December 2012

NEW PERTH STADIUM

Flora and Fauna Surveys Report Addendum

Submitted to:
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Public Transport Centre
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REPORT

Report Number. 127643056-019-R-Rev0

Distribution:

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Executive Summary

Golder Associates Pty Ltd (Golder) was commissioned to undertake Level 1 flora and Level 1 fauna surveys of the Claisebrook Foreshore Reserve in East Perth and Burswood Peninsula Rail Reserve for the new Perth Stadium project (the project). These surveys are in addendum to the Level 1 flora and Level 1 fauna surveys already completed for the project and to the New Perth Stadium Flora and Fauna Surveys Report (117643077-012-R-Rev0).

The original conceptual design of the project's pedestrian bridge over the Swan River linking the Burswood Peninsula to East Perth has altered, which has resulted in a new proposed landing location in Claisebrook, East Perth. This new proposed landing location, the Claisebrook Foreshore Reserve, is south of the originally proposed site and outside the areas which have been surveyed for flora and fauna. Further, the Rail Reserve from Windan Bridge to Burswood Train Station, including the road reserve between Graham Farmer Freeway and the Rail Reserve, the land between the Rail Reserve and Victoria Park Drive, and the State Tennis Centre on Victoria Park Drive (referred to as the Rail Reserve) is also outside the original flora and fauna survey areas.

The objective of this report is to undertake a Level 1 flora and fauna survey of the Claisebrook Foreshore Reserve and the Rail Reserve to assess the baseline environment and any potential impacts and areas of concern as a result of the proposed footprint of the project.

Desktop research was undertaken to gather background information on the Claisebrook Foreshore Reserve and the Rail Reserve, considering but not limited to the following:

- previously-completed specialist studies for the project, government databases and commercially available map-based information
- DEC Threatened Ecological Community (TEC) database for TECs and Priority Ecological Communities (PECs)
- DEC threatened flora species database for Declared Rare Flora (DRF) and Priority listed taxa
- species on the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) list of threatened species and ecological communities
- Birds Australia databases.

A survey of the Rail Reserve and Claisebrook Foreshore Reserve was undertaken on 12 October 2012. Major habitat units were identified through sample site surveys and sampled with photos taken of each site. Broad vegetation categories were then identified with the assistance of satellite imagery.

Survey methods employed included basic vegetation community surveying and chance fauna sightings. No targeted species searches were undertaken; however, emphasis was placed on migratory and water bird observations. Only observations (no formal trapping) were undertaken.

Flora communities were surveyed for assemblage and then defined according to their health and environmental significance. Weeds of national and state ecological significance were also recorded and mapped. Samples were taken of flora species unable to be identified in the field for later identification.

Rail Reserve

Only three water bird species were sighted. Two were observed near Site 5 on the railway corridor flying overhead; Black Cormorant (*Phalacrocorax carbo*) and a White-faced Heron (*Egretta novaehollandiae*). Purple Swamphen (*Porphyrio porphyrio*) was also observed at the small constructed wetland at Site 12 where it is also likely to breed.

Although endemic, all are common species. No other environmentally significant fauna were observed.

The Rail Reserve vegetation consisted of 14 units, dominated by pest species and common native, and introduced specimen species. All of the introduced specimen species, and most of the native species, appear to have been directly established over the course of many planting/revegetation attempts dating back to almost 50 years (personal estimate). Two small constructed wetland units were also identified; the largest being near the State Tennis Centre, which may be of value to nesting common waterfowl.

A number of plant pests were identified, but none considered either significant or readily controlled, for example, introduced grasses such as Veldt Grass (*Ehrharta erecta*).

Claisebrook Foreshore Reserve

Pacific Black Duck (*Anas superciliosa*) was common under shade trees along the Claisebrook Foreshore Reserve. Although endemic, Pacific Black Duck were common species. No other environmentally significant fauna were observed at this site.

Claisebrook Foreshore Reserve vegetation consisted of four units primarily of specimen plantings of introduced, mature trees and self-established native Sheoaks (*Casuarina* spp.) and Paperbarks (*Melaleuca* spp.) trees on the river edge. Although both of these species are common, they do contribute to foreshore stabilisation and the Sheoaks (*Casuarina obesa*) can be a source of food for cockatoos (Johnstone, et al, 2011) albeit not roosting or nesting habitat (DEC, 2011).

Summary of Findings

Overall, only common species of endemic fauna and flora were observed. There were few associated environmental values outside of the low ecological value planted Sheoaks found in the Rail Reserve and the Claisebrook Foreshore Reserve. Other flora species observed included introduced specimens of eastern state and non-Australian ornamental garden plants.

Native fauna observed included the common species of waterfowl Purple Swamphen (*Porphyrio porphyrio*) at Site 12 (see Figure 4), the constructed wetland near the State Tennis Centre.

No conservation significant floral or fauna species were identified during the survey although it is likely that cockatoos would occasionally use Sheoak trees for some feeding, although not for roosting or nesting.

Impacts of the project development to the identified environmental values would come principally from direct vegetation destruction. If any vegetation can be retained, conservation of the Sheoaks and the constructed wetland within the Rail Reserve would be recommended as this habitat provides the most value to local communities. However, due to the proximity of the Sheoak stand to busy roads and rail, this habitat is not ideal for bird roosting and nesting.

Maintenance or replacement of disturbed stands of Sheoaks thought to be used by cockatoos should be undertaken where practicable; replacement of these trees with more suitable food sources may improve environmental outcomes as a result, specifically if revegetation occurs away from busy roads and rail.

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1.0 INTRODUCTION

Golder Associates Pty Ltd (Golder) was commissioned to undertake Level 1 flora and fauna surveys of the Claisebrook Foreshore Reserve in East Perth, and Burswood Peninsula Rail Reserve for the new Perth Stadium project (the project). These surveys are an addendum to the original flora and fauna surveys completed for the project, but extend to new areas within the project area, which were added due to conceptual design changes. The results of all flora and fauna surveys undertaken for the project to date are summarised in the *New Perth Stadium Flora and Fauna Surveys Report* (Golder, 2012a, report reference 117643077-012-R-Rev0), to which this report is an addendum.

2.0 BACKGROUND

2.1 Project History

In June 2011, the State Government announced its intention to build a new 60 000 seat sports stadium within a new Sports Precinct on the Burswood Peninsula in Perth.

The project is to design, construct, operate and maintain a new Perth Stadium (the stadium) contained within a "Sports Precinct". The "Sports Precinct" is described in the New Perth Stadium Master Plan (Strategic Projects, 2012) as including:

- A 60 000 seat stadium, with an east-west orientated pitch measuring 165 m × 130 m. The stadium will incorporate an external, elevated plaza up to 30 m wide.
- An upgraded Belmont Park rail station, with dual access to transport up to 28 000 patrons within an hour after an event. The upgraded facility will include rail forecourts to allow queuing.
- An on-street bus hub facility.
- A pedestrian bridge linking the stadium with Nelson Avenue in East Perth.
- A parkland for community sports, and temporary car parking on event days north of the stadium.
- The retention of the existing Swan River-fed lake (Lake 2) as a major feature of the Sports Precinct.
- Footpaths/cycle networks linking the stadium with Windan Bridge and East Perth train station.
- The supply of additional water, power and gas utilities to service the stadium. Sources are available in the vicinity and are generally aligned along Victoria Park Drive.

The State Government has set a target completion date for the project of 2018.

A Section 38 Referral under the *Environmental Protection Act 1986* (EP Act) was submitted to the Office of the Environmental Protection Authority (OEPA) on 12 October 2012.

2.2 Project Location

The project will be located on the northern nine holes of the existing Burswood Park Golf Course and the State Tennis Centre located on the Burswood Peninsula (the project area). The project area is shown in Figure 1, as depicted by the solid red border. The project area is bounded by the Graham Farmer Freeway to the north and east and the Swan River to the north, the remainder of the Burswood Park Golf Course, the Mirvac residential development and Swan River to the south and Gloucester Park and East Perth to the west.

Within the project area, the survey area includes two different areas, the Rail Reserve survey area on the Burswood Peninsula and the Claisebrook Foreshore Reserve survey area in East Perth. These two sites are illustrated in Figure 2 and are separated by the Swan River.

The Rail Reserve is bounded by the Graham Farmer Freeway, which runs parallel to and north of the survey area, and the Burswood Park Golf Course and Mirvac Peninsula residential development which runs parallel to and south of the survey area, and is highlighted by the purple border in Figure 2. Included within the Rail Reserve survey area site is the southern Graham Farmer Freeway road reserve, Armadale rail line, Belmont Park train station and the State Tennis Centre. The Rail Reserve is generally considered to be a well-developed area due to its current land uses and the narrow vegetated areas appear to be relatively young and are thought to be planted during landscape works.

The Claisebrook Foreshore Reserve is bounded by the Swan River to the east, Gloucester Park Trotting Ground to the west, a commercial area to the south and a park reserve to the north, and is highlighted by the green border in Figure 2. The Claisebrook Foreshore Reserve is a vacant grassed site on the edge of the Swan River, with includes riparian vegetation.

A Preliminary Site Investigation (PSI), conducted in accordance with the Department of Environment and Conservation's (DEC) *Contaminated Sites Management Series Guidelines*, identified that the project area has had an extensive history of potentially contaminating land use activities. Therefore, a detailed site investigation (DSI), in accordance with the DEC's *Contaminated Sites Management Series Guidelines*, is currently underway for this site.

Golder Associates

CLIENT Public Transport Authority
DOCUMENT 127643056-019-R-Rev0
DATE 21 Dec 2012
COMPILED GGW
APPROVED IYK

0 100 200 300
metres

SCALE (at A4) 1:9,000

NOTES
Coordinate System: PCG94

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Aerial imagery © Nearmap (2012).

LEGEND
Project area

New Perth Stadium

REGIONAL LOCATION AND PROJECT AREA

FIGURE 1

File Location: G:\Spatial_Information_Group\GIS_WORKSPACE_AUSTRALIA\01_WA\M6100_BURSWOOD\127643056\Projects\019 R\Rev0\127643056-019-R-F001-Rev0.mxd

LEGEND

- Sample site
- Lake site
- Claisebrook foreshore reserve survey area
- Rail reserve survey area

NOTES

Coordinate System: Perth Coastal Grid (PCG 94)

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Aerial imagery © Nearmap (2012).
Development layout (Oct 2012) traced from concept design plan provided by client.

0 75 150 225 300
Metres

SCALE (at A3) 1:7,000

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CLIENT	Public Transport Authority
DOCUMENT	127643056-019-R-Rev0
DATE	21 Dec 2012
COMPILED	LD
APPROVED	IYK

New Perth Stadium
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EXTENDED FAUNA AND FLORA SURVEY AREAS

FIGURE 2

File Location: G:\Spatial_Information_Group\GIS_WORKSPACE_AUSTRALIA\01_WA\M6100_BURSWOOD\127643056\Projects\019 R\Rev0\127643056-019-R-F002-Rev0.mxd

3.0 OBJECTIVE

The original conceptual design of the project's pedestrian bridge over the Swan River, linking the Burswood Peninsula to East Perth, has altered. This has resulted in a new proposed landing location in Claisebrook, East Perth. This new proposed landing location, the Claisebrook Foreshore Reserve (as illustrated in Figure 2), is south of the originally proposed site and outside the areas which were originally surveyed for flora and fauna (Golder, 2012a). Additionally, the Rail Reserve, from the Windan Bridge to the Burswood Train Station, including the road reserve between Graham Farmer Freeway and the Rail Reserve, the land between the Rail Reserve and Victoria Park Drive, and the State Tennis Centre on Victoria Park Drive (referred to as the Rail Reserve and illustrated in Figure 2), is also outside the original flora and fauna survey areas (Golder, 2012a). The original flora and fauna survey areas are illustrated in Figure 3.

Given the above, the objective of this report is to present the findings of a Level 1 flora and fauna survey of the Claisebrook Foreshore Reserve and the Rail Reserve. The surveys were undertaken to assess the baseline ecological conditions, and identify potential impacts and areas of concern that may arise as a result of the proposed footprint of the project.

The surveys were conducted according to the Environmental Protection Authority's (EPA) relevant guidance documents:

- *Guidance for the Assessment of Environmental Factors - No. 51 Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia* (EPA, 2004).
- *Guidance for the Assessment of Environmental Factors - No. 56 Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia* (EPA, 2004).

4.0 SCOPE OF WORK

The scope of work for the Level 1 flora and fauna surveys within the Claisebrook Foreshore Reserve and Rail Reserve includes the tasks outlined in the following sections.

4.1 Desktop Research

Desktop research was undertaken to gather background information on the Claisebrook Foreshore Reserve and the Rail Reserve, considering:

- previously-completed specialist studies for the project
- literature supplied by PTA
- government databases and commercially available map-based information
- DEC Threatened Ecological Community (TEC) database for TECs and Priority Ecological Communities (PECs)
- DEC threatened flora species database for Declared Rare Flora (DRF) and Priority listed taxa
- species on the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) list of threatened species and ecological communities
- Birds Australia databases.

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CLIENT	Public Transport Authority
DOCUMENT	127643056-019-R-Rev0
DATE	21 Dec 2012
COMPILED	GGW
APPROVED	IYK

0 100 200 300
metres

SCALE (at A4) 1:8,000

NOTES
Coordinate System: PCG94

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LEGEND
- Flora survey location
- Swan River riparian survey site
- Fauna survey location / Burswood lake site
- Burswood Site
- Claisebrook Site

New Perth Stadium

STUDY AREA FOR FLORA AND FAUNA SURVEYS

FIGURE 3

File Location: G:\Spatial_Information_Group\GIS_WORKSPACE_AUSTRALIA\01_WA\M6100_BURSWOOD\127643056\Projects\019 R\Rev0\127643056-019-R-F003-Rev0.mxd

4.2 Field Survey

A field survey of the Claisebrook Foreshore Reserve and the Rail Reserve was undertaken in late spring on the 12 October 2012 and a further survey of the vegetation within the southern end of the Rail Reserve was undertaken in summer on the 13 December 2012. This involved traversing the survey areas and observing, identifying and recording flora and fauna to:

- inform the results of the fauna desktop study and assess the accuracy of the background information
- assess the flora and the range of vegetation units present
- assess the fauna habitat present
- identify potentially adverse and beneficial effects of the proposed project.

4.3 Data Analysis and Reporting

Data analysis and reporting included:

- plant identification of unknown species, priority-listed species and flora of taxonomic interest, with vouchering of required samples at the WA Herbarium, where necessary
- fauna identification of unknown species with vouchering of required samples at the WA Museum, where necessary
- broad-scale mapping of vegetation communities within the surveyed areas
- descriptions of primary vegetation community types and vegetation health
- descriptions of the fauna habitat present and habitat condition
- identification of the potential presence of riparian vegetation of value
- identification and listing of migratory birds using the area and their habitat requirements
- potential adverse impacts as a result of the proposed project works to vegetation and fauna, particularly Priority Species, SREs and species listed under the EPBC Act
- recommendations of further targeted surveys, if required.

5.0 DESKTOP RESEARCH

5.1 Methodology

Previously-completed specialist studies for the project were reviewed and relevant information was extracted. The ecological assessments undertaken for the project and reviewed during this process were:

- Desktop Study and Review of Previous Environmental Reports: Proposed Burswood Stadium (Golder 2012d)
- Proposed Burswood Stadium - Level 1 Flora Survey (Golder, 2012m)
- Assessment of the importance of Burswood Peninsula and Claisebrook for Migratory and other Significant Birds (Bamford, 2012a)
- Assessment of the importance of Burswood Peninsula and Claisebrook for Non-Avian Fauna (Bamford 2012b)
- New Perth Stadium Flora and Fauna Surveys Report (Golder, 2012a).

A search was undertaken to determine which of the migratory and threatened species identified as potentially occurring within the project area also fell under the following Australian bilateral migration agreements:

- JAMBA: Japan - Australia Migratory Bird Agreement
- CAMBA: China - Australia Migratory Bird Agreement
- ROKAMBA: Republic of Korea - Australia Bird Agreement.

The following government databases and commercially available map-based information were either consulted with regard to the project, searched or analysed with regard to application to the project, or existing research/search information was reviewed and applied to this aspect of the project:

- DEC Threatened Ecological Community (TEC) database for TECs and Priority Ecological Communities (PECs) (a request to the DEC Flora and Fauna Divisions to carry out a search for flora and threatened ecological communities (TEC) database was made on 20 October 2011)
- DEC threatened flora species database for Declared Rare Flora (DRF) and Priority listed taxa
- Species on the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) list of threatened species and ecological communities
- Birds Australia databases.

5.2 Findings

5.2.1 Desktop Research and Database Searches

Database searches provided preliminary species lists for the project area and identified potential species of conservation significance. Fauna searches included short range endemic species (SREs) present, terrestrial vertebrates, subterranean fauna, bats, reptiles and birds (emphasis on water birds), amphibians, aquatic invertebrates and fish. The flora literature review focused on records of both terrestrial and aquatic vegetation communities within the project area, with an emphasis on remnant Swan River riparian vegetation. Findings are outlined in the sections below.

5.2.2 Project Specialist Studies

5.2.2.1 Flora

Golder (2012a) presents the results of the Level 1 flora survey completed for the Burswood and Claisebrook sites. Findings from those surveys, as relevant to the current study, include:

- Burswood site:
  - flora within the site consists of fringing riparian vegetation surrounding the artificial lakes, Swan River riparian vegetation and stands and individual trees and palms within the Burswood Park Golf Course
  - most of the trees appear to be less than 30 years old based upon their size and are generally garden specimen trees
  - it is estimated that >226 mature Sheoaks (*Casuarina* sp.) were growing in the northern nine holes of the Burswood Park Golf Course
  - aside from mixed native and mixed exotic hardwood composition, no clear vegetation units were identified due to the extremely modified and variable nature of vegetation along the River margin and amongst the lakes which consisted of mixed planted and naturalised vegetation
  - no units or even individuals of remnant native vegetation were identified

- the site contains little vegetation that is ecologically significant in itself
- much of the vegetation observed was introduced and not representative of regional flora or vegetation, or consisted of species common to wetlands within the region
- all lake and riparian sites surveyed demonstrated ecologically depauperate and poor conditions
- given the artificial lake's vegetation assemblage and expected water qualities, the lakes are not likely to be of high conservation value
- artificial lake vegetation is, however, of regional value and displays many vegetation assemblages typical of the region such as Paperbark canopies and Bulrush/Sea Rush understoreys.

- Claisebrook site:
  - vegetation assemblages demonstrated predominantly introduced or common floral species that may also serve as riparian habitat for native vertebrate fauna, such as waterfowl and other birds
  - vegetation is of low conservation or ecological value.

5.2.2.2 Fauna

Golder (2012a) presents the results of the Level 1 fauna surveys completed for the Burswood and Claisebrook sites. Findings from those surveys, as relevant to the current study include:

- Burswood site:
  - Waterbirds were a major component of the bird assemblage of the Burswood site, with few land birds (mostly only small numbers of those species counted) present.
  - Significant bird species identified during the survey were the locally-significant: Musk Duck (*Biziura lobata*), Hardhead (*Aythya australis*) and Dusky Moorhen (*Gallinula tenebrosa*).
  - Some common waterbird species appear to be present regularly and in moderate numbers on and around lakes on the site. These include: the Black Swan (*Cygnus atratus*), which regularly breeds at the site; the Australian Wood Duck (*Chenonetta jubata*); Pacific Black Duck (*Anas superciliosa*); Australasian Grebe (*Tachybaptus novaehollandiae*); Great Crested Grebe (*Podiceps cristatus*); Purple Swamphen (*Porphyrio porphyrio*); Eurasian Coot (*Fulica atra*);and Australian Reed-Warbler (*Acrocephalus australis*).
  - The survey indicated that Lakes 1, 4, 5 and 9 (Figure 2) supported the highest numbers of species and individuals; they also supported a lot of breeding. Ornithological Technical Services, 2012 and SEMP Shorebirds 2020, 2012 listed Lake 2 as a site that hosted some species of migratory birds (Bamford, 2012).
  - Within the northern portion of the golf course, Lake 1 is an irrigation lake north of the clubhouse, while Lake 2 is hydraulically connected to the Swan River. Lakes 3 to 11 are located within the southern portion of the golf course. Lake 1 (Figure 2) will be directly impacted due to the proposed works, while Lake 2 is likely to be retained. However, there is the potential for Lake 2 (Figure 2) to be indirectly impacted due to the proximity of the works.
  - Numbers of birds of conservation significance were generally low. However, the following observations were of note:
    - the migratory Common Sandpiper (*Actitis hypoleucos*) occasionally occurs in high numbers on Lake 2 (see Figure 2) (Bamford, 2012a)
    - the migratory Caspian Tern (*Sterna caspia*) roosts regularly in high numbers on the lawn near the first tee located on the southern nine holes. This is located outside the proposed project disturbance area (see Figure 1) (Bamford, 2012a)

- the migratory Eastern Grey Egret (*Egretta modesta*) - one or two individuals regularly seen foraging around the lakes; none were identified during the survey (Ornithological Technical Services, 2012; Swan Estuary Marine Park (SEMP) Shorebirds 2020 database, 2012)
- the migratory Eastern Osprey (*Pandion cristatus*) - single birds are observed frequently over the Swan River and Lakes 1 and 2; none were identified during the survey (Ornithological Technical Services, 2012)
- the migratory White-bellied Sea-Eagle (*Haliaetus leucogaster*) - a single adult bird was identified in 2011 (Ornithological Technical Services, 2012)
- the migratory Rainbow Bee-eater (*Merops ornatus*) - maximum count by Ornithological Technical Services of 35 represent a group migrating through the area (Ornithological Technical Services, 2012)
- the migratory Common Greenshank (*Tringa nebularia*), Red-necked Stint (*Calidris canutus*), Sharp-tailed Sandpiper (*Calidris acuminate*) and Fairy Tern (*Sterna nereis*) were also listed as occurring in the project area (Ornithological Technical Services, 2012 and SEMP Shorebirds 2020 database), yet were not observed during the survey (Bamford, 2012a)
- the threatened Peregrine Falcon (*Falco Peregrinus*) - single birds regularly seen over the Burswood Park Golf Course and the Burswood Casino site (Ornithological Technical Services, 2012). This predator species is likely to be feeding on small birds also found over this area (Bamford, 2012a)
- the vulnerable Forest Red-tailed Black-Cockatoo (*Calyptorhynchus banksii naso*) makes occasional, and the endangered Carnaby's Black-Cockatoo (*Calyptorhynchus latirostris*) makes regular use of planted Sheoaks adjacent to the 15th fairway (see Figure 3) (Bamford, 2012a).

- Based on the habitat values observed within the site, there is likely no suitable habitat to host any significant terrestrial invertebrates.
- Field observations suggest it is likely that all of the artificial lakes in the Burswood site contain the introduced Mosquitofish (*Gambusia holbrooki*).
- Staff reported that native freshwater fish, including the Western Pygmy Perch (*Edelia vittata)* have been released into some of the lakes, although it is not known if that species has survived because they can be preyed upon by the Mosquitofish (Morgan *et al.* 1998).
- Small fish were abundant in Lake 2; these included Black Bream (*Acanthopagrus butcheri*) and Yellowtail Grunter (*Amniataba caudavittata*) (Bamford, 2012b).
- The Fence Skink (*Cryptoblepharus buchanani*), was observed at the Burswood site, while Long-necked Tortoises (*Chelodina oblonga*) are reported to occur in the artificial lakes.
- One mammal, the introduced Brown (or Ship) Rat (*Rattus norvegicus*), was observed during the field survey of the Burswood site and is reported by golf course staff to be abundant in the area.

- Claisebrook site:
  - A single Eastern Great Egret (*Egretta modesta)* (a migratory species) was observed in this site.

The results of the avian fauna survey, including the database search results and previous survey results (Bamford, 2012a) are included as Appendix A.

Following the literature review, Bamford (2012) noted the following conservation significant bird assemblage as potentially occurring within a 5 km radius of the Burswood Park Golf Course site (Table 1 and 2):

- 28 species listed as migratory (listed in Table 1)
- Four species listed as threatened (listed in Table 2)
- One species listed as Priority (listed in Table 2).

Table 1: Migratory Avian Species Recorded within 5 km of the Burswood Park Golf Course Database Search Area

Apodidae (swifts)		**Scolopacidae** (sandpipers) cont.	
Fork-tailed Swift	*Apus pacificus*	Marsh Sandpiper	*Tringa stagnatalis*
Ardeidae (herons and egrets)		Common Greenshank	*Tringa nebularia*
Cattle Egret	*Ardea ibis*	Terek Sandpiper	*Tringa terek*
Eastern Great Egret	*Egretta modesta*	Common Sandpiper	*Tringa hypoleucos*
Accipitridae (kites, hawks and eagles)		Grey-tailed Tattler	*Tringa brevipes*
Eastern Osprey	*Pandion cristatus*	Ruddy Turnstone	*Arenaria interpres*
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	Great Knot	*Calidris tenuirostris*
Charadriidae (lapwings and plovers)		Red Knot	*Calidris canutus*
Pacific Golden Plover	*Pluvialis fulva*	Red-necked Stint	*Calidris ruficollis*
Grey Plover	*Pluvialis squatarola*	Pectoral Sandpiper	*Calidris melanotos*
Lesser Sand Plover	*Charadrius mongolus*	Sharp-tailed Sandpiper	*Calidris acuminata*
Greater Sand Plover	*Charadrius leschenaultii*	Curlew Sandpiper	*Calidris ferruginea*
Scolopacidae (sandpipers)		Broad-billed Sandpiper	*Limicola falcinellus*
Black-tailed Godwit	*Limosa limosa*	**Laridae** (gulls and terns)	
Bar-tailed Godwit	*Limosa lapponica*	Caspian Tern	*Hydroprogne caspia*
Little Curlew	*Numenius minutus*	**Meropidae** (bee-eaters)	
Whimbrel	*Numenius phaeopus*	Rainbow Bee-eater	*Merops ornatus*

Table 2: Threatened and Priority Avian Species Recorded within 5 km of the Burswood Park Golf Course Database Search Area.

Avian Species Recorded		EPBC Act Conservation Status
Falconidae (falcons)		
Peregrine Falcon	*Falco peregrinus*	Threatened
Charadriidae (lapwings and plovers)		
Hooded Plover	*Thinornis rubricollis*	P4
Laridae (gulls and terns)		
Fairy Tern	*Sterna nereis*	Threatened
Cacatuidae (cockatoos)		
Forest Red-tailed Black-Cockatoo	*Calyptorhynchus banksii naso*	Threatened
Carnaby's Black-Cockatoo	*Calyptorhynchus latirostris*	Threatened

No migratory, threatened or Priority species were observed within the Burswood Park Golf Course during the site inspections conducted in February and October 2012. A single Eastern Great Egret was present at the Claisebrook foreshore site during the survey conducted on the 17 February 2012. A full list of the avian fauna identified from the literature review and site inspection is provided as Appendix A.

Bamford (2012) commented that the majority of migratory species listed as recorded in the general vicinity have not been seen in the Burswood Park Golf Course area, or have been seen only in small numbers, despite the extensive records collected by Ornithological Technical Services. They are very unlikely to be present except as vagrants in the Claisebrook area. This is because at both sites, the tidal mudflats favoured by the majority of migratory birds (i.e. sandpipers and plovers) are not present.

Bamford (2012) provided the following list and description of conservation significant avian fauna that might be present regularly on the Burswood Park Golf Course. These comments are drawn extensively from notes provided by Ornithological Technical Services and from the habitat assessment made on the 17 February 2012.

Table 3: Conservation Significant Avian Fauna Considered to be Present Regularly on the Burswood Park Golf Course (Bamford, 2012)

EPBC Act Conservation Status	Species	Comments (Bamford, 2012)
Migratory	Eastern Great Egret (*Egretta modesta)*	One or two birds seen foraging around artificial wetlands regularly; a single bird was present at Claisebrook on 17 February.
Migratory	Eastern Osprey (*Pandion cristatus)*	Single birds observed frequently over the river and occasionally over Lakes 1 and 2. The species is known to nest further upstream (Ascot) and downsteam near Freshwater Bay, but no nesting occurs in the project area and there are few large trees with open crowns likely to support nesting. The Eastern Osprey is common along the Swan River.
Migratory	White-bellied Sea-Eagle (*Haliaeetus leucogaster)*	A single, sub-adult bird seen in January 2011. This species is infrequently observed along the Swan River.
Migratory	Rainbow Bee-eater (*Merops ornatus)*	Maximum count by Ornithological Technical Services of 35, which represents a group moving through on migration and flying over but also foraging within the area.
Migratory	Common Greenshank *(Tringa nebularia),* Red-necked Stint (*Calidris canutus*), Sharp-tailed Sandpiper (*Calidris acuminate*) and Fairy Tern *Sterna nereis*)	Listed as occurring in the Project area under Ornithological Technical Services, 2012 and SEMP Shorebirds 2020 database, yet were not observed during the survey.
Migratory	Common Sandpiper *(Tringa hypoleucos)*	At least occasionally occurs in locally high numbers on Lake 2 which is hydraulically linked to the Swan River and is to be retained as part of the Project (NB: Bamford (2012) report incorrectly states Lake 1).
Migratory	Caspian Tern *(Hydroprogne caspia)*	Roosts regularly in locally high numbers on the lawn near the First Tee, which is in the southern portion of the Burswood Golf Course and is outside of the Project area
Threatened	Peregrine Falcon (*Falco Peregrinus*	Single birds regularly seen over the Burswood Park Golf Course and the Burswood Casino site (Ornithological Technical Services, 2012).

EPBC Act Conservation Status	Species	Comments (Bamford, 2012)
Threatened	Forest Red-tailed Black-Cockatoo (*Calyptorhynchus banksii naso)* and Carnaby's Black-Cockatoos *(Calyptorhynchus latirostris)*	Forest Red-tailed Black-Cockatoo makes occasional visits and the Carnaby's Black-Cockatoo makes regular use of planted Sheoaks adjacent to the 15th Fairway (immediately north of Lake 1).

Bamford (2012) concluded that the numbers of birds of conservation significance were generally low over the Burswood Park Golf Course and Claisebrook foreshore.

5.2.3 DEC Threatened Flora Species Database for Declared Rare Flora and Priority Listed Taxa

The results from the Threatened Flora Database (DEFL), the WA Herbarium database (WAHerb), and the Declared Rare and Priority Flora Species List for the project identified no occurrences of, threatened flora, declared rare flora or priority listed taxa within the project area (Golder, 2012c).

5.2.4 DEC Threatened Ecological Community and Priority Ecological Communities Databases

The results from the DEC Flora and Fauna Divisions search for flora and threatened ecological communities (TEC) database found no known occurrences of TEC recorded within the project area (Golder, 2012c).

5.2.5 Environment Protection and Biodiversity Conservation Act 1999 Threatened Species and Ecological Communities Database

A search of the EPBC Act Protected Matters Register identified a number of matters of National Environmental Significance potentially occurring in the project area. These are summarised in Table 4; however, none of these were located directly within the project area.

Table 4: Burswood Peninsula: Summary of Environmental Protected Areas within a 5 km Radius of the Project Area

Matters of National Environmental Significance	
World Heritage Properties	None
National Heritage Places	None
Lakes of International Significance (Ramsar Lakes)	None
Great Barrier Reef Marine Park: Commonwealth Marine Areas	None
Threatened Ecological Communities	None
Listed Migratory Species	12
Listed Threatened Species	16
Other Matters Protected by the EPBC Act	
Commonwealth Lands	None
Commonwealth Heritage Places:	None
Listed Marine Species	9
Whales and Other Cetaceans	None
Critical Habitats	None
Commonwealth Reserves	None

Additional Information	
Place on the Register of the National Estate (RNE)	4
State and Territory Reserves	None
Regional Forest Agreements	None
Invasive Species	16
Nationally Important Lakes	1
Key Ecological Features (Marine)	None

There are no threatened ecological communities listed in the vicinity of the project or nearby surrounds; however, there are listed threatened species within the vicinity of the project.

Table 5 outlines the results of the EPBC Act Protected Matters Search Tool for listed threatened fauna identified with the vicinity of the project area.

Table 5: Results of the EPBC Act Protected Matters Search Tool for Listed Threatened Fauna Identified within the Vicinity of a 5 km Radius of the Project Area

Scientific Name	Common Name	EPBC Act Listing
Calyptorhynchus banksii naso	Forest Red-tailed Black-Cockatoo	Vulnerable
Calyptorhynchus latirostris	Carnaby's Black-Cockatoo, Short-billed Black-Cockatoo	Endangered
Leipoa ocellata	Malleefowl	Vulnerable
Rostratula australis	Australian Painted Snipe	Vulnerable
Sternula nereis nereis	Fairy Tern (Australian)	Vulnerable
Synemon gratiosa	Graceful Sun Moth	Endangered
Dasyurus geoffroii	Chuditch, Western Quoll	Vulnerable
Caretta caretta	Loggerhead Turtle	Endangered
Chelonia mydas	Green Turtle	Vulnerable
Dermochelys coriacea	Leatherback Turtle, Leathery Turtle	Endangered

Table 6 outlines the results of the EPBC Act Protected Matters Search Tool for listed threatened flora identified with the vicinity of the project area.

Table 6: Results of the EPBC Act Protected Matters Search Tool for Listed Threatened Flora Identified within the Vicinity of a 5 km Radius of the Project Area

Scientific Name	Common Name	EPBC Act Listing
Andersonia gracilis	Slender Andersonia	Endangered
Centrolepis caespitosa		Endangered
Darwinia foetida	Muchea Bell	Critically endangered
Lepidosperma rostratum	Beked Lepidosperma	Endangered
Thelymitra manginii K.Dixon & Batty ms.		Endangered
Villarsia calthifolia	Mountain Villarsia	Endangered

Table 7 outlines the results of the EPBC Act Protected Matters Search Tool for listed migratory species identified within the vicinity of the project area.

Table 7: Results of the EPBC Act Protected Matters Search Tool for Listed Migratory Species Identified within the Vicinity of a 5 km Radius of the Project Area

Scientific Name	Common Name	EPBC Act Listing
Apus pacificus	Fork-tailed Swift	Threatened
Ardea alba	Great Egret, White Egret	Threatened
Ardea ibis	Cattle Egret	Threatened
Haliaeetus leucogaster	White-bellied Sea-Eagle	Vulnerable
Leipoa ocellata	Malleefowl	Vulnerable
Merops ornatus	Rainbow Bee-eater	Vulnerable
Rostratula benghalensis (sensu lato)	Painted Snipe	Vulnerable
Dasyurus geoffroii	Chuditch, Western Quoll	Vulnerable
Caretta caretta	Loggerhead Turtle	Endangered
Chelonia mydas	Green Turtle	Vulnerable
Dermochelys coriacea	Leatherback Turtle, Leathery Turtle, Luth	Endangered

An interpretation of these results and an assessment of the potential impact of the proposed project on the species listed above are being managed under state and Commonwealth referral advice and applications.

6.0 FIELD SURVEY

6.1 Methodology

A survey of the Rail Reserve and Claisebrook Foreshore Reserve was undertaken on 12 October 2012. Golder's Principal Environmental Scientist Dr Clint McCullough completed the fauna and flora component with assistance from Dr van Etten (a specialist in ecology based at Edith Cowan University). Another survey of the vegetation within the Rail Reserve towards the Great Eastern Highway was completed on 13 December 2012 by Dr Clint McCullough and Sarah Brown. Major habitat units were identified through sample site surveys and sampled with photos taken of each site. Broad vegetation categories were then identified with the assistance of satellite imagery.

Survey methods employed included basic vegetation community surveying and chance fauna sightings. No targeted species searches were undertaken; however, emphasis was placed on migratory and water birds observations.

Flora communities were surveyed for assemblage and then defined according to their health and environmental significance. Weeds of national and state ecological significance were also recorded and mapped. Samples were taken of flora species unable to be identified in the field for later identification.

Only observations (no formal trapping) were undertaken. Additionally, there was no night survey component. However, it is not expected that any significant fauna were missed due to the low value nature of most habitat observed in the survey and the low density of habitat (largely small Sheoak stands) that were found.

6.2 Survey Results

6.2.1 Rail Reserve

Only three water bird species were sighted. Two were observed near Site 5 (see Figure 4) on the railway corridor flying overhead; Black Cormorant (*Phalacrocorax carbo*) and a White-faced Heron (*Egretta novaehollandiae*). Purple Swamphen (*Porphyrio porphyrio*) was also observed at the small constructed wetland at Site 12 (see Figure 4) where it is also likely to breed.

Although endemic, all are common species. No other environmentally significant fauna were observed.

The Rail Reserve vegetation consisted of 14 units dominated by pest species and common native and introduced specimen species (see Figure 4). All of the introduced specimen species, and most of the native species, appear to have been directly established over the course of many planting/revegetation attempts dating back to almost 50 years (personal estimate). Two small constructed wetland units were also identified; the largest near the State Tennis Centre, which may be of value to nesting common waterfowl (see Figure 4).

A number of plant pests were identified, but none considered either significant or readily controlled, for example, introduced grasses such as Veldt Grass (*Ehrharta erecta*).

6.2.2 Claisebrook Foreshore Reserve

Pacific Black Duck (*Anas superciliosa*) was common under shade trees along the Claisebrook Foreshore Reserve. Although endemic, Pacific Black Duck were common species. No other environmentally significant fauna were observed at this site.

Claisebrook Foreshore Reserve vegetation consisted of four units primarily of specimen plantings of introduced, mature trees and self-established native Sheoaks (*Casuarina* spp.) and Paperbarks (*Melaleuca* spp.) trees on the River edge (see Figure 4). Although both of these species are common, they do contribute to foreshore stabilisation and the Sheoaks can be a source of food for cockatoos (Johnstone et al. 2011), albeit not roosting or nesting habitat (DEC, 2011) (Figure 5).

No significant plant pests were identified at these survey sites.

Golder Associates

CLIENT	Public Transport Authority
DOCUMENT	127643056-019-R-Rev0
DATE	21 Dec 2012
COMPILED	GGW
APPROVED	IYK

0 110 220 330
metres

SCALE (at A4) 1:10,000

NOTES
Coordinate System: PCG94

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Aerial imagery © Nearmap (2012).

LEGEND
- Sample site
- Assorted Rehabilitated
- Constructed Wetland
- Heavily disturbed
- Specimen garden

New Perth Stadium

EXTENDED FLORA AND FAUNA SURVEY AREA HABITAT MAPPING

FIGURE 4

File Location: G:\Spatial_Information_Group\GIS_WORKSPACE_AUSTRALIA\01_WA\M6100_BURSWOOD\127643056\Projects\019 R\Rev0\127643056-019-R-F004-Rev0.mxd

Figure 5: C. obesa *Stabilising River Banks but being Undercut through Wave Erosion*

6.3 Summary of Findings

Overall only common species of endemic fauna and flora were observed, with few associated environmental values outside of the low ecological value planted Sheoaks found in the Rail Reserve and the Claisebrook Foreshore Reserve. Other flora species observed included introduced specimens of eastern state and non-Australian ornamental garden plants.

Fauna observed included the common species of waterfowl Purple Swamphen (*Porphyrio porphyrio*) at Site 12 (see Figure 4), the constructed wetland near the State Tennis Centre.

7.0 CONCLUSIONS

Most of the survey areas consist of either deliberately replanted trees and lawn with only some natural colonisation by a few endemic floral species.

No significant flora or fauna species were identified during the survey although it is likely that cockatoos would occasionally use Sheoak trees for some feeding although not for roosting or nesting.

Impacts of the project development to the identified environmental values would come principally from direct vegetation destruction. If any vegetation can be retained, conservation of the Sheoaks and the constructed wetland within the Rail Reserve is recommended as this habitat provides the most value to local communities. However, due to the proximity of the Sheoak stand to busy roads and rail, this habitat is not ideal for birds.

Maintenance or replacement of disturbed stands of Sheoaks thought to be used by cockatoos should be undertaken where practicable; replacement of these trees with more suitable food sources may improve environmental outcomes as a result, specifically if revegetation occurs away from busy roads and rail.

8.0 LIMITATIONS

Your attention is drawn to the document - "Limitations", which is included as Appendix C to this report. This document is intended to assist you in ensuring that your expectations of this report are realistic, and that you understand the inherent limitations of a report of this nature. If you are uncertain as to whether this report is appropriate for any particular purpose please discuss this issue with us.

9.0 REFERENCES

Bamford, M.J. and Bamford, A.R. (2012a). *Assessment of the importance of Burswood Peninsula and Claisebrook for Migratory and other Significant Birds*. Bamford Consulting Ecologists, Kingsley. Included as Attachment B of Golder Associates (2012a)

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Report Signature Page

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APPENDIX A

Avian Fauna Survey and Database Search Results

Table 8: Avian Fauna Survey and Database Search Results

Species	EPBC Act Conservation Status	Local Conservation Status	Present in Agreement			Quantity			
			JAMBA	CAMBA	ROKAMBA	BPGC OTS	SEMP	BPGC 17/02/2012	Golder 12/10/2012
Musk Duck *Biziura lobata*		Local				17	164	9	
Black Swan *Cygnus atratus*						38	194	8	
Australian Shelduck *Tadorna tadornoides*						9	38		
Australian Wood Duck *Chenonetta jubata*						300		44	
Pink-eared Duck *Malacorhynchus membranaceus*		Local				3	4		
Pacific Black Duck *Anas superciliosus*						200	111	60	X
Grey Teal *Anas gibberifrons*						35	608		
Australasian Shoveler *Anas rhynchotis*		Local				42	6		
Hardhead *Aythya australis*		Local				22	12	17	
Blue-billed Duck *Oxyura australis*		Local				X			
Domestic ducks (Muscovy, Mallard and hybrids)								1	
Podicepididae (grebes)									
Australasian Grebe *Tachybaptus novaehollandiae*						12		11	
Great Crested Grebe *Podiceps cristatus*						4	12	6	
Hoary-headed Grebe *Poliocephalus poliocephalus*							25		
Columbidae (pigeons and doves)									
Rock Dove (Domestic Pigeon)[int] *Columba livia*						X		X	
Laughing Dove[int] *Streptopelia senegalensis*						X		X	
Spotted Dove[int] *Streptopelia chinensis*						X			
Caprimulgidae (nighjars)									
Spotted Nightjar *Eurostopodus argus*						1			
Apodidae (swifts)									
Fork-tailed Swift *Apus pacificus*	Migratory		✓	✓	✓				
Anhingidae (darters)									

Species	EPBC Act Conservation Status	Local Conservation Status	Present in Agreement			Quantity			
			JAMBA	CAMBA	ROKAMBA	BPGC OTS	SEMP	BPGC 17/02/2012	Golder 12/10/2012
Darter *Anhinga melanogaster*						5	10	3	
Phalacrocoracidae (cormorants)									
Great Cormorant *Phalacrocorax carbo*						4	50		
Pied Cormorant *Phalacrocorax varius*						2	30		
Little Black Cormorant *Phalacrocorax sulcirostris*						300	1200		5
Little Pied Cormorant *Phalacrocorax melanoleucos*						20	223	9	
Pelecanoididae (pelicans)									
Australian Pelican *Pelecanus conspicillatus*						7	151	1	
Ardeidae (herons and egrets)									
Australasian Bittern *Botaurus poiciloptilus*									
Cattle Egret *Ardea ibis*	Migratory		✓	✓					
White-faced Heron *Egretta novaehollandiae*						4	11	1	1
Little Egret *Egretta garzetta*						5	2		
Eastern Great Egret *Egretta modesta*	Migratory					4	14		
Nankeen Night-Heron *Nycticorax caledonicus*						1			
Plataleidae (ibis and spoonbills)									
Australian White Ibis *Threskiornis molucca*						5	450	3	
Straw-necked Ibis *Threskiornis spinicollis*						300	12	1	
Yellow-billed Spoonbill *Platalea flavipes*						9	2		
Accipitridae (kites, hawks and eagles)									
Eastern Osprey *Pandion cristatus*	Migratory					4			
Black-shouldered Kite *Elanus axillarus*						1			
White-bellied Sea-Eagle *Haliaeetus leucogaster*	Migratory			✓		1			
Little Eagle *Hieraaetus morphnoides*						5			
Falconidae (falcons)									

Species	EPBC Act Conservation Status	Local Conservation Status	Present in Agreement			Quantity			
			JAMBA	CAMBA	ROKAMBA	BPGC OTS	SEMP	BPGC 17/02/2012	Golder 12/10/2012
Nankeen Kestrel *Falco cenchroides*						1			
Australian Hobby *Falco longipennis*						4			
Peregrine Falcon *Falco peregrinus*	Threatened					1			
Rallidae (crakes and rails)									
Buff-banded Rail *Gallirallus philippensis*						8			
Purple Swamphen *Porphyrio porphyrio*						c. 20		15	1
Spotless Crake *Porzana tabuensis*						1			
Black-tailed Native-hen *Tribonyx ventralis*						1			
Dusky Moorhen *Gallinula tenebrosa*		Local				15		22	
Eurasian Coot *Fulica atra*						3000		81	
Haematopodidae (oystercatchers)									
Australian Pied Oystercatcher *Haematopus longirostris*									
Recurvirostridae (stilts and avocets)									
Black-winged Stilt *Himantopus himantopus*						14			
Red-necked Avocet *Recurvirostra novaehollandiae*						2			
Charadriidae (lapwings and plovers)									
Pacific Golden Plover *Pluvialis fulva*	Migratory						7		
Grey Plover *Pluvialis squatarola*	Migratory		✓	✓	✓		119		
Red-capped Plover *Charadrius ruficapillus*						6	200		
Lesser Sand Plover *Charadrius mongolus*	Migratory						2		
Greater Sand Plover *Charadrius leschenaultii*	Migratory				✓		3		
Hooded Plover *Thinornis rubricollis*	P4						1		
Black-fronted Dotterel *Elseyornis melanops*						14	1		
Scolopacidae (sandpipers)									
Black-tailed Godwit *Limosa limosa*	Migratory		✓	✓	✓		6		
Bar-tailed Godwit *Limosa lapponica*	Migratory		✓	✓	✓		35		

Species	EPBC Act Conservation Status	Local Conservation Status	Present in Agreement			Quantity			
			JAMBA	CAMBA	ROKAMBA	BPGC OTS	SEMP	BPGC 17/02/2012	Golder 12/10/2012
Little Curlew ***Numenius minutus***	Migratory			✓	✓				
Whimbrel ***Numenius phaeopus***	Migratory		✓	✓	✓		1		
Marsh Sandpiper ***Tringa stagnatalis***	Migratory			✓	✓		4		
Common Greenshank ***Tringa nebularia***	Migratory			✓		2	58		
Terek Sandpiper ***Tringa terek***	Migratory		✓	✓			4		
Common Sandpiper ***Tringa hypoleucos***	Migratory		✓	✓	✓	8	6		
Grey-tailed Tattler ***Tringa brevipes***	Migratory			✓	✓		3		
Ruddy Turnstone ***Arenaria interpres***	Migratory			✓			1		
Great Knot ***Calidris tenuirostris***	Migratory		✓	✓	✓		140		
Red Knot ***Calidris canutus***	Migratory		✓	✓	✓		91		
Red-necked Stint ***Calidris ruficollis***	Migratory			✓	✓	17	3046		
Pectoral Sandpiper ***Calidris melanotos***	Migratory		✓		✓		1		
Sharp-tailed Sandpiper ***Calidris acuminata***	Migratory		✓	✓	✓	14	150		
Curlew Sandpiper ***Calidris ferruginea***	Migratory		✓	✓	✓		1078		
Broad-billed Sandpiper ***Limicola falcinellus***	Migratory		✓	✓	✓		1		
Laridae (gulls and terns)									
Silver Gull ***Larus novaehollandiae***						250	1165	X	
Caspian Tern ***Hydroprogne caspia***	Migratory			✓		19	17		
Crested Tern ***Sterna bergii***			✓			2	98		
Fairy Tern ***Sterna nereis***	Threatened						58		
Cacatuidae (cockatoos)									
Forest Red-tailed Black-Cockatoo ***Calyptorhynchus banksii naso***	Threatened	Vulnerable				14			
Carnaby's Black-Cockatoo ***Calyptorhynchus latirostris***	Threatened	Endangered				200			
Galah ***Cacatua roseicapilla***						10			
Long-billed Corella[int] ***Cacatua tenuirostris***						30			
Little Corella ***Cacatua sanguinea***						200		X	

Species	EPBC Act Conservation Status	Local Conservation Status	Present in Agreement			Quantity			
			JAMBA	CAMBA	ROKAMBA	BPGC OTS	SEMP	BPGC 17/02/2012	Golder 12/10/2012
Psittacidae (lorikeets and parrots)									
Rainbow Lorikeet [int] ***Trichoglossus haematodus***						1000			
Australian Ringneck ***Barnardius zonarius***						5			
Strigidae (hawk-owls)									
Southern Boobook ***Ninox novaeseelandiae***						1			
Halcyonidae (forest kingfishers)									
Laughing Kookaburra [int] ***Dacelo novaeguineae***						4			
Meropidae (bee-eaters)									
Rainbow Bee-eater ***Merops ornatus***	Migratory					35			
Meliphagidae (honeyeaters)									
Western Spinebill ***Acanthorhynchus superciliosus***									
Singing Honeyeater ***Lichenostomus virescens***								X	
Red Wattlebird ***Anthochaera carunculata***								X	
Western Wattlebird ***Anthochaera lunulata***									
Brown Honeyeater ***Lichmera indistincta***								X	
New Holland Honeyeater ***Phylidonyris novaehollandiae***		Local							
Campephagidae (cuckoo-shrikes)									
Black-faced Cuckoo-shrike ***Coracina novaehollandiae***									
Artamidae (Australian Magpie, woodswallows)									
Australian Magpie ***Gymnorhina tibicen***								X	
Rhipiduridae (fantails)									
Willie Wagtail ***Rhipidura leucophrys***								X	
Corvidae (crows and ravens)									
Australian Raven ***Corvus coronoides***								X	
Monarchidae (monarch flycatchers and allies)									

Species	EPBC Act Conservation Status	Local Conservation Status	Present in Agreement			Quantity			
			JAMBA	CAMBA	ROKAMBA	BPGC OTS	SEMP	BPGC 17/02/2012	Golder 12/10/2012
Magpie-lark *Grallina cyanoleuca*								X	
Acrocephalidae (reed-warblers)									
Australian Reed-Warbler *Acrocephalus australis*						20		2	
Megaluridae (grassbirds)									
Little Grassbird *Megalurus gramineus*						6		1	
Timaliidae (white-eyes)									
Silvereye *Zosterops lateralis*								X	
Hirundinidae (swallows and martins)									
Welcome Swallow *Hirundo neoxena*								X	
Tree Martin *Petrochelidon nigricans*									
Motacillidae (pipits and true wagtails)									
Australasian Pipit *Anthus novaeseelandiae*								X	

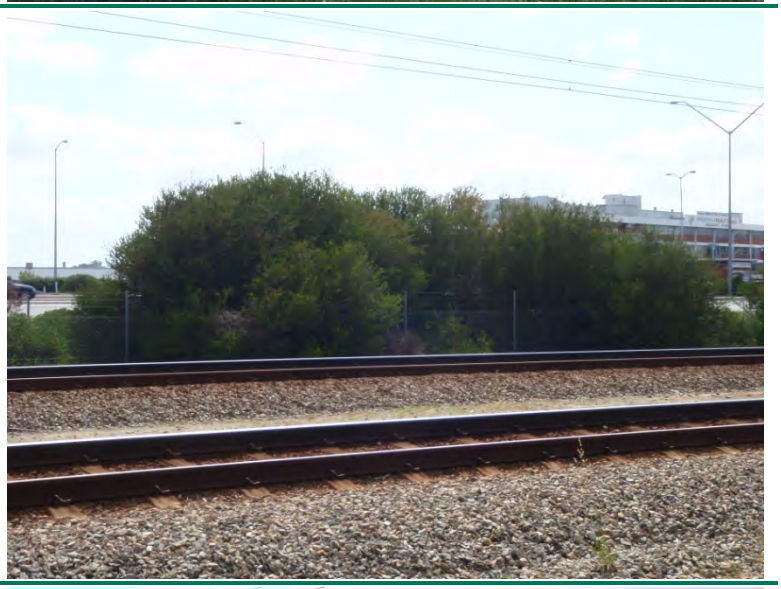
EPBC Act - Environmental Protection and Biodiversity Conservation Act 1999
BPGC- Burswood Park Golf Course
BPGC 17/02/2012 - Species identified at Burswood Park Golf Course on 17 February 2012
BPGC OTS - Species identified as occurring at the Burswood Park Golf Course by Ornithological Technical Services
SEMP - Maximum counts from the SEMP (Swan Estuary Marine Park; Shorebirds 2020 database)
JAMBA - Japan-Australia Migratory Bird Agreement
CAMBA - China - Australia Migratory Bird Agreement
ROKAMBA - Republic of Korea-Australia Migratory Bird Agreement
X - Recorded but not counted
✓ - Species present
Migratory - listed as migratory under the EPBC Act and Wildlife Conservation Act
Threatened - Listed as threatened (Endangered or Vulnerable under the EPBCT Act, Schedule 1 or 4 of the Wildlife Conservation Act)
Local - listed as having declined in the Perth Region (Dell and Banyard, 2000).

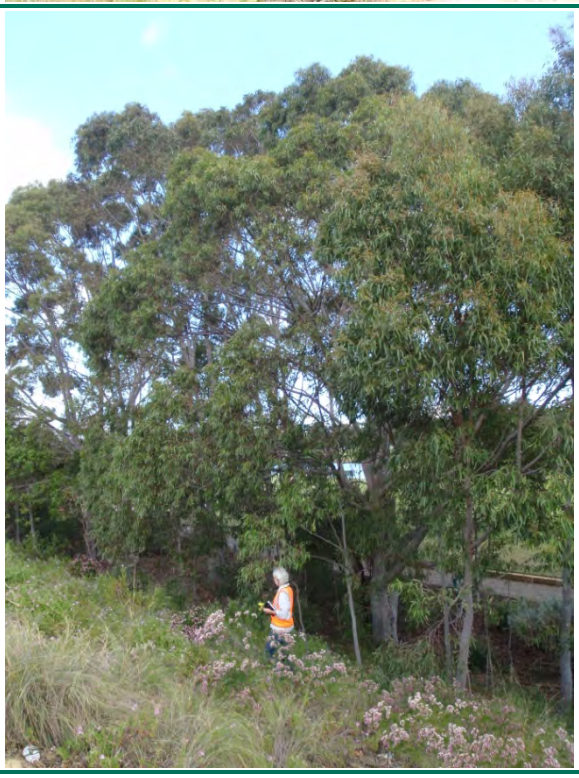
APPENDIX B

Survey Sites

Table B: Survey Sites and Photographs

Site	Photograph
Site 1: End of rail access road. Likely planted tuart 50 y+ old and other introduced and planted gums in open space.	
Site 2: Western end of rail access road.	

Site 3: Swampy soak off rail access road.	
Site 4: Graham Farmer Freeway (revegetated strip between freeway and rail).	
Site 5: Between freeway and rail - revegetation site (planted and maybe seeded).	

Site 6: Ornamental garden at entrance to rail reserve (revegetated slope with weed matting and reticulation - likely to have been several attempts at restoration here as many different species and types of species, i.e. native and non-native).	
Site 7: South of Site 6 on same slope (revegetated slope with reticulation and weed matting) demonstrating multiple revegetation attempts over last ca. 15 years.	

Site 8: South of tennis centre. Casuarina stand with about 40 stems.	
Site 9: North of Tennis Centre. Casuarina stand with about 150 stems.	
Site 10: Rail reserve east of tennis centre and area of recent revegetation ('rip and seed') near new housing development.	

Site 11: Most eastern end of rail reserve.	
Site 12: Rear of Tennis Centre in rail reserve.	
Site 13: Soak to south-west of Tennis Centre.	

Site 14: 25 y old irrigated planting off Freeway.	
Site 15: Off ramp to Freeway (revegetated strip between freeway and rail).	
Site 16: Swan River foreshore (northern end). Eucalypts have been planted on lawn area, but *Melaleuca* and *Casuarina* may be remnant or have colonised bank (approx. 10-30 y old). Bank is eroding in places with much evidence of past attempts armoury and bank stabilisation using concrete and building debris (mostly unsuccessful).	

Site 17: Swan River foreshore - middle section. Mostly lawns with planted trees. Riverbank here is actively eroding and in need of armoury or other protection (e.g. tree planting).	
Site 18: Swan River foreshore - southern end. Planted trees on lawn. No trees on river bank.	
Site 19: Vegetation along the northern side of the eastern-most railway line section were planted Geraldton Wax bushes.	

Site 20: The vegetation around Burswood Station consisted of mown patchy introduced grasses such a Veldt grass.	
Site 21: Vegetation in the rail corridor east of the Tennis Courts consisted of mown grass and introduced eastern states gum trees and woody garden shrub specimens.	

APPENDIX C

Flora List

Table A: Flora Survey Results for Rail Reserve and Claisebrook Foreshore Surveys

Site and Species List	Common Name
Site 1	
**Cortaderia selloana*	Pampas
Eucalyptus gomphocephala	Tuart
Acacia saligna	Orange wattle
Callitris preissii	Rottnest island pine
Site 2	
Casuarina obesa	Swamp sheoak
Site 3: swampy soak off rail access road	
Casuarina obesa	Swamp sheoak
Typha domingensis	Bulrush
Schoenoplectus validus	Lake club-rush
Eucalyptus rudis	Swamp gum
Eucalyptus ovata	Gum
Site 2: Western end of rail access road	
+Eucalyptus camaldulensis	River Red Gum
Casuarina obesa	swamp sheoak
Site 3	
Casuarina obesa	Swamp sheoak
Typha domingensis	Bulrush
+Eucalyptus camaldulensis	River red gum
+Eucalyptus kochii	Oil mallee
Schoenoplectus validus	Lake club-rush
+Callistemon sp. (cultivar)	Bottlebrush
Eucalyptus rudis	Swamp gum
Eucalyptus ovata	Gum
Site 4	
Hardenbergia comptoniana	Native wisteria
Scaevola crassifolia	
Grevillea crithmifolia	
Casuarina obesa	Swamp sheoak
Site 5	
Acacia saligna	Orange wattle
Acacia pulchella	Prickly Moses
Hardenbergia comptoniana (Native Wisteria)	
Casuarina obesa	Swamp sheoak
**Hypochaeris radicata*	Flatweed
**Pelargonium capitatum*	Rose pelargonium
**Cortaderia selloana*	Pampas
**Ehrharta calycina*	Perennial veldt grass
**Avena fatua*	Wild oats
**Trifolium* sp.	Clover

Site and Species List	Common Name
Site 6	
**oenothera drummondii*	Evening primrose
**?Sporobolus sp.*	
**ehrharta longifolia*	Annual Veldt grass
**Poa* spp.	Winter grass
**Cynodon dactylon*	Couch grass
Acacia saligna	Orange wattle
Mesomelaena pseudostygia	Semaphore sedge
**Pelargonium capitatum*	Rose pelargonium
Adenanthos cygnorum	Woollybush
Pimelea rosea	Rose banjine
Hemiandra linearis	Snakebush
+Corymbia citriodora	Lemon-scented gum
Site 7	
Hemiandra linearis	Snakebush
Templetonia retusa	Cockie's tongue
**Ehrharta longifolia*	Annual Veldt grass
**Poa* spp.	Winter grass
**Cynodon dactylon*	Couch grass
Acacia saligna	Orange wattle
Mesomelaena pseudostygia	
**Pelargonium capitatum*	
Adenanthos cygnorum	Woollybush
Pimelea rosea	Rose banjine
Hemiandra linearis	Snakebush
Ricinocarpos glaucus	Wedding bush
Olearia axillaris	Coastal daisy bush
**Schinus terebinthifolius*	Japanese pepper tree
**Monadenia bracteata*	South African orchid
**Genista linifolia*	Flaxleaf broom
Site 8	
Adenanthos cygnorum	Woollybush
Hardenbergia comptoniana	Native wisteria
Acacia saligna	Orange wattle
Acacia pulchella	Prickly Moses
**Ehrharta longifolia*	Annual Veldt grass
**Poa* spp.	Winter grass
**Cynodon dactylon*	Couch grass
**Lupinus angustifolius*	Sweet lupin

Site and Species List	Common Name
Site 9	
Casuarina obesa (150)	Swamp sheoak
Acacia saligna	Orange wattle
Hardenbergia comptoniana	Native wisteria
Site 10	
Hardenbergia comptoniana	Native wisteria
Jacksonia furcellata	
Jacksonia sternbergiana	
Acacia saligna	Orange wattle
Adenanthos cygnorum	Woollybush
Site 11	
Hardenbergia comptoniana	Native wisteria
Adenanthos cygnorum	Woollybush
Eucalyptus rudis	Flooded gum
**Ficus macrophylla*	Fig
Grevillea vestita	
Casuarina obesa	Swamp sheoak
**Lantana camara*	Lantana
Site 12	
Casuarina obesa (40)	Swamp sheoak
[+]*Eucalyptus camaldulensis* (7)	River Red Gum
Site 13	
Juncus kraussii	Sea rush
Schoenoplectus validus	Lake club-rush
Cyperus sp.	Sedge
Acacia saligna	Orange wattle
Typha domingensis	Bulrush
Site 14	
Grevillea vestita	
+*Callistemon* sp. (cultivar)	Bottlebrush
+*Calothamnus* sp. (cultivar)	
Acacia saligna	Orange wattle
+*Eucalyptus kochii*	Oil mallee
Scaevola crassifolia	
[+]*Eucalyptus camaldulensis*	River Red Gum
Acacia pulchella	Prickly Moses
Casuarina obesa	Swamp sheoak
Adenanthos cygnorum	Woollybush
Hardenbergia comptoniana	Native wisteria

Site and Species List	Common Name
Site 15	
Hardenbergia comptoniana	Native wisteria
Scaevola crassifolia	
Grevillea crithmifolia	
Casuarina obesa	Swamp sheoak
Site 16	
Corymbia calophylla	Marri
Eucalyptus rudis	Flooded gum
Melaleuca rhaphiophylla	Swamp paperbark
Melaleuca preissiana	Moonah
Casuarina obesa	Swamp sheoak
Juncus kraussii	Sea rush
**Cynodon* spp.	Couch grass
**Poa spp.*	Winter grass
Site 17	
**Ficus macrophylla*	
**Araucaria heterophylla*	Norfolk island pine
**Schinus molle*	Pepper tree
**Cynodon* spp.	Couch grass
**Poa spp.*	Winter grass
**Pinus ?pinea*	
Site 18	
Casuarina obesa	Swamp sheoak
**Ficus* sp.	Fig
**Pinus ?pinea*	Pine
**Cynodon* spp.	Couch grass
**Poa* spp.	Winter grass
Site 19	
+*Eucalyptus kochii*	Oil mallee
[+]*Eucalyptus camaldulensis*	River Red Gum
+*Chamelaucium uncinatum*	Geraldton Wax
Site 20	
+*Eucalyptus kochii*	Oil mallee
[+]*Eucalyptus camaldulensis*	River Red Gum
+*Cynodon* spp.	Couch grass
Site 21	
**Ehrharta longifolia*	Annual Veldt grass

Note:

* = weed (not native to Australia)

+ = non-indigenous native (not normally found in area, but native to other parts of Australia).

APPENDIX D

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LIMITATIONS

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