The ecological community represents the most southern occurrences of rainforest type vegetation in Western Australia.

TEC (Vulnerable): Roebuck Bay mudflats

Roebuck Bay was designated a “Wetland of International Importance” under the Ramsar Convention in June 1990. Roebuck Bay was listed as a Ramsar site under seven of the nine criteria. Roebuck Bay is one of less than twenty soft bottom intertidal mudflats worldwide that support very large numbers of migratory shorebirds that comprise the primary staging and over-wintering areas for Palaearctic shorebirds on their annual southwards migrations. The high biomass of benthic invertebrates at Roebuck Bay (for a tropical mudflat) is a key characteristic that makes it such an important shorebird habitat. The soft bottom intertidal mudflats of the northern and eastern shores of Roebuck Bay, and high tide roosts at Bush and Sandy Points are the most biologically significant parts of the site, which was listed for several reasons including, most notably, outstanding shorebird values.

5.4 Conservation Significant Flora

The desktop assessment identified 31 flora species of conservation significance that may occur within 50 kilometres of the survey area. This includes two species listed as Threatened under the EPBC Act and WC Act. Only one of these species (*Seringia exastia*) was considered likely to occur due to their restricted known occupancy and preferred habitat. The remaining 29 species are Priority flora. Of these eight may occur (Table 6).

A preliminary assessment was undertaken in 2017 by DER who suggested that *Seringia exastia* may exist in the survey area given the locality, soil and vegetation types present. This species is known from two populations on the Broome Peninsula, and scattered records on the edge of the Great Sandy Desert. It is often recorded on flat land with *Triodia schinzii* and scattered trees of *Acacia colei* and *Corymbia dampieri*. A comprehensive species list including habitat, last count date, flowering period and number of records are presented in Appendix A Table 1.

Table 5 Priority species that may occur within the survey area

Species	Conservation code	Habitat	Likelihood
<i>Aphyllodium parvifolium</i>	P1	In greyish pindan soil, sand and sandhills	May
<i>Corymbia paractia</i>	P1	Skeletal soils in transition zone between coastal beach dunes and red pindan soils	May
<i>Jacquemontia</i> sp. Broome (A.A. Mitchell 3028)	P1	Orange sand on plain	May
<i>Phyllanthus eremicus</i>	P3	Red pindan sand	May
<i>Polymeria</i> sp. Broome (K.F.Kenneally 9759)	P1	Red pindan soils	May
<i>Pittosporum mollucum</i>	P4	White sand, sand dunes	May
<i>Seringia exastia</i>	T	Flat pindan soils	May
<i>Tribulopsis marliesiae</i>	P3	No information available	May

6.0 Field Survey Results

6.1 Vegetation

6.1.1 Threatened and Priority Ecological Communities

Two Threatened or Priority Ecological Communities were anticipated to occur in the survey area.

6.1.2 Vegetation Communities

Two vegetation community are described and mapped from the undisturbed section of native vegetation lying at the northern end of the survey area which encompasses about ½ the total area of the proposed redevelopment. Community A is described as low shrubland and grassland on sand dunes whilst community B is described as fragmented monsoon vine thicket on Holocene sand dunes. The vegetation communities are described in Table 7.

It is difficult to delineate the boundaries between the two communities, as monsoon vine thicket patches naturally contain open areas of shrub and grassland. The size of these open area influences whether they are considered part of natural variability within the vine thickets or delineated as a separate community. This natural patchy variability is particularly pronounced in the Broome area, at the southern arid limit of the vine thicket range.

In this case, as the development foot print is small, the vine thicket community boundary has been delineated as the clumps of trees and shrubs containing vine thicket restricted species (e.g. *Grewia breviflora*, *Tinaspora smilacina* and *Abrus precatorius*). As such, the TEC monsoon vine thicket community occurred outside of the nominal clearing area indicated on the site plans, yet surrounds the whole site in close proximity.

6.1.3 Inventory of Flora Species

A total of 28 species from 25 genera and 14 families were recorded within the survey area during the field assessment. The total includes 22 (81%) locally native species and six introduced (exotic) or naturalised weed species.

The full list of vascular flora species recorded are presented in Appendix a Table 2.



6.1.4 Weed Species

Six weed species were recorded in the survey area. All are common weeds found throughout the Broome town site and wider Kimberley region. The gardens surrounded the existing carpark also contained introduced plant species however none are considered as invasive or at risk of becoming weedy.

Figure 2 Large patch of weed buffel grass *Cenchrus ciliaris* near erosion channel which will facilitate spread of weed into surrounding TEC monsoon vine thicket.



Table 6 Vegetation communities recorded in the survey area.

Vegetation Description	Additional Information
<p>Low shrubland and grassland on coastal sand dunes.</p> <p>Low sparse shrubland consisting of <i>Acacia bivenosa</i>, <i>Crotalaria cunninghamii</i>, <i>Corchorus pumilo</i>, <i>Tephrosia rosea</i>, <i>Aerva javanica</i>, <i>Waltheria indica</i>, and <i>Cullen martinii</i> over open hummock grassland of <i>Chrysopogon pallidus</i> and <i>Triodia schinzii</i> with sprawling groundcovers <i>Boeharvia dominii</i>, <i>Euphorbia myrtooides</i>.</p> 	<p>Condition: Very Good</p> <p>1 weed species: <i>Aerva javanica</i></p> <p>Due to the timing of the survey groundcover was only about 30%</p>
<p>Fragmented TEC monsoon vine thicket on coastal sand dunes. (Located at the north eastern end of the proposed area of redevelopment)</p> <p>Low tree cover consisting of <i>Gyrocarpus americanus</i> and shrubs <i>Grewia breviflora</i>, <i>Clerodendron tomentosum</i> and <i>Acacia monticola</i> incorporating vines <i>Tylophora cinerescens</i>, <i>Tinaspora smilacina</i> and <i>Abrus precatorius</i> over low shrubland of <i>Crotalaria cunninghamii</i>, <i>Cleome viscosa</i> and groundcovers <i>Boeharvia dominii</i> and <i>Euphorbia myrtooides</i>.</p> 	<p>Condition: Very Good</p> <p>1 weed species: <i>Aerva javanica</i></p>

6.2 Fauna

The fauna survey included desktop investigations and field surveys, conducted with regard to the EPA's Guidance statement No. 56, where possible.

The fauna survey was an opportunistic survey and did not involve any fauna trapping. The survey involved visual and aural surveys for any fauna species in the area. The study area was also searched for any fauna signs, such as tracks, scats, bones, diggings and feeding signs.

6.2.1 Fauna Species

A total of nineteen bird species, one mammal species, and one reptile species were recorded during the reconnaissance survey within the Area A survey area (Table 15, Appendix C).

This survey only provides a brief snapshot of those species present at the time of sampling (daytime), in one season, in one year. Not all potentially occurring species would be recorded during a single survey due to spatial and temporal variations in fauna population numbers.

A number of small diggings were located across the study area. A fauna-trapping program would be required to accurately identify these species.

7.0 Conclusions and Recommendations

In January 2019 Phil Docherty was commissioned to undertake biological assessments on behalf of the Broome Golf Club for a survey area incorporating 7500 square metres (of which approximately half is uncleared native vegetation) with the objective being to document the results in a technical report.

In summary, the biological assessments identified:

- Two Threatened Ecological Communities (TECs) occur within close proximity to the survey area, with one identified on site (TEC monsoon vine thickets). An additional vegetation community (low shrubland and grassland) was also described and recorded.
- The TEC monsoon vine thickets occurred outside of the nominal clearing area, yet surrounds the site in close proximity.
- One conservation significant flora species (*Seringia exastia*) is found nearby (approximate distance 2 kilometres) but was not recorded within the survey area designated as future Golf Club carpark.
- None of the weeds listed are present on WONS (Weeds of National Significance) however it is recommended that care is taken that those present in the area do not spread into the surrounding (TEC) Monsoon Vine Thicket.

Based on these results, it is recommended that:

- Suitable drainage is installed to channel water west towards the golf course to prevent run off from the carpark causing erosion occurring in the surrounding TEC Monsoon Vine Thicket and TEC Roebuck Bay mudflats.
- All care is taken to mitigate the spread of weeds (whilst carrying out any earthworks) into the surrounding TEC monsoon vine thicket.
- Development footprint only encroaches into northern one third of proposed development area on a needs only basis so that the integrity of the dune system and surrounding monsoon vine thicket is maintained. Where possible loss of any trees should be avoided.
- Native indigenous plants are used to revegetate areas of disturbance and to replace existing non-native plants in gardens.
- The golf club and garden staff are provided information about the TEC monsoon vine thicket for education, to inform gardening practices and to build pride in the environment surrounding their club. This could be through a presentation from Yawuru, Department of Biodiversity Conservation and Attractions, or Environs Kimberley.

Figure 3 Pictures showing previous efforts to mitigate erosion caused by runoff from current carpark



8.0 References

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Appendix A

Table 1 Threatened and Priority Flora that may occur in the survey area identified from database searches with descriptions sourced from Florabase (WAH 1998-)

Species	Cons. Status	Habitat	# of Records	Last Recorded	Flowering
<i>Acacia monticola x tumida</i> var. <i>kulparn</i>	P3	On exposed clifftop site	9	9/06/1983	Unknown
<i>Aphyllodium parvifolium</i>	P1	In greyish pindan soil, sand and sandhills.	2	3/04/1988	Apr, Jul
<i>Aphyllodium glossocarpum</i>	P3	Sand. Pindan.	1	12/06/1981	Apr-Oct
<i>Corymbia paraectia</i>	P1	Skeletal soils in transition zone between coastal beach dunes and red pindan soils.	22	12/12/2015	Apr-May
<i>Croton aridus</i>	P3	Deep red sand, pindan soil. Sandplains or ridges, spinifex sandplains.	1	No date	August
<i>Decaisnina signata</i> subsp. <i>cardiophylla</i>	P1	Hemiparasitic on stems. On <i>Banksia dentata</i> (species restricted to skeletal soils over sandstone or quartzite, seasonally moist, includes rocky slopes, creeks and gorges).	3	No date	August
<i>Fuirena incrassata</i>	P3	On ironstone in grey sandy clay.	2	16/03/1986	May-Aug
<i>Glycine pindanica</i>	P3	Pindan, red sand.	20	09/02/2005	Jan, Feb
<i>Gomphrena pusilla</i>	P2	Behind foredune; fine beach sand.	3	02/06/1986	Mar-Apr, Jun
<i>Goodenia byrnesii</i>	P3	Orange Brown Silty sand.	3	09/04/2008	May, June
<i>Hibiscus kenneallyi</i>	P3	Coastal soils, sandstone.	1	08/03/1992	May-June
<i>Jacquemontia</i> sp. <i>Broome</i> (A.A. Mitchell 3028)	P1	Brown Orange Sand on Plain.	3	02/06/2011	Unknown
<i>Nicotiana heterantha</i>	P1	On seasonally wet black clay.	12	19/03/1998	May, June,
<i>Nymphoides beaglensis</i>	P3	Edges of permanent waterholes or in seasonally inundated claypans and	3	28/03/1996	May-Aug
<i>Pandanus spiralis</i> var. <i>flammeus</i>	E P B C	It is known from two populations occurring in the Edgar Ranges. Species grows in white and grey sand over sandstone and is restricted to a small, narrow gorge near waterholes.	1	No date	Feb-Aug
<i>Phyllanthus eremicus</i>	P3	Red Pindan and Sand.	4	10/04/2008	Aug-Oct
<i>Polymeria</i> sp. <i>Broome</i> (K.F. Kenneally 9759)	P1	Red pindan soil.	1	25/05/1986	Unknown
<i>Pterocaulon intermedium</i>	P3	Partly cleared pindan sandplain.	4	05/10/1993	Aug
<i>Pittosporum moluccanum</i>	P4	White sand. Sand dunes.	1	No date	Feb-Aug
<i>Schoenus punctatus</i>	P3	Watercourses.	1	04/04/2011	Aug
<i>Seringia exastia</i>	E P B	Known from seven subpopulations within the Port of Broome area, occupying 0.04km ² . It grows on pindan (red soil) heathland.	17	10/04/2008	Mar-Aug

<i>Seringia katatona</i>	P3	Red sand.	4	20/05/2005	Apr, June-
<i>Stylidium pindanicum</i>	P3	Clay flat.	3	07/05/2011	Unknown
<i>Terminalia kumpaja</i>	P3	Pindan, sandy.	5	18/10/1984	Unknown
<i>Tetragonia coronata</i>	P3	Cultivated pindan plain.	1	26/08/2003	July
<i>Thespidium basiflorum</i>	P1	Black soil with white sand.	2	15/06/1985	May-Aug
<i>Triodia acutispicula</i>	P3	Orange, silty sand.		28/08/2007	Jan-Apr
<i>Triodia caelestialis</i>	P3	Brown orange sand on plain.	3	02/06/2011	Unknown
<i>Tephrosia andrewii</i>	P1	Pindan Sand.	1	No date	Apr, Oct
<i>Tetragonia coronata</i>	P3	Red clay loam.	1	No date	Jul
<i>Tribulopsis marliesiae</i>	P3	No information available.	1	No date	Unknown

Table 2 Flora recorded in the survey area proposed carpark extension Broome Golf Club

Species list	Family	Type	Weed
<i>Abrus precatorius</i>	Papilionaceae	vine	
<i>Acacia bivenosa</i>	Mimosaceae	Shrub	
<i>Acacia eripoda</i>	Mimosaceae	shrub	
<i>Acacia monticola</i>	Mimosaceae	shrub	
<i>Aerva javanica</i>	Amaranthaceae	shrub	*
<i>Boeharvia dominii</i>	Nyctaginaceae	Herb	
<i>Canavalia rosea</i>	Papilionaceae	vine	
<i>Cenchrus ciliaris</i>	Poaceae	grass	*
<i>Chrysopogon pallidus</i>	Poaceae	grass	
<i>Cleome viscosa</i>	Capparaceae	herb	
<i>Clerodendrum tomentosum</i>	Verbenaceae	shrub	
<i>Corchorus pumilo</i>	Tiliaceae		
<i>Crotalaria cunninghamii</i>	Papilionaceae	shrub	
<i>Cullen martinii</i>	Papilionaceae	shrub	
<i>Euphorbia myrtoidies</i>	Euphorbiaceae	herb	
<i>Grewia breviflora</i>	Tiliaceae	shrub	
<i>Gyrocarpus americanus</i>	Gyrocarpaceae	tree	
<i>Leucaena leucocephala</i>	Mimosaceae	tree	*
<i>Macroptilium atropurpureum</i>	Papilionaceae	vine	*
<i>Merremia dissecta</i>	Convolvulaceae	vine	*
<i>Santalum lanceolatum</i>	Santalaceae	shrub	
<i>Spinifex longifolius</i>	Poaceae	grass	
<i>Stylosanthes hamata</i>	Papilionaceae	herb	*
<i>Tephrosia rosea</i>	Papilionaceae	shrub	
<i>Tinospora smilacina</i>	Asclepiadaceae	vine	
<i>Triodia schinzii</i>	Poaceae	grass	
<i>Tylophora cinerascens</i>	Asclepiadaceae	vine	
<i>Waltheria indica</i>	Sterculiaceae	herb	

Table 3 Fauna observed in the survey area proposed redevelopment Broome Golf Club

Species list	Family	Common Name	Cons Status
Reptiles			
<i>Amphibolurus gilberti</i>	Agamidae	Gilbert's Dragon, Ta-ta Lizard	
Mammals			
<i>Macropis Agilis</i>	Macropodidae	Agile Wallaby	
Birds			
<i>Haliastur indus</i>	Accipitridae	Brahminy Kite	
<i>Cracticus nigogularis</i>	Artamidae	Pied Butcherbird	
<i>Coracinia novaeholiandiae</i>	Campephagidae	Black-faced Cuckoo-shrike	
<i>Geopelia cuneata</i>	Columbidae	Diamond Dove	
<i>Ocyphaps lophotes</i>	Columbidae	Crested Pigeon	
<i>Grallina cyanoleuca</i>	Dicruridae	Magpie-lark	
<i>Merops omatus</i>	Meropidae	Rainbow Bee-eater	
<i>Rhipidura leucophrys</i>	Dicruridae	Willie Wagtail	
<i>Milvus migrans</i>	Accipitridae	Black Kite	
<i>Aprosmictus erythropterus</i>	Psittacidae	Red-winged Parrot	
<i>Melithreptus albogularis</i>	Meliphagidae	White-throated Honeyeater	