Airport Link

FAUNA AND FLORA

TECHNICAL PAPER NO. 7

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Contents

Executive Summary

The assessment on flora and fauna of the study area and the proposed spoil placement sites was conducted through a comprehensive review of species recorded from relevant databases, and the observance of existing species through field surveying, to confirm the occurrence, or likely occurrence of threatened species within the study area. The existing habitat values of parks, open spaces and creeks likely to be affected by the project were assessed in terms of terrestrial and aquatic vegetation and habitat.

Due to the highly urbanised and disturbed nature of the study area, no endangered, vulnerable or rare flora or fauna species were observed during the field surveys. The species observed and commonly found throughout Brisbane and include both native and exotic species, comprising birds, possums, bats, frogs and turtles. No areas of mapped remnant vegetation were found.

Spoil placement sites within the Brisbane Airport and Port of Brisbane are already significantly disturbed and cleared of all remnant native vegetation. Due to the low ecological value of these sites, the placement of spoil will have a negligible impact on flora and fauna. Spoil placement sites are within the Red Imported Fire Ant restricted zone. There are no procedures for transporting soil from an unrestricted to a restricted site, however procedures to ensure fire ants are not spread from trucks returning from the restricted areas to the construction sites will be implemented.

Mitigation strategies to protect ecological values include minimising disturbance to vegetation and habitat during construction, sedimentation and erosion control, inspection of tree hollows in Kalinga and Ross Parks prior to site clearance to ensure the relocation of any arboreal mammals, bats or birds found, and landscaping and revegetation of disturbed areas with local native species to replace existing vegetation cleared.

1. Introduction

This report describes the ecological context of the Airport Link study corridor and the proposed spoil placement sites in terms of terrestrial and aquatic flora and fauna. The Airport Link project is a predominantly underground road proposed between Brisbane's northern suburbs and the northern end of the North-South Bypass Tunnel, at Horace Street, Windsor. The study area runs from the Inner City Bypass (ICB) and the North South Bypass Tunnel (NSBT) at Bowen Hills, north along Lutwyche Road to Gympie Road in Kedron and in an easterly direction to the intersection of Sandgate Road and the East-West Arterial at Toombul.

The study area comprises a highly urbanised area of Brisbane, and much of the habitat and vegetation has been substantially cleared for development and urban land uses. Isolated fragments of vegetation exist in parks and along two watercourses in the study area, Breakfast/Enoggera Creek in the south and Kedron Brook in the north.

The study aimed to investigate the terrestrial and aquatic flora and fauna of the study corridor and is based on a desktop analysis of background information, and field investigations undertaken by SKM and Connell Wagner in 2005 and 2006. The objectives of this study were to:

- Investigate, prepare and compile a description of the vegetation assemblages and fauna habitats of the study area, including the compilation of records of threatened species listed under the *Nature Conservation Wildlife Regulation 1994* (NCWR) and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) from study area;
- Confirm the occurrence, or likely occurrence, of rare or threatened flora and fauna species within the study area;
- Confirm the extent of remnant vegetation and regional ecosystems occurring within the study area;
- Assess existing habitat values of the study area;
- Assess and describe the condition and health of instream habitat and riparian vegetation along the watercourses;
- Address the impact of the project on threatened species and ecological communities under the EPBC Act;
- Provide recommendations for measures to mitigate adverse impacts on flora and fauna at the design and construction phase.

The legislative context for ecological matters is outlined in **Section 2**. The methodology used for these investigations is described in **Section 0**, along with the description of the study area environment in **Section 4**. **Section 5** presents an assessment of impacts on terrestrial and qualitc ecology, while mitigation measures are recommended in **Section 6**.

2. Legislative Context

2.1 Commonwealth Legislation

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) prescribes the Commonwealth's role in environmental assessment, biodiversity conservation and the management of protected areas. Under the environmental assessment provisions of the EPBC Act, actions that are likely to have a significant impact on a matter of National Environmental Significance are identified as "controlled actions" and cannot be undertaken without approval under the EPBC Act.

The Act identifies seven matters of national environmental significance:

- World Heritage properties;
- National heritage places;
- Wetlands of international importance (Ramsar wetlands);
- Threatened species and ecological communities;
- Migratory species;
- Commonwealth marine areas; and
- Nuclear actions (including uranium mining).

The Airport Link Project, including the potential spoil placement sites, was referred to the Commonwealth Minister for Environment and Heritage under the EPBC Act on 15 December 2005. It was found that there was no likelihood of the proposed action having a significant impact on, World Heritage Properties, National heritage places, Commonwealth marine areas or nuclear actions. In relation to listed threatened and migratory species it was found that the proposed tunnel location and associated onshore spoil disposal areas are not known to provide important habitat for any listed species or ecological communities under the EPBC Act. In relation to the Moreton Bay Ramsar Wetland it was found that construction and operation of the tunnel is not likely to have a significant impact on the Ramsar site and that disposal of spoil on three of the four identified spoil disposal sites is also not likely to have a significant impact on the ecological character of the Ramsar site.

The proposed Export Park West spoil placement site within the Brisbane Airport Corporation land was found however to present a risk of significant impact on the Ramsar site. This was generally due to its proximity and associated drainage path to the Ramsar site, the extensive earthworks required to prepare the site and also the lack of current investigations to ensure the sites suitability for the placement of spoil.

The referred action was consequently notified as being a controlled action on the basis of the potential significant risk the proposed Export Park West site posed to the Moreton Bay Ramsar Wetland of International Importance.

The Export Park West site was subsequently removed from the project and the Queensland Minister for Transport and Main Roads requested from the Minister for the Environment and Heritage reconsideration under section 79 of the controlled action decision.

2.2 Queensland Legislation

The *Nature Conservation Act 1992* provides for the conservation and management of Queensland's native animal and plants. The Act prohibits the taking or destruction, without authorisation, of certain listed flora and fauna species.

The *Nature Conservation (Wildlife) Regulation 1994* lists the plants and animals considered presumed extinct, endangered, vulnerable, rare, common, international, and prohibited. It discusses their significance and states the declared management intent and the principles to be observed in any taking and use for each group.

The Land Protection (Stock and Pest Route Management) Act 2002 and the Land Protection (Pest and Stock Route Management) Regulation 2003 provides for pest management in Queensland, and includes both weeds and fire ants.

2.3 Brisbane City Council Local Laws

Brisbane City Council's Natural Assets Local Law 2003 plays a key role in protecting Brisbane's bushland, waterways, wetlands and significant trees. It aims to:

- Protect the biodiversity of the city;
- Preserve natural landforms;
- Preserve the city's natural landscape character;
- Preserve vegetation of cultural and historical value; and
- Improve weed management.

The Natural Assets Local Law defines seven categories of protected vegetation, including Council Controlled Vegetation, Vegetation Protection Order, Significant Native Vegetation, Valued Urban Vegetation, Waterway Vegetation, Wetland Vegetation and Significant Landscape Trees.

Under the Local Law it is prohibited to remove or interfere with protected vegetation without approval from the Council.

3. Methodology

The methods adopted for the flora and fauna investigations described in this report involved two stages:

- Background data collection and review; and
- Field surveys.

3.1 Background Data Collection and Review

The desktop analysis involved a review of relevant databases, surveys and ecological literature. In describing the terrestrial flora and fauna of the study area the following data sources were used:

- Searches of the Queensland Herbarium, Queensland Museum, the Environmental Protection Agency's (EPA's) Wildnet and the EPBC Act Protected Matters (Department of the Environment and Heritage) databases;
- Information from the EPA's regional ecosystem mapping;
- Information from Brisbane City Council (BCC) on ecological corridors and Common Nature Conservation Classification System (CNCCS) significant area mapping;
- Information from BCC on existing significant trees, including Vegetation Protection Orders (VPOs) within the study area.
- In collating background information on the aquatic flora and fauna of the lower Brisbane Estuary, the following data sources were used:
- Search of the Queensland Museum database;
- Results of fish surveys in Kedron Brook obtained from the Kedron Brook Catchment Network;
- A report on 'An Assessment of Fauna Habitat along Kedron Brook' obtained from the Kedron Brook Catchment Network; and
- BCC's Waterway Management Plan for Breakfast/Enoggera Creek.

The conservation status of the flora and fauna species observed or recorded in the study area has been assigned in the local, state and regional context with reference to the *Environment Protection and Conservation Biodiversity Act 1999*, the Queensland *Nature Act 1994* and BCC's Natural Assets Planning Scheme Policy.

A 'Waterway Management Plan' for the Breakfast/Enoggera Creek catchment was produced by Brisbane City Council in June 2004. This involved the assessment of the health of the Breakfast/Enoggera Creek at 33 sites within the catchment, three of which are located within or in close vicinity of the study area. Indicators used to assess the environmental health of the ecosystem include riparian vegetation, instream habitat, macroinvertebrates, water quality, sediment quality and litter.

Furthermore, an additional study on 'An Assessment of the Fauna Habitat along Kedron Brook' was undertaken by the Wildlife Preservation Society of Queensland in December 2001. This report describes the potential and existing fauna habitat along Kedron Brook and is based on field inspections and observations by Bushcare groups.

3.2 Field Surveys

3.2.1 Terrestrial Flora and Fauna

Field investigations were undertaken in November and December 2005 by SKM to verify general findings of background data. Ten sites were selected across the study area for surveying. These sites are parks and open spaces, which have potential ecological value. These are listed in **Table 3-1** and the locations shown on **Figure** 3-1.

Terrestrial flora and vegetation was assessed at each of the survey sites, where species lists were prepared of the species present. The survey sites were traversed and dominant plant species identified within each area. Incidental fauna sightings were also noted and habitat values were assessed.

Table 3-1 Study area sections

No.	Study Area Section	Description
1	Kalinga Park adjacent to Sandgate Road	Eastern section of Kalinga Park, under North Coast rail line to the lower carpark of the Toombul Shopping Centre.
2	Melrose Park, Wooloowin	The watercourse in the southern section of the Park, adjacent to the playground.
3	Kedron Brook, adjacent to Gympie Road	The section of Kedron Brook for a distance of 300 m upstream and downstream of Gympie Road bridge.
4	Kedron Park Hotel, Wooloowin	The carpark of the Kedron Park Hotel.
5	Wallace Place Park (D1411) - Lutwyche Road and Truro Road median, Lutwyche	The park at the northern end of the traffic island between Lutwyche road and Truro Road.
6	Clarke Park (D0507) - Lutwyche Road and Truro Road median, Lutwyche	The park at the southern end of the traffic island between Lutwyche road and Truro Road.
7	Windsor Town Quarry Park (D1300) and Windsor Chambers between Palmer Street and Lutwyche Road.	The quarry park and adjacent Windsor Shire Chambers.
8	Windsor War Memorial Park (D0506) - median of Lutwyche Road and Roblane Street	The park between Lutwyche Road and Roblane Street, Lutwyche.
9	Windsor State School, Windsor and 270 Lutwyche Road, (Officeworks)	The western side of these properties, facing Lutwyche Road.
10	Downey Park, Enoggera Creek and Northey Street City Farm, Windsor	The area on the northern side of Enoggera Creek from Bowen Bridge to Downey Park.

A fauna survey involving diurnal bird survey and nocturnal searches was undertaken between the 15 and 24 February 2006. The survey was undertaken at locations with vegetation and areas of habitat within the study area and spoil placement sites in the Australia Trade Coast. **Table 3-2** lists the fauna survey sites, the locations of which are shown in **Figure 3-1**. The spoil placement site at Fishermans Islands was not surveyed, as it is a reclaimed area and does not currently have any habitat values. A stretch of Kedron Brook to the north of Kalinga Park was investigated for platypus, including incidental fauna sightings.

Table 3-2 Fauna survey sites

No.	Study Area Section	Description
11	Northey Street	The area to the north of Enoggera Creek near the Royal Brisbane Hospital.
12	Mercer Park	The section of Kedron Brook upstream of the Gympie Road bridge.
13	Kalinga Park and Ross Parks	The entire area of both Kalinga and Ross Parks, extending to the lower park of the Toombul Shopping Centre.

No.	Study Area Section	Description
14	Kedron Brook, Kalinga Park	Stretch of Kedron Brook north of Kalinga Park investigated for platypus and incidental fauna sightings.
15	Clunies Flat	Spoil placement site at the Port of Brisbane
16	Viola Place	Spoil placement site at Brisbane Airport – the area to the north of Viola Road.

The diurnal bird survey involved an early morning count, which was conducted between dawn and two hours after dawn, and a late morning count was conducted between two and four hours after dawn. During the diurnal bird survey incidental sightings of terrestrial and aquatic fauna were recorded.

The nocturnal searches involved the use of a spotlight to search for nocturnal mammals, arboreal and semi-arboreal mammals. In conjunction with the nocturnal searches an ANABAT II and ANABAT CF Storage ZCAIM was used to detect microchiropteran bats. A call playback session (targeting birds and amphibians) was used to identify any species within the vicinity of the monitoring location. Each call playback session involved an initial ten minute listening period, where unelicited calls from arboreal mammals and nocturnal birds were recorded, followed by the broadcasting of pre-recorded calls. After the calls were played, each observer scanned the immediate area by spotlight for five minutes.

Within the study area, the bird and nocturnal surveys were conducted at each site twice, and once at the spoil placement sites.

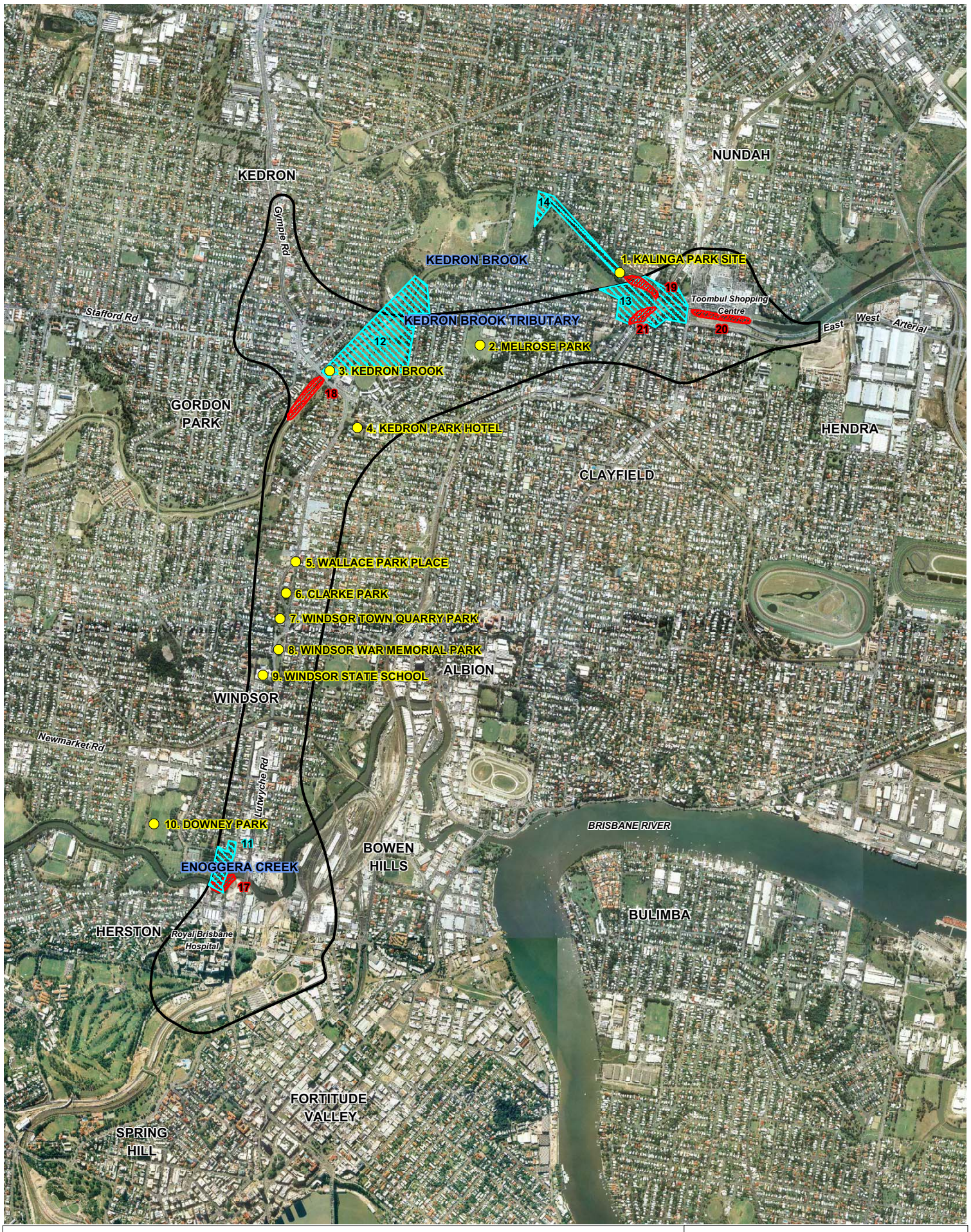
Nomenclature and common names used in the report were described by Pizzey and Knight (1999) for birds, Cogger (2000) for reptiles, Tyler (1997) for amphibians and Strahan (1995) and Menkhorst and Knight (2004) for mammals.

3.2.2 Aquatic Flora and Fauna

For the aquatic survey, survey sites relating to creek crossings or surface works in adjacent areas were chosen from aerial photos and study area mapping. Five sites were selected for a more detailed survey of riparian vegetation and observations associated with instream habitat and aquatic fauna. These are listed in **Table 3-3** and include one site along Enoggera Creek, three sites along Kedron Brook, and another site along a small tributary of Kedron Brook in Kalinga Park. **Figure 3-1** shows the location of the aquatic survey sites. Photographs of these sites are shown in **Figure 3-2** to **Figure 3-6**.

- **Table 3-3 Aquatic Survey Sites**

No.	Study Area Section	Description
17	Enoggera Creek	The section of Enoggera Creek located at Bowen Bridge on Lutwyche Road.
18	Kedron Brook	The section of Kedron Brook upstream of the Gympie Road bridge.
19	Kedron Brook	The section of Kedron Brook at Kalinga Park.
20	Kedron Brook	The section of Kedron Brook near the intersection of Sandgate Road and the East-West Arterial.
21	Kedron Brook Tributary	A small tributary of Kedron Brook in Kalinga Park



LEGEND

- Airport Link Corridor
- Aquatic Survey Sites
- Fauna Survey Sites
- Terrestrial Survey Sites

Figure 3.1

Terrestrial and Aquatic Ecology Sites

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Airport Link

SKM Connell Wagner JOINT VENTURE

BRISBANE CITY

- **Figure 3-2 Enoggera Creek, facing upstream**

- **Figure 3-3 Kedron Brook south of Gympie Road, facing downstream**

- **Figure 3-4 Kedron Brook at Kalinga Park, facing downstream**

- **Figure 3-5 Kedron Brook tributary off Kedron Brook in Kalinga Park, facing upstream**

- **Figure 3-6 Kedron Brook at Sandgate Road, facing upstream**

3.2.3 Instream Habitat

Instream habitat was assessed using the Classification System for Urban Streams developed for the River Health Assessment Program (RHAP) developed by Anderson (1999). This methodology has been adopted by BCC to assess instream habitat across the Local Government area and is a methodology endorsed by the National River Health Program. A field inspection of instream habitat was undertaken at Enoggera Creek and Kedron Brook on 5 December 2005 at the five aquatic survey sites shown in **Figure 3-1**. The characteristics that were assessed include:

- Surrounding land use, including potential threats or disturbance;
- Bank characteristics and condition;
- Aquatic habitat characteristics (due to time constraints and turbidity of water, limited assessment of aquatic habitat characteristics could be made); and
- Conservation value rating for aquatic flora and fauna, riparian flora and fauna, as a wildlife corridor and the representativeness of the habitat.

This assessment is a basic geomorphological assessment and only provides information on the potential of the site for aquatic habitat, other factors such as water quality will influence the presence or absence of particular flora and fauna.

3.2.4 Riparian Vegetation

A field inspection of riparian vegetation and condition was undertaken at Enoggera Creek and Kedron Brook on 5 December 2005 at the five aquatic survey sites shown in **Figure 3-1**. The assessment of riparian vegetation covered a distance of approximately 500 m up and downstream of the impact points on each side of the waterway. Field inspections incorporated photo points (upstream, downstream), survey of riparian vegetation species, structure and riparian vegetation condition. The methodology followed BCC's methodology used for the Enoggera/Breakfast Creek Waterway health assessment of riparian vegetation. Generally, the field inspections incorporated dominant/prevailing vegetation communities/species present, the presence/absence of weed species, structural characteristics, corridor width and an assessment of condition or if relevant conservation. The results were used as a validation of what vegetation communities have been reported to be present along these waterways.

3.2.5 Aquatic Fauna

Assessment of existing aquatic fauna was undertaken through a desktop analysis. Water quality at Breakfast Creek and Lower Enoggera Creek was recorded to have a health rating of D (poor) according to the Waterway Management Plan for Breakfast/Enoggera Creek (BBC, 2004). This is due to elevated metal and nutrient concentrations attributed to the adjacent industrial and residential land uses as well as tidal movements from the Brisbane River. As a result, further investigation of the aquatic fauna was not deemed necessary due to the high level of disturbance experienced at waterway habitats creating unfavourable conditions for aquatic fauna and the considerable amount of information already available from relevant government databases and reports, particularly from the BCC, Queensland Museum and the Kedron Brook Catchment Network. These databases have been developed over many years and include results of detailed studies, particularly in Kedron Brook. These databases provide adequate information base to characterise the aquatic fauna in the waterways and to determine the likely presence of species of conservation significance.

4. Description of the Existing Environment

4.1 Study Area

The study area comprises:

- The route of the Airport Link through the inner northern suburbs of Brisbane; and
- The spoil placement areas in the Australia TradeCoast area centred on the Port of Brisbane and Brisbane Airport.

The route study area is about eight kilometres in length and runs north from the Inner City Bypass (ICB) and the North South Bypass Tunnel (NSBT) at Bowen Hills, north along Lutwyche Road to Gympie Road at Kedron Brook in Kedron. It then runs to the east to the intersection of Sandgate Road and the East-West Arterial at Toombul, passing under the residential areas of Wooloowin and Clayfield. Two watercourses pass through the study area. Breakfast/Enoggera Creek, at the southern end of the study area, is a tributary of the Brisbane River, which flows into the River approximately one kilometre downstream of the study area. Kedron Brook, at the northern end of the study area which flows into Moreton Bay north of Brisbane Airport.

The study area covers a highly urbanised area of Brisbane, with terrestrial and aquatic ecosystems being highly disturbed from development and urban land uses. Terrestrial communities and ecosystems have been substantially cleared with small, isolated fragments of vegetation being found in parks, gardens and scattered along watercourses in the study area. Planted vegetation, compromising both native and exotic species is found in parks, gardens, schools and along watercourses and roads throughout the study area.

Aquatic ecosystems have been impacted from clearing of riparian vegetation, infestation by environmental weeds, pollution from surface water runoff, and past management practices of waterways, including channelisation for flood mitigation. Vegetation and habitat of the watercourses is mainly found within the channels, with areas once occupied by riparian vegetation now used for parks, sporting grounds and open space.

The Brisbane City Council has devised a Common Nature Conservation Classification System (CNCCS) for areas of ecological significance throughout Brisbane. Within the study area there is one area classified as ‘State significant’, a small area of mangroves on the south bank of Enoggera Creek.

There are several parks and open spaces located within the study area. These are:

- Kalinga Park, Clayfield;
- Shaw Park, Wooloowin;
- Ross Park, Nundah;
- Shultz Canal, Nundah;
- Melrose Park, Wooloowin;
- Kedron Brook Corridor;
- Wallace Park, Lutwyche;
- Clark Park, Windsor;
- Windsor Town Quarry Park, Windsor;
- Windsor War Memorial Park, Windsor;
- Bowen Park, Bowen Hills;

- Enoggera Creek Corridor; and
- The northern tip of Victoria Park, Herston.

These parks and open spaces, and associated watercourses have a landscape and amenity value to the community, in terms of providing recreational opportunities and green space corridors. The landscape and amenity values of these parks are considered in the Urban Design, Landscape and Visual Existing Environmental Report. There are also several trees and groups of trees which contribute to the landscape amenity of the local area, these are listed in **Section 4.2.5**.

Three spoil placement sites have been identified for the project. These are:

- Fisherman's Island at the Port of Brisbane;
- Clunies Flat at the Port of Brisbane; and
- Airport Industrial Park (Viola Place) at the Brisbane Airport.

The Port of Brisbane site at Clunies Flat is identified on the land use strategy map for the Port of Brisbane as not being an area of high ecological value. The lands are clear of remnant native vegetation and have been identified in the land use strategy as a location for maritime industries and/or port operational activities. The Fisherman Island reclamation area was exclusively subtidal prior to the creation of the surrounding seawall. There is the potential for avifauna to use newly created areas (reclamation paddocks) as roost sites.

The Airport land is predominately flat, well drained and has been cleared of much of its natural vegetation. The land drains to either the Boggy Creek catchment (adjacent to the mouth of the Brisbane River) or to the Kedron Brook catchment north of the airport. These catchments discharge into Moreton Bay adjacent to the airport.

4.2 Terrestrial Flora

4.2.1 EPBC Records

A search of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Database was made for the study area. This information was used to assess the occurrence or likely occurrence of nationally threatened flora species listed by the EPBC Act. The plant species that were listed are shown in **Table 4-1**.

Table 4-1 EPBC listed plant species

Species	Common Name	EPBC Classification	Likely Presence
Arthraxon hispidus	hairy-joint grass	vulnerable	not likely
Bosistoa selwynii	heart-leaved bosistoa	vulnerable	not likely
Bosistoa transversa	three-leaved bosistoa	vulnerable	not likely
Corchorus cunninghamii	native jute	endangered	not likely
Cryptostylis hunteriana	leafless tongue-orchid	vulnerable	possible
Hydrocharis dubia	frogbit	vulnerable	possible
Macadamia integrifolia	macadamia nut	vulnerable	possible

4.2.2 Regional Ecosystems

The Regional Ecosystem Mapping (Version 5, 2005) for the study area was reviewed to determine the presence of remnant vegetation. No remnant vegetation was found within the study area.

A review of the BCC's Significant Area mapping showing the Common Nature Conservation Classification System (CNCCS) values for the study area, have identified two ecological corridors passing through the study area. These are Kedron Brook in Kedron and Enoggera Creek in Bowen Hills.

Kedron Brook has been classified as an ecological corridor of state significance, as it is the largest remaining corridor connecting mountains of Brisbane Forest Park to mangroves of Moreton Bay and contains habitat to support many raptor species and squirrel gliders.

State significant areas are assessed as being significant for biodiversity at a state level that contains Endangered Regional Ecosystems, Of Concern Regional Ecosystem and intertidal regional ecoystems, supports nationally and internationally recognised wetlands, and supports essential habitat for threatened species, and/or migratory birds. Habitat that supports vegetation and species recognised by state or commonwealth legislation as significant. These areas are critical for maintaining the biodiversity within the State

Enoggera Creek has been classified as an ecological corridor of regional significance …

These are areas assessed as being significant for biodiversity at a regional level that contain regionally significant Of Concern Regional Ecosystems, contain state and regionally significant wetlands, and support essential habitat for rare species. Habitat that supports vegetation and species recognised by state legislation as significant. These areas are critical for maintaing the biodiversity with the region.

4.2.3 Queensland Herbarium Records

Herbrecs records from the Queensland Herbarium were obtained for the study area and the spoil placement sites, and these are included in **Appendix A**. The Herbrecs list includes species commonly found in the urban Brisbane area and also contains weeds that are well established in the City.

There are no records of species covered by Commonwealth and State legislation. One species, *Eucalyptus seeana*, recorded from Kedron is listed in the Herbrecs list. This species is a significant flora species, as listed in Schedule 3 of the Brisbane City Council Natural Assets Planning Scheme Policy.

4.2.4 Field Observations

Ten sites of the study area were surveyed for terrestrial flora species and to assess the condition of vegetation in each area.

The vegetation within the study area has been substantially cleared, with isolated fragments of vegetation being found in parks and along watercourses. Planted vegetation, compromising both native and exotic species is found in parks, gardens, schools and along watercourses and roads throughout the study area. The species observed during the field investigation are listed in **Appendix A**. The species observed are commonly found throughout Brisbane, and include both native and exotic species.

A description of the vegetation and flora species found at each site surveyed within the study area is provided in **Table 4-2**.

Table 4-2 Terrestrial vegetation description

Study Area Section	Vegetation Description
Kalinga Park adjacent to Sandgate Road	Consists of a mosaic of scattered remnant trees and planted native trees including Sydney blue gum (*Eucalyptus saligna*), tallowwood (*E. microcorys*), hoop pine (Araucaria cunninghamii), broad leaf paperbark (*Melaleuca leucadendra*), silky oak (*Grevillea robusta*) and weeping lilly pilly (*Waterhousea floribunda*). Several large

Study Area Section	Vegetation Description
	trees have developed hollows suitable for use by birds and arboreal mammals. The understorey is generally mown turf grasses or mulch and planted native herbs except along the creeks and drainage lines where rank, exotic grasses dominate. Downstream of Sandgate Road are scattered specimens of the grey mangrove (*Avicennia marina* var *australasica*) and scattered planting of bottle brush (*Callistemon viminalis)* along the bank of Kedron Brook.
Melrose Park, Wooloowin	Mown and well-maintained park with planted native trees and remnant /regrowth eucalypts and other species confined to an unnamed tributary of Kedron Brook which flows through the southern section of the park. Species included Moreton Bay fig (Ficus marcophylla), silky oak (Grevillea robusta), tuckeroo (Cupaniopsis anacardioides), hoop pine (Araucaria cunninghamii), cheese tree (Glochidion ferdinandii), cock's comb coral tree (Erythrina crista-galli).
Kedron Brook, adjacent to Gympie Road	Terrestrial vegetation along this section of Kedron Brook has been cleared from the channel of the watercourse. Rank exotic grasses dominate the banks of Kedron Brook. Outside the channel of Kedron Brook the vegetation consists of scattered plantings of native and exotic trees and mown grass. There is no understorey and shrub layer present. Species found outside the channel of Kedron Brook include Moreton Bay ash (*Corymbia torelliana*), brush box (*Lophostemon confertus*), Queensland blue gum (*Eucalyptus tereticornis*), jacaranda (*Jacaranda mimosaefolia*), camphour laurel (*Cinnamomum camphora*), poinciana (*Delonix regia*), tulipwood (*Harpullia pendula*). A remnant Forest Red Gum (*Eucalyptus tereticornis*) 30m tall and a diameter at beast height (dbh) of approximately 1m with hollows is also present.
Wallace Place Park (D1411) - Lutwyche Road and Truro Road median, Lutwyche	This is a park in a large traffic island in Lutwyche Road. A large and dominant fig (*Ficus benjamina*), known as Pop's fig is growing on the northern end of the park. This tree is 20m tall and 30m in canopy diameter with an understorey of planted shade tolerant native and exotic palms and herbs.
Clarke Park (D0507) - Lutwyche Road and Truro Road median, Lutwyche	Clarke Park is dominated by a group of hoop pines (*Araucaria cunninghamii*) to 25m tall in a mown park. The hoop pine planting is listed as Valued Urban Vegetation under the BCC Natural Asset Local Law, which recognises the significant landscape value of this plantation. A mature fig is also present at the southern end of this park. White cypress pine (*Callitris collumellaris*) also present along the western side of the park.
Windsor War Memorial Park (D0506) - median of Lutwyche Road and Roblane Street	Mixed planting of native and exotic trees and shrubs in a mown park. Trees are relatively small and low in height.
Windsor Town Quarry Park (D1300) and Windsor Chambers between Palmer Street and Lutwyche Road.	Well maintained park with a mixed planting of exotic and native trees shrubs and herbaceous plants (including ornamental grasses) and mown grass. None of this vegetation is particularly old. Regrowth trees present adjacent to the cliff face.
Kedron Park Hotel, Wooloowin	Three large mature trees that are covered by a Vegetation Protection Order. These include a crows ash (*Flindersia australis*) and two figs (*Ficus benjamina*).
Windsor State School, Windsor and 270 Lutwyche Road, (Officeworks)	Various species of large fig trees fronting Lutwyche Road and Harris Street.
Downey Park, Enoggera Creek and Northey Street City Farm, Windsor	Narrow mangrove community present along the banks of Enoggera Creek. Community planting including gallery rainforest species, cabinet timber plot and vegetable garden occurs in the vicinity of Northey Street. Amenity planting in Downey Park.

4.2.5 Significant Trees

A list of significant trees existing in the study area was obtained from the Brisbane City Council and is provided in **Table 4-3** below.

Table 4-3 Significant Trees

Address	Significant Trees
270 Lutwyche Road, Windsor	21 fig trees
189 Lutwyche Road, Windsor	1 Manigifera indica
Lutwyche Road, Windsor	9 trees
Harris Street	12 trees
Windsor Memorial Park, Lutwyche Road	1 Ficus hillii
Windsor Council Chambers	3 Ficus benjamina
Clark Park, between Lutwyche Road and Truro Street	50 Araucaria cunninghamii
Wallace Place Park	1 Ficus benjamina
Victoria Street	1 Ficus elastica
Cnr Norman and Lutwyche Road	2 Ficus benjamina
Wooloowin Primary School	1 Ficus benjamina
Kedron High car park	1 Ficus benjamina
Park Road (private property)	Several Ficus benjamina
Melrose Park , Rose Street, Wooloowin	Group of eucalypts
4 Lydia Street, Wooloowin	5 Ficus benjamina
800's Sandgate Road, Clayfield	2 Ficus benjamina
Eastern side of the T section of Sandgate and the East West Arterial	parkland planting of araucarias and eucalypts

4.3 Terrestrial Fauna

Ecological surveys were conducted in November and December 2005, with a fauna survey conducted between 15 and 24 February 2006. A total of 85 species were recorded from the study area and spoil placement sites including 61 avian species, seven species of amphibians, ten reptilian species and nine mammalian species. No threatened species as described under the *Nature Conservation Act 1992* and *Environmental Protection and Biodiversity Conservation Act 1999* were encountered.

Details of the species recorded during the fauna survey are provided below.

4.3.1 Birds

During fieldwork activities, 61 bird species were observed within the study area. All the species are common and widespread throughout south-east Queensland and the Brisbane region. Three introduced/exotic species, spotted turtle-dove (*Streptopelia chinensis*), feral pigeon (*Columba livia*) and the Indian mynah (*Acridotheres tristis*), frequented the area.

The depauperate avian population is possibly attributed to the location of the study area in a highly urbanised area of Brisbane, with the majority of the species typical of urban area habitats, which have to some degree been disturbed and fragmented as a result of urbanisation. The avian populations were greatest in the Ross and Kalinga Park area, which reflects the complexity of these parks compared to other parks in the area.

The sedentary nature of some species, localised migration for breeding purpose (summer migration species include cuckoos, leaden flycatcher and spangled drongo) or to exploitation of unpredictable food resources

(honeyeaters, welcome swallows) would account for variability in the avian population within the project corridor.

Of the 61 species observed, three species the white-throated needletail, great egret and cattle egret are listed under Japan-Australia Migratory Bilateral Agreement (JAMBA) and as such are protected under the EPBC Act 1999. The white-throated needletail was observed flying over the Enoggera River, while the egrets were inhabiting the Clunies Flat designated spoil placement site.

Bird records from the Queensland Museum and Wildnet databases for the study area are included in **Appendix B**.

4.3.2 Mammals

Nine mammalian species, including five microchiropteran bats were recorded from the study area during the fauna survey. All species identified during the field surveys are species common and widespread within south-east Queensland and the greater Brisbane area.

During the fauna survey one ground dwelling mammalian species was identified the black rat (*Rattus rattus*). The Queensland Museum and WildNet database search indicated three species may be present, including the introduced house mouse (*Mus musculus*), brown rat (*Rattus norvegicus*) and black rat (*Rattus rattus*).

A number of scratches were found on a Queensland blue gum (*Eucalyptus tereticornis*) in Ross Park and Kalinga Park areas. During the terrestrial fauna survey two arboreal mammals were found. These were the common brushtail possum (*Trichosurus vulpecula*) and common ringtail possum (*Pseudocheirus peregrinus*).

During the survey, five microchiropteran bat species were recorded using an ANABAT II bat detector. These are Gould's wattled bat (*Chalinolobus gouldii*), common bentwing bay (*Miniopterus schreibersii*), long-eared bat (*Nyctophilus spp*), eastern broad-nosed bat (*Scotorepens greyii*) and the white-striped mastiff bat (*Tadarida australis*). These species recorded commonly roost in tree hollows, with the exception of the common bent-wing bat which is a cave dwelling species.

The black-headed flying-fox was commonly recorded within the study area especially in the vicinity of the Enoggera Creek area. There is the potential for the grey-headed flying Fox (*Pteropus poliocephalus*), a species listed as "vulnerable" under the EPBC Act to utilise the area during feeding activities. Therefore it can be assumed that although there were no grey-headed flying foxes recorded during the survey, it is possible that they would use trees within the study area as a food source.

4.3.3 Amphibians

Seven species of amphibians were observed within the study area. These are the beeping froglet (*Crinia parinsignifera*), the striped marsh frog (*Limnodynastes peronii*), the graceful treefrog (*Litoria gracilenta*), broad-palmed rocketfrog (*Litoria latopalmata*), the striped rocket frog (*Litoria nasuata*), the eastern sedge frog (*Litoria phalanx*), and the introduced cane toad (*Bufo marinus*). All frog species recorded are common and widespread species within south-east Queensland and the greater Brisbane area.

The cane toad was common to all sites and the most abundant species recorded at Kalinga, Ross and Mercer Parks. The other species recorded were associated with riparian areas and waterholes along Kedron Brook and a drainage line at Viola Road. The Striped Marshfrog was recorded only from the Viola Road site.

A search of the Queensland Museum and WildNet databases identified 14 amphibian species, including the tusked frog (*Adelotus brevis*) which is listed as vulnerable under the NCA, within the study area. The absence of

some species reflects the disturbed habitat, absence of freshwater pools (i.e. riparian areas of Enoggera Creek) and the cryptic nature of some species (i.e. some species are active during breeding cycle).

4.3.4 Reptiles

Ten reptile species were recorded during the fauna survey. All reptilian species recorded are common and widespread species within south-east Queensland and the greater Brisbane area. The poor species richness and abundance reflects the poor complexity at the sites and cryptic nature of some species.

The most common and abundant species recorded were semi-aquatic eastern water dragon (*Physignathus leseurii*) and the introduced Asian house gecko (*Hemidactylus frenatus)*. Other species common within the study area included the Brisbane short-necked turtle (*Emydura macquarii signata*) found along Kedron Brook within the Kalinga, Ross and Mercer Parks, and the arboreal gecko, *Gehyra dubia*. The majority of the reptile species recorded from the area were in low abundance reflecting rarity (eg fire-tailed skink, nobbi dragon and the native geckoes).

Variability between the sites can be attributed to habitat type, poor connectivity and complexity of habitat within the site (i.e. homogenic groundcover). Of the ten species recorded eight species were recorded from the Kalinga/Ross Park site reflecting the sites complexity, habitat diversity and habitat potential.

4.3.5 Fauna of Conservation Significance

There is the potential for fauna species which are listed under the *Nature Conservation (Wildlife) Regulation 1994* (NCA) and/or the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) to be found in the study area.

A search of the EPBC database identified seven avian species, one amphibian species, one reptilian species and four mammalians species. Four of the thirteen species are listed as endangered under the EPBC Act while the other nine species are listed as vulnerable. This information was used to assess the occurrence or likely occurrence of nationally threatened fauna species listed by the EPBC Act within the study area. The species that were listed are shown in **Table 4-4**. These species were not observed during the field investigations. Only the Australian painted snipe and grey-headed flying fox have been identified as likely to fly over the study area.

Table 4-4 EPBC listed fauna species in corridor study area

Species	Common Name	EPBC Classification	Likely Presence
Birds			
Cyclopsitta diophthalma coxeni	Coxen's fig-parrot	Endangered Migratory (terrestrial)	highly unlikely
Erythrotriorchis radiatus	red goshawk	Vulnerable	not likely
Geophaps scripta scripta	squatter pigeon (southern)	Vulnerable	highly unlikely
Lathamus discolor	swift parrot	Endangered	not likely
Rostratula australis	Australian painted snipe	Vulnerable	may overfly the area
Turnix melanogaster	black-breasted button-quail	Vulnerable	highly unlikely
Xanthomyza phrygia	regent honeyeater	Endangered Migratory (terrestrial)	not likely
Mammals			
Chalinolobus dwyeri	large-eared pied bat, large pied bat	Vulnerable	not likely

Species	Common Name	EPBC Classification	Likely Presence
Dasyurus maculatus maculatus (s. lat.)	spotted-tailed quoll	Vulnerable	not likely
Potorous tridactylus tridactylus	long-nosed potoroo (SE mainland)	Vulnerable	not likely
Pteropus poliocephalus	grey-headed flying-fox	Vulnerable	may overfly the area
Reptiles			
Coeranoscincus reticulatus	three-toed snake-tooth skink	Vulnerable	not likely
Amphibians			
Mixophyes iteratus	southern barred frog, giant barred frog	Endangered	highly unlikely

In addition to the EPBC search, a search of the Queensland Museum and Wildnet databases was undertaken (records are included in **Appendix B**). The majority of the species recorded are listed as common or exotic/introduced, however five species recorded are listed as "endangered, vulnerable or rare" under the NCA or EPBC Act. The grey goshawk (*Accipiter novaehollandiae*), the black-chinned honey eater (*Melithreptus gularis*) and lewin's rail (*Rallus pectoralis*) are all listed as rare under the NCA, while the tusked frog (*Adelotus brevis*) is listed as vulnerable. The grey-headed flying fox (*Pteropus poliocephalus*) is identified as vulnerable under the EPBC Act.

No species found during the fauna surveys are listed under the NCA or EPBC Act.

There are nine species that are covered by Schedule 4 of the Brisbane City Council Natural Assets Planning Scheme Policy. These species are listed in **Table 4-5**. The date these species have been recorded ranges from 1964 to 1996, and four do not have collection dates recorded. It is possible that some of these species are no longer to be found in the study area or nearby sites.

Table 4-5 Species covered by Natural Assets Planning Scheme Policy

Species	Common Name	Location
Chelodina longicollis	eastern long-necked turtle	Kedron Brook, this species is considered to be at a low level of threat, it is rare or uncommon in Brisbane.
Vermicella annulata	bandy bandy	Lutwyche, this species has a medium level of threat, it is it is rare or uncommon in Brisbane.
Coturnix chinensis	king quail	Mayne Junction 1981, this species is considered to be at a low level of threat, it is rare or uncommon in Brisbane.
Ixobrychus minutes	little bittern	Gordon Park, 1964, this species is considered to be at a low level of threat, it is rare or uncommon in Brisbane.
Haliaeetus Ileucogaster	white bellied sea-eagle	Bowen Hills, no date, this species is considered to be at a low level of threat, it is rare or uncommon in Brisbane.
Accipter novahollandiae	grey goshawk	Albion, no date, this species has a medium level of threat, it is it is rare or uncommon in Brisbane.
Ptilinopus magnificus	wompoo fruit-dove	Clayfield, 1996, this species is considered to be at a low level of threat, it is rare or uncommon in Brisbane.
Ptilinopus regina	rose crowned fruit dove	Wilston, 1986, this species is considered to be at a low level of threat, it is rare or uncommon in Brisbane.

4.3.5.1 Migratory Species

Migratory species that are protected under the Japan-Australia Migratory Bird Agreement (JAMBA) and China-Australia Migratory Bird Agreement (CAMBA) are listed under the schedules of the EPBC Act. Nine migratory

species were identified which potentially inhabit the area (**Table 4-6**). The white-throated needletail, listed under JAMBA, was seen flying over the Enoggera Creek area during fieldwork activities.

Many of the migratory shorebirds that visit Queensland's coast from Asian breeding grounds each year feed in saltmarsh wetlands when those habitats are inundated by tides, direct rainfall or freshwater inflows. The absence of these habitats and the urbanisation within and adjacent the study area potentially limits the distribution of these species. Some of the migratory species may utilise the project corridor or the air space above it but are unlikely to breed within them or be significantly affected by the proposed works.

Other migratory species identified included a number of marine reptiles, mammals and sharks. The species are unlikely to occur within the study area, as the study is primarily terrestrial and estuarine ecosystems.

Table 4-6 Migratory Bird Species identified by EBPC Database

Species	Common Name	EPBC Classification	Likely Presence
Birds			
Gallinago hardwickii	Latham's snipe	Migratory (wetland)	may overfly the area
Haliaeetus leucogaster	white-bellied sea-eagle	Migratory (terrestrial)	may overfly the area
Hirundapus caudacutus	white-throated needletail	Migratory (terrestrial)	Was observed overflying the area
Monarcha melanopsis	black-faced monarch	Migratory (terrestrial)	may overfly the area
Monarcha trivirgatus	spectacled monarch	Migratory (terrestrial)	may overfly the area
Myiagra cyanoleuca	satin flycatcher	Migratory (terrestrial)	not likely
Nettapus coromandelianus albipennis	Australian cotton pygmy-goose	Migratory (wetland)	not likely
Rhipidura rufifrons	rufus fantail	Migratory (terrestrial)	may overfly the area

4.3.6 Regional Connections

Kedron Brook and its associated parklands including areas within the study area form a recreational link and wildlife corridor between Brisbane Forest Park and Moreton Bay.

The value of Enoggera/Breakfast Creek which connects Brisbane Forest Park to the Brisbane River as a wildlife corridor is relatively low due to the level of urbanisation and the disjointed nature of riparian vegetation. However it does have the potential with further revegetation efforts by local bushland groups to connect Brisbane Forest Park to the Brisbane River.

While the habitat and vegetation communities along these watercourses have been substantially cleared, fauna still is found in these areas.

4.3.7 Tree Hollows

There are a number of dead trees and mature trees with hollows within the study area. Arboreal mammals, insectivorous bats and hollow nesting birds may use these. Rainbow lorikeets and Scaly-breasted lorikeets were observed nesting in hollows in the Ross and Kalinga Park areas.

Within the study area, these trees are typically found in parks and areas adjacent to Kedron Brook and Enoggera Creek. They are mature, open grown eucalypts. As they are found in areas where surrounding vegetation has been removed, these trees provide excellent roosting and nesting sites, for birds, arboreal mammals and bats.

4.3.8 Habitat Values

The habitat value of the study area is described in **Table 4-7**. While most of the study has been developed, there are still areas of habitat for a range of species that are adapted to urban environments. Areas that are not mown, have pockets of trees and along the watercourses of the area all provide habitat for small birds, arboreal mammals, reptiles and amphibians.

Table 4-7 Habitat Values of Study Area

No.	Survey Site	Vegetation Description
1	Kalinga Park adjacent to Sandgate Road	This section of Kalinga Park has moderate habitat value relative to other parts of the study area due to the presence of Kedron Brook. There are some large trees with hollows near Sandgate Road which are likely to be important habitat trees for arboreal mammals, microbats and hollow nesting birds. Parts of this area are not frequented by people, and as such provide habitat for small granivorous birds that favour the protection offered by grasses and understorey plants.
2	Melrose Park, Wooloowin	This area has low habitat value as it is isolated from other areas of vegetation. Vegetation along the creek provides some habitat, however this is fairly localised.
3	Kedron Brook, adjacent to Gympie Road	Low habitat value due to lack of vegetation to provide habitat. There is one large hollow bearing tree present upstream of Gympie Road, however it is relatively isolated, but does offer opportunities for birds, arboreal mammals and bats for nesting, roosting and breeding. Other trees in gardens provide shade and shelter particularly for birds and arboreal mammals.
4	Kedron Park Hotel, Wooloowin	Low habitat value due to lack of structural diversity, limited extent of vegetation, proximity to traffic noise and isolation from other substantial vegetation. However some limited habitat is provided by the large figs and crows ash tree for birds and arboreal mammals.
5	Wallace Place Park (D1411) - Lutwyche Road and Truro Road median, Lutwyche	Low habitat value due to lack of structural diversity, limited extent of vegetation, proximity to traffic noise and isolation from other substantial vegetation. However some limited habitat is provided by the large figs trees for birds and arboreal mammals.
6	Clarke Park (D0507) - Lutwyche Road and Truro Road median, Lutwyche	Low habitat value due to lack of structural diversity, limited extent of vegetation, proximity to traffic noise and isolation from other substantial vegetation. However some limited habitat is provided by the large hoop pine trees for birds and arboreal mammals.
7	Windsor Town Quarry Park (D1300) and Windsor Chambers between Palmer Street and Lutwyche Road.	Low habitat value due to lack of structural diversity, limited extent of vegetation, proximity to traffic noise and isolation from other substantial vegetation.
8	Windsor War Memorial Park (D0506) - median of Lutwyche Road and Roblane Street	Low habitat value due to lack of structural diversity, limited extent of vegetation, proximity to traffic noise and isolation from other substantial vegetation.
9	Windsor State School, Windsor and 270 Lutwyche Road, (Officeworks)	Low habitat value due to lack of structural diversity, limited extent of vegetation, proximity to traffic noise and isolation from other substantial vegetation. However some limited habitat is provided by the large figs trees for birds and arboreal mammals.
10	Downey Park, Enoggera Creek and Northey Street City Farm, Windsor	Moderate habitat value relative to other sections within the project corridor due to the presence of Enoggera Creek and fringing mangroves.

4.4 Aquatic Flora

4.4.1 In-stream Habitat

The results of the in-stream habitat assessments for Enoggera Creek and Kedron Brook are provided in **Table 4-8**.

- **Table 4-8 Enoggera Creek and Kedron Brook**

In-stream Habitat Components		Enoggera Creek Bowen Bridge	Kedron Brook Gympie Road	Kedron Brook Kalinga Park	Eagle Junction Tributary	Kedron Brook Sandgate Road
Environ	Land Tenure	Urban Reserve	Urban reserve	Urban reserve	Urban reserve	Urban reserve
	Land use	Urban park or road reserve	Urban park or reserve	Urban park or reserve	Urban park or reserve	Urban park or reserve, other – car park
	Disturbance	Road, bridge	Road, bridge, channelisation, pipe outlet	Bridge, pipe outlet	Road, Bridge, Weir	Road, bridge, channelisation, pipe outlet
	Disturbance Rating	High	Very High	Moderate	Very High	Very High
Bank Condition	Instability Rating	Minimal	Minimal	Minimal	Minimal	Low
	Susceptibility Rating	Minimal	Low	Low	Low	Moderate
Bed and Bar Condition	Stability Rating	Moderately aggrading	Stable	Moderately aggrading	Stable	Stable aggrading
Aquatic Habitat Condition	Aquatic Habitat Rating	Good	Poor	Good	Poor	Poor
Conservation Value Rating	Aquatic Habitat Rating	7 out of 10	3 out of 10	5 out of 10	3 out of 10	5 out of 10
	Riparian Habitat Rating	5 out of 10	2 out of 10	4 out of 10	4 out of 10	3 out of 10
	Wildlife Corridor Rating	5 out of 10	2 out of 10	6 out of 10	3 out of 10	3 out of 10
	Aquatic Representativeness Rating	7 out of 10	3 out of 10	4 out of 10	4 out of 10	3 out of 10
	Riparian Representativeness Rating	5 out of 10	2 out of 10	4 out of 10	4 out of 10	4 out of 10

Table Note: The aquatic habitat value has been rated on a scale of very good to very poor, and disturbance of the stream environs on a scale of very high to very low These assessment scales and conservation value ratings from 1-10 are comparative scales applied by an experienced ecologist from direct observation and based on personal experience to convey comparison of the different sections of stream rather than to identify objective measures.

In terms of instream habitat value upstream and downstream of Bowen Bridge on Enoggera Creek, this stretch had relatively good ecological value, particularly with regard to the provision of physical habitat. There may be however, water quality issues, in particular high turbidity, that may inhibit the presence of aquatic species in this section of creek. In contrast, the value of this corridor for wildlife movement was relatively low due to the highly urbanised and disjointed nature of the riparian vegetation.

The value of instream habitat along Kedron Brook varied between Gympie Road, Kalinga Park and Sandgate Road.

The site at Gympie Road had poor habitat value due to the total removal of riparian vegetation for flood mitigation. Consequently no overhang was provided. Nevertheless, the site provides some value to aquatic organisms through the creation of small pools and riffles. The absence of riparian vegetation provided no corridor for wildlife.

The Kalinga Park section of Kedron Brook had good habitat value in several regards, particularly for wildlife corridors through the relatively thick riparian zone and aquatic habitat due to the presence of deep pools and riffle areas. This area would provide a significant instream refuge for aquatic organisms, contribute nutrient inputs through leaf litter and moderation of water temperatures.

The Sandgate Road section of Kedron Brook was determined to have a low habitat value due to the removal of riparian vegetation and the presence adjacent car park areas. The habitat value for this site was further limited by significant amounts of rubbish occur in the water.

The small tributary of Kedron Brook at Kalinga Park, had generally poor habitat value due to the fragmented nature of the riparian zone, abundance of weeds and weir structure limiting aquatic fauna movement. A small section at the lower end, however, had good riparian cover and provided good condition aquatic habitat.

No areas in Kedron Brook had significant issues with erosion or aggradation, presumably due to the flood mitigation works that have occurred in Kedron Brook. Enoggera Creek also did not appear to be erosion prone.

4.4.2 Riparian vegetation

Prevailing vegetation types

Riparian vegetation surveys were undertaken at Enoggera Creek and the sites on Kedron Brook, including sites at Gympie Road, Kalinga Park (including tributary) and Sandgate Road. The flora species found during the surveys are listed in **Table D-1** in **Appendix D**.

The prevailing vegetation community at Enoggera Creek was mangrove.

No significant remnant riparian vegetation was located at the Gympie Road site on Kedron Brook. There was no effective tree canopy present and shrub and ground layers were sparse. Banks were dominated by exotic grasses.

Kedron Brook at Kalinga Park (including the tributary) contained patchy and fragmented communities of riparian vegetation comprising both native and exotic species. The overstorey was estimated to be up to 25 m high and no shrub layer existed. Groundcover consists of exotic grasses on top of the banks and into the waterway.

A thin band of mangrove trees exist along the banks of Kedron Brook near Sandgate Road.

Prevailing species

The only mangrove species detected at Enoggera Creek were grey mangrove (*Avicennia marina*) and river mangrove (*Aegiceras corniculatum*).

Many invasive or exotic species were also prevalent at these sites. In particular Japanese sunflower (*Tithonia diversifolia*), Singapore daisy (*Wedelia trilobata*), blue morning glory (*Ipomea indica*), Chinese elm (*Celtis sinensis*) and castor oil plant (*Ricinus communis*) were prevalent on the edges of these mangrove communities. Grasses such as blady grass (*Imperata cylindrica*) were also common.

Kedron Brook at Gympie Road was dominated by exotic grasses on the banks. Inwater vegetation was dominated by dense waterweed (*Egeria densa*), bulrushes (*Typha* sp.), milfoil (*Myriophyllum* sp.), water primrose (*Ludwigia peploides*) and para grass (*Brachiaria mutica*).

Species dominant in Kedron Brook at Kalinga Park (including the tributary) included native hibiscus (*Hibiscus tiliaceus*), Queensland blue gum (*Eucalyptus tereticornis*), camphor laurel (*Cinnamomum camphora*), Chinese elm (*Celtis sinensis*), brushbox (*Lophostemon confertus*) and waterhousea (*Waterhousea* sp.).

The only mangrove species detected at Kedron Brook near Sandgate Road were grey mangrove (*Avicennia marina*) and river mangrove (*Aegiceras corniculatum*). Exotic grasses were also prevalent on the banks.

Significant vegetation communities

All marine vegetation, including mangrove communities is protected under the *Fisheries Act 1994*. This prevents removal or disturbance of this vegetation without approval from the Department of Primary Industries and Fisheries (DPI&F).

Under the Brisbane City Council *Natural Assets Local Law 2002*, waterway and wetland vegetation is protected. This includes vegetation along Enoggera Creek and Kedron Brook. No lands subject to the wetlands code occur in the study area.

Structural characteristics

The lower reaches of Enoggera Creek comprise mangrove communities that are very simple in structure. Generally, these communities have few tree or shrub layers and limited ground cover. Canopy cover at the survey sites was considered to be relatively high and riparian vegetation (mangrove) width was limited and ranged from one to ten metres.

Kedron Brook in the vicinity of Gympie Road almost exclusively contained exotic grasses and sparse shrubs that have been planted.

Kalinga Park comprises disjointed riparian communities that are relatively thick and tall in places, contrasted against cleared riparian areas that are overgrown with exotic grasses and environmental weeds. In places the overstorey was estimated to be up to 25 metres high. No significant shrub layer exists. Groundcover consists of exotic grasses on top of the banks and into the waterway.

Kedron Brook at Sandgate Road was comprised of mangrove communities that are very simple in structure. Generally, these communities have few tree or shrub layers and have limited ground cover.

Vegetation condition

The mangrove community at Enoggera Creek was in relatively good condition, however, taking into account weed invasion, width of corridor, diversity and their use as significant habitat assessment using the CNCCS Diagnostic Criteria rates these areas as having a low value.

Vegetation condition at the Kedron Brook sites was poor to very poor. At the Gympie Road site, the vegetation has been removed for flood mitigation. At Kalinga Park, the condition of the riparian vegetation was poor due to dominance of environmental weed species and the level of disturbance experienced by the vegetation along this section of the waterway.

4.5 Aquatic Fauna

4.5.1 Fish

A search of the Queensland Museum database and review of data from the Kedron Brook Catchment Network has identified the fish species listed in **Tables C-2** and **C-3** of **Appendix C**, being historically recorded in the Enoggera/Breakfast Creek and Kedron Brook Catchment. Fish species observed during the fauna surveys are listed in **Table C-1** of **Appendix C**. **Table 4-9** lists those species from **Table C-2** which are likely to be found in the study area.

Table 4-9 Fish species likely to be located in Enoggera/Breakfast Creek and Kedron Brook

Family	Species	Common Name	Location	Recorded since 1980	Status
Enoggera/ Breakfast Creek					
Ceratodontidae	Neoceratodus forsteri	Australian lungfish	Breakfast Creek at Bowen Bridge Brisbane	yes	Vulnerable under EPBC Act (1999) Protected under Fisheries Act (1994)
Ceratodontidae	Neoceratodus forsteri	Australian lungfish	Enoggera Ck at Wilston footbridge Brisbane	yes	Vulnerable under EPBC Act (1999) Protected under Fisheries Act (1994)
Clupeidae	Nematalosa erebi	bony bream	Breakfast Creek Brisbane River	Yes	Common
Ariidae	Arius graeffei	lesser salmon catfish	Breakfast Creek Brisbane River	Yes	Common
Plotosidae	Euristhmus lepturus	long-tailed catfish	Breakfast Creek Brisbane River	Yes	Common
Ambassidae	Ambassis marianus	estuary perchlet	Breakfast Creek Brisbane River	Yes	Common
Sparidae	Acanthopagrus australis	yellowfin bream	Breakfast Creek Brisbane River	Yes	Common
Mugilidae	Liza subviridis	green-back mullet	Breakfast Creek Brisbane River	Yes	Common
Mugilidae	Mugil cephalus	sea mullet	Breakfast Creek Brisbane River	Yes	Common
Gobiidae	Mugilogobius stigmaticus	Mangrove goby	Breakfast Creek Brisbane River	Yes	Common
Eleotrididae	Butis butis	bony snouted gudgeon	Breakfast Creek Brisbane River	Yes	Common
Kedron Brook					

Family	Species	Common Name	Location	Recorded since 1980	Status
Mugilidae	Mugil cephalus	sea mullet	Kedron Brook Royal Parade Alderley	Yes	Common
Poeciliidae	Gambusia holbrooki	mosquitofish	Kedron Brook Royal Parade Alderley	Yes	Introduced
Poeciliidae	Gambusia holbrooki	mosquitofish	Schultz Canal at Rail Bridge Toombul	Yes	Introduced
Poeciliidae	Poecilia latipinna	sailfin molly	Kedron Brook at Gympie Rd Kedron Brisbane	Yes	Introduced
Poeciliidae	Xiphophorus helleri	swordtail	Kedron Brook Royal Parade Alderley	Yes	Introduced
Poeciliidae	Xiphophorus helleri	swordtail	Schultz Canal at Rail Bridge Toombul	Yes	Introduced
Poeciliidae	Xiphophorus helleri	swordtail	Kedron Brook at Kedron Sports Club Brisbane	Yes	Introduced
Poeciliidae	Xiphophorus maculatus	platy	Kedron Brook at Gympie Rd Kedron Brisbane	Yes	Introduced
Plotisidae	Tandanus tandanus	eel-tailed catfish	Kedron Brook	Yes, during fauna survey	Common
Clupeidae	Nematalosa erebi	bony bream	Kedron Brook	Yes, during fauna survey	Common
Terapontidae	Leiopotherapon unicolor	spangled perch	Kedron Brook	Yes, during fauna survey	Common

Table Note: Records sourced from Queensland Museum, May 2004. Likelihood of presence determined through habitat preference and consulting *The Brisbane River: a source book for the future* (1990) written by the Australian Littoral Society.

The Queensland Museum database identified the Australian lungfish in Enoggera Creek/Breakfast Creek. It is unlikely that this listed species would be located in the study area on a permanent basis. The populations in Enoggera Reservoir have been introduced. The presence of lungfish in the downstream reaches toward Breakfast Creek are probably only likely after flood events, when the Reservoir overtops.

The fish communities of Enoggera Creek and Kedron Brook are dominated by hardy, common native species and introduced species that are common pests in urban streams in south-east Queensland. Fish most likely to survive in Kedron Brook are those able to use a number of habitats, adapt to change and tolerate the fluctuating pollution and nutrient levels (Melville, 2001).

No threatened fish species are likely to occur in the study reaches. There are no Fish Habitat Areas within or near the proposed Airport Link alignment.

4.5.2 Aquatic Invertebrates

Aquatic invertebrate surveys have been undertaken previously in Enoggera Creek and Kedron Brook.

In Enoggera Creek, BCC (2003) sampled benthic invertebrate species as part of the Enoggera Creek Waterway Health Assessment. The study concluded that the invertebrate community in the estuarine reach was in moderate condition and the community has a high degree of stability. The study resulted in collection of 18 species. In this study, nereid polychaetes and tanaidacean crustaceans (*Apseudes estuaries*) dominated the Breakfast Creek area, while the bivalve *Arthitica helmsii* were most common in the sublittoral habitat of the Rasey Park site.

Within the BCC study hazard, quotients were calculated according to water quality parameters and results indicated that for parameters such as Copper, Lead, Zinc, turbidity, oxides of Nitrogen and total phosphorus there was substantial potential risk of adverse impacts on the benthic fauna in the middle and lower estuary of Enoggera/Breakfast Creek. Sediment analysis using similar parameters found similar results with the inclusion of nickel and mercury.

In Kedron Brook, WBM (1999) undertook surveys at a total of seven sites along Kedron Brook, including sites at Sandgate Road and Kalinga Park. Surveys were undertaken twice in October 1998 and February 1999. Generally, the invertebrate fauna present were considered representative of a degraded urban waterbody. The site at Sandgate Road was determined to have poor to moderate communities based on SIGNAL scores, while the site at Kalinga Park was moderate. The number of invertebrate families identified for habitats at each site (pool and microphyte) also showed a decrease between the Kalinga Park site and Sandgate Road site. The difference was suggested to have been due to rehabilitation works that had been carried out in the mid-section of Kedron Brook including Kalinga Park. Fewer organisms and lower SIGNAL scores were observed in Kedron Brook following a flooding event.

The freshwater crayfish (*Cherax dispar*) has been recorded by the Queensland Museum from Kedron Brook.

4.5.3 Water Dependent Mammals

No information exists regarding the presence of marine mammals in Enoggera Creek. A variety of marine mammals (dugong and several dolphin species) have been reported from lower reaches of the Brisbane River and Moreton Bay, however, they would not be found in Enoggera Creek due to lack of habitat and relatively poor water quality.

Similarly, no marine mammals have been reported for Kedron Brook, which is essentially freshwater in the study area and water depths are insufficient for these marine mammal fauna.

Melville (2001) suggests that platypus (*Ornithorhynchus anatinus*) are common around Brisbane even in more urbanised parts, and may occur in Kedron Brook. Other suitable habitat may also exist in the vicinity of Keperra Golf Course and in deeper pools in the Mitchelton reaches. Melville (2001) states that platypus have been seen in the Kedron Brook area although no records were cited. According to the BCC species profile, the platypus is most prevalent in western suburbs. In the northern suburbs it's local distribution includes Kedron Brook, however has not been marked anyway along Kedron Brook on the distribution map. Platypus was not included in the Queensland Museum records for the study area.

4.5.4 Water Dependent Reptiles

WBM (2000) identified three marine turtle species that are resident in Moreton Bay however these are unlikely to extend further upstream than the Brisbane River mouth due to the lack of habitat and food sources and the high boating traffic that occurs in the Brisbane River.

Freshwater turtles are common in the deeper pools along Kedron Brook (Melville, 2001). The Saw shelled turtle (*Elseya latisternum*) and Brisbane long-necked turtle (*Chelodina longicollis*) are reported as the most common species. During the fauna surveys the Brisbane short-necked turtle (*Emydura macquarii signata*) was observed inhabiting Kedron Brook above the estuarine/freshwater interface. No specific information is available regarding turtles in Lower Enoggera or Breakfast Creek.

All turtles are protected in Queensland under the *Nature Conservation (Wildlife) Regulation 1994.*

4.6 Spoil Placement Areas

4.6.1 Port of Brisbane sites

The Port of Brisbane spoil placement site at Clunies Flat has been identified on the Port of Brisbane land use strategy as not being an area of high ecological value. The site is clear of remnant native vegetation and has been identified in the Port land use strategy as a location for maritime industries and/or port operational activities.

The Fisherman Islands site is an area being reclaimed by the Port of Brisbane that extends the existing area of reclaimed port land, into Moreton Bay. The Fisherman Islands reclamation area is undergoing gradual filling primarily from dredge spoil in preparation for development. The area of reclamation is a man made landscape that will be ultimately be used for port and marine related industry. The area does not currently have any habitat values, however shore and migratory birds frequent the area.

The fauna species observed during the fauna survey at the Clunies Flat site are listed in **Appendix B**. A total of 17 avian species were observed within the Port of Brisbane area including the great egret and cattle egret. Both species are listed under JAMBA agreements and as such are listed under the EPBC as migratory species.

4.6.2 Brisbane Airport sites

A Brisbane Airport Vegetation and Habitat Assessment was completed in 2002. The Industrial Park site has been cleared of remnant vegetation and has undergone multiple disturbances. The site is currently vegetated with weedy species, grass species and by pioneer Acacia species that are providing low shrub and tree cover. There are also areas of ephemeral waterbodies. The lack of human presence and activity in recent years has enabled wildlife to use the area without disturbance, which has added to the habitat value of the site, despite the past history of modification of habitat.

The presence of ephemeral waterbodies provides seasonal habitat for wader birds and other waterfowl. Due to the low-lying nature of this area, it is likely that opportunistic breeding by frog species may occur after periods of freshwater flooding/rain periods. The fauna species observed during the fauna survey at the Viola Place site are listed in **Appendix B**. Four species of amphibians were recorded form the site during the field surveys (refer Table B-1 in **Appendix B**). These include three native frogs, the striped marsh frog (*Limnodynastes peronii*), the striped rocket frog (*Litoria nasuata*) and the eastern sedge frog (*Litoria phalanx*) which are common and widespread throughout Queensland, and the introduced cane toad (*Bufo marinus*).

4.6.3 Threatened Species

The listed threatened and migratory species identified from the EPBC Act Protected Matters Database (24 October 2005) for the general area of the spoil placement sites are listed in **Table 4-10**.

The likelihood that the species listed in the table may be encountered is briefly identified in the last column of the Table. Where a species is determined to be unlikely to be present, the assessment is based on the lack of suitable habitat or recorded sightings of the species in the spoil placement area.

Table 4-10 EPBC listed flora and fauna species at spoil placement sites

Species	Common Name	EPBC Classification	Type of Presence	Likely Presence
Plants				
Arthraxon hispidus	hairy-joint grass	Vulnerable	Species or species habitat likely to occur	not likely
Austromyrtus	angle-stemmed	Endangered	Species or species	not likely

Species	Common Name	EPBC Classification	Type of Presence	Likely Presence
gonoclada	myrtle		habitat likely to occur	
Bosistoa selwynii	heart-leaved bosistoa	Vulnerable	Species or species habitat likely to occur	not likely
Bosistoa transversa	three-leaved bosistoa	Vulnerable	Species or species habitat likely to occur	not likely
Corchorus cunninghamii	native jute	Endangered	Species or species habitat likely to occur	not likely
Cryptostylis hunteriana	leafless tongue-orchid	Vulnerable	Species or species habitat may occur	not likely
Hydrocharis dubia	frogbit	Vulnerable	(type of presence was not identified in the EPBC Search Report)	not likely
Macadamia integrifolia	Macadamia nut	Vulnerable	Species or species habitat likely to occur	not likely
Phaius australis	lesser swamp-orchid	Endangered	Species or species habitat likely to occur	not likely
Birds				
Arenaria interpres	ruddy turnstone	Migratory (wetland)	Species or species habitat likely to occur	may be found overflying the area
Calidris ferruginea	curlew sandpiper	Migratory (wetland)	Species or species habitat likely to occur	may be found overflying the area
Charadrius mongolus	Mongolian plover	Migratory (wetland)	Species or species habitat likely to occur	may be found in the vicinity of the area
Cyclopsitta diophthalma coxeni	Coxen's fig-parrot	Endangered Migratory (terrestrial)	Species or species habitat likely to occur	not likely
Erythrotriorchis radiatus	red goshawk	Vulnerable	Species or species habitat likely to occur	has been recorded in area
Gallinago hardwickii	Latham's snipe	Migratory (wetland)	Species or species habitat may occur	has been recorded in area
Geophaps scripta scripta	squatter pigeon (southern)	Vulnerable	Species or species habitat likely to occur	not likely
Haliaeetus leucogaster	white-bellied sea-eagle	Migratory (terrestrial)	Species or species habitat likely to occur	has been recorded in area
Heteroscelus brevipes	grey-tailed tattler	Migratory (wetland)	Species or species habitat likely to occur	has been recorded in area
Hirundapus caudacutus	white-throated needletail	Migratory (terrestrial)	Species or species habitat may occur	may be found overflying the area
Lathamus discolor	swift parrot	Endangered	Species or species habitat may occur	not likely
Limosa lapponica	bar-tailed godwit	Migratory (wetland)	Species or species habitat likely to occur	has been recorded in area
Macronectes giganteus	southern giant-petrel	Endangered Migratory (marine)	Species or species habitat may occur	not likely
Macronectes halli	northern giant-petrel	Vulnerable Migratory (marine)	Species or species habitat may occur	not likely
Monarcha trivirgatus	spectacled monarch	Migratory (terrestrial)	Breeding may occur	may be found overflying the area

Species	Common Name	EPBC Classification	Type of Presence	Likely Presence
Monarcha melanopsis	black-faced monarch	Migratory (terrestrial)	Breeding likely to occur	may be found overflying the area
Myiagra cyanoleuca	satin flycatcher	Migratory (terrestrial)	Breeding likely to occur	not likely
Nettapus coromandelianus albipennis	Australian cotton pygmy-goose	Migratory (wetland)	Species or species habitat may occur	not likely
Numenius madagascariensis	eastern curlew	Migratory (wetland)	Species or species habitat likely to occur	has been recorded in area
Numenius phaeopus	whimbrel	Migratory (wetland)	Species or species habitat likely to occur	has been recorded in area
Pluvialis fulva	Pacific golden plover	Migratory (wetland)	Species or species habitat likely to occur	has been recorded in area
Pterodroma neglecta neglecta	Kermadec petrel (western)	Vulnerable	Species or species habitat may occur	not likely
Puffinus leucomelas	streaked shearwater	Migratory (marine)	Species or species habitat may occur	not likely
Rhipidura rufifrons	rufous fantail	Migratory (terrestrial)	Breeding may occur	may be found in the area
Rostratula australis	Australian painted snipe	Vulnerable	Species or species habitat may occur	not likely
Rostratula benghalensis s. lat.	painted snipe	Migratory (wetland)	Species or species habitat may occur	not likely
Thalassarche impavida	campbell albatross	Vulnerable Migratory (marine)	Species or species habitat may occur	not likely
Turnix melanogaster	black-breasted button-quail	Vulnerable	Species or species habitat likely to occur	not likely
Xanthomyza phrygia	regent honeyeater	Endangered Migratory (terrestrial)	Species or species habitat may occur	not likely
Xenus cinereus	terek sandpiper	Migratory (wetland)	Species or species habitat likely to occur	has been recorded in area
Frogs				
Mixophyes iteratus	southern barred frog, giant barred frog	Endangered	Species or species habitat likely to occur	not likely
Mammals				
Chalinolobus dwyeri	large-eared pied bat	Vulnerable	Species or species habitat may occur	not likely
Dasyurus maculatus maculatus	spotted-tailed quoll	Endangered	Species or species habitat likely to occur	not likely
Potorous tridactylus tridactylus	long-nosed potoroo	Vulnerable	Species or species habitat may occur	not likely
Pteropus poliocephalus	grey-headed flying-fox	Vulnerable	Roosting known to occur	has been recorded in area
Xeromys myoides	water mouse	Vulnerable	Species or species habitat may occur	has been recorded in area
Reptiles				
Coeranoscincus reticulatus	three-toed snake-tooth skink	Vulnerable	Species or species habitat may occur	not likely

Of the 27 threatened species listed in the EPBC Protected Matters Report there are three species or their habitat areas that have been recorded in the spoil placement area:

- Red goshawk (Erythrotriorchis radiatus);
- Grey-headed flying fox (*Pteropus poliocephalus*); and
- Water mouse (*Xeromys myoides*).

The grey-headed flying fox is a wide ranging species, commonly found within the Brisbane region. However, the grey-headed flying fox feeds opportunistically on flowering native and exotic species across the Brisbane region and ranges throughout the region. It has been recorded at the Airport and it is believed that this species overflys the Airport to areas of habitat. There are no colonies of the grey-headed flying fox at the Airport, or other areas of the Australia TradeCoast.

The water mouse is known the inhabit mangrove forests, where they feed on small crabs, shellfish and worms. They build large mud nests, usually in sedges outside the mangroves where they can escape above the highest of tides. It is found in coastal wetlands such as lagoons, swamps and sedged lakes close to fore dunes. It forages amongst the mangroves at night when the tide is low, and when the tide rises, it returns to the adjacent sedgelands for shelter. It has not been reported from the Brisbane Airport or the Australia TradeCoast.

4.6.4 Listed Migratory Species

Of the 24 migratory species identified in the EPBC Protected Matters Report (excluding migratory marine mammals, reptiles and sharks), some 15 species are considered likely to overfly the area, be found in the area or have been recorded in the area. These 15 species include:

- Ruddy turnstone (*Arenaria interpres*) - may be found overflying the area;
- Curlew sandpiper (*Calidris ferruginea*) - may be found overflying the area;
- Lesser sand plover (*Charadrius mongolus*) -may be found in the area;
- Latham's snipe (*Gallinago hardwickii*) - has been recorded in area;
- White-bellied sea-eagle (*Haliaeetus leucogaster*) - has been recorded in area;
- Grey-tailed tattler (*Heteroscelus brevipes*) - has been recorded in area;
- White-throated needletail (*Hirundapus caudacutus*) - may be found overflying the area;
- Bar-tailed godwit (*Limosa lapponica*) has been recorded in area;
- Spectacled monarch (*Monarcha trivirgatus*) - may be found overflying the area;
- Black-faced monarch (*Monarcha melanopsis*) - may be found overflying the area;
- Eastern curlew (*Numenius madagascariensis*) - has been recorded in area;
- Whimbrel (*Numenius phaeopus*) - has been recorded in area;
- Pacific golden plover (*Pluvialis fulva*) - has been recorded in area;
- Rufous fantail *(Rhipidura rufifrons*) - has been recorded in area; and
- Terek sandpiper (*Xenus cinereus*) - has been recorded in area.

4.6.5 Fire Ants

The spoil placement areas are within the Red Imported Fire Ant restricted zone, as defined by the Queensland Department of Primary Industries and Fisheries.

The Red Imported Fire Ants (*Solenopsis invicta*) are a small reddish-brown ant with a dark abdomen and ranges in size from 2 mm to 6 mm. The nest is a dome shape approximately 40 cm high and has no obvious openings. They predominantly inhabit disturbed ecosystems, cleared or partially cleared land where there is less competition from established species. These areas include lawns, pastures, roadsides, unused crop land, industrial sites, residential areas, open forests and areas adjacent to waterways.

The Red Imported Fire Ant is a notifiable pest under the *Plant Protection Act 1989*. The Plant Protection Regulation 2002 outlines pest control measures for movement of all "high risk items" within and out of restricted areas. The movement of fire ants can occur through natural or human influenced processes. The *Plant Protection Regulation 2002* recognises the movement of fire ants through "high risk items" such as soil, baled hay and straw, landscaping and construction materials and machinery and equipment that may have come into contact with the ground. Fire ants are quickly attracted to freshly disturbed soil, particularly during mating flights. During mating flights the winged queen ants fly up to 2 km to colonise suitable new areas.

The placement of spoil within the Red Imported Fire Ant restricted area is controlled by the Plant Protection Regulation 2002. There are no procedures for the distribution of soil from an unrestricted site to restricted site. However, disturbance including compacting, covering, excavating or exposing soil of more than one cubic metre soil in a restricted zone requires an inspector's approval. Notification of the disturbance should be made seven days prior to the DPI&F.

5. Potential Impacts on Flora and Fauna

5.1 Terrestrial Flora and Fauna

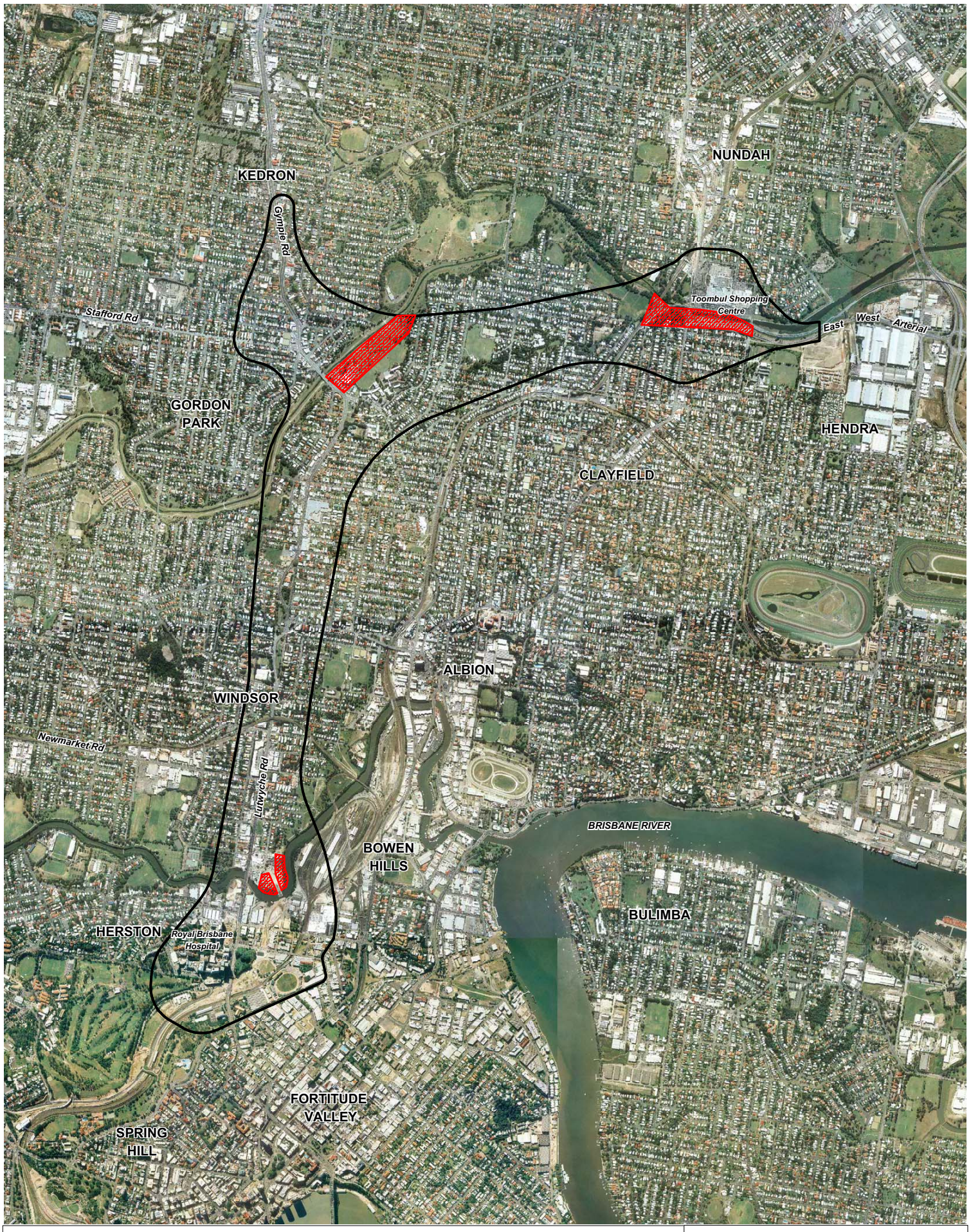
The Airport Link project commences from the northern end of the NSBT at Horace Street, Windsor, across Enoggera Creek, north along the Lutwyche Road corridor with portal entrances to Gympie Road and Stafford Road at Kedron, and continues in an easterly direction with portal entrances to Sandgate Road and the East-West Arterial at Toombul. The following works are proposed:

- Construction of two new bridges across Enoggera Creek, connecting the tunnel to the lanes of the ICB, either side of the existing Horace Street bridge;
- Widening of the existing bridge at Gympie Road across Kedron Brook;
- Bored tunnelling beneath Lutwyche Road to Gympie Road at Kedron, and between Gympie Road and the intersection of Sandgate Road and East-West Arterial;
- Cut and cover tunnelling at the Kedron and Toombul portal entrances;
- Surface works at connecting roads and portal entrances – Gympie, Stafford and Kedron Roads, Sandgate Road and the East West Arterial;
- Establishment of construction site works at the emergency services in Kedron;
- Diversion of the Kedron Brook tributary to flow over the cut and cover tunnel along the west of the railway line to connect to Kedron Brook in Kalinga Park; and
- Re-landscaping of the southern end of Ross Park as wetlands for flood mitigation.

Figure 5-1 shows the sites of impact associated with the project, along the tunnel alignment.

The impacts of the project on terrestrial flora and fauna are unlikely to be significant, as the project is located in a highly urbanised area and the vast majority of the project is underground. There are no areas of remnant vegetation in the study area affected by the project, and areas of wildlife habitat and vegetation have been disturbed and fragmented as a result of urban development. The species observed are commonly found throughout Brisbane, and include both native and exotic species.

Potential impacts on terrestrial flora and fauna will occur at the Gympie Road and Sandgate Road portals, where habitat and vegetation at the southern end of Kalinga and Ross Parks, and in the backyard of Kedron High School and the Emergency Services (immediately south of Kedron Brook), will be cleared for construction of cut and cover tunnels and transition structures. Further impacts across Kalinga and Ross Parks will arise from the clearing of trees and vegetation for construction site works at this location.



LEGEND

- Airport Link Corridor
- Area of Ground Disturbance

Figure 5.1

Project Impacts - Ecology

N

0 0.5 1km

Airport Link

SKM Connell Wagner JOINT VENTURE

BRISBANE CITY

Vegetation along Kedron Brook has been cleared from the channelisation of the watercourse. Exotic grasses dominate the banks, and outside the channel the vegetation consists of scattered plantings of common and exotic trees and mown grass. The fauna species recorded during the fauna surveys of the Mercer Park study area are all common and widespread species within Brisbane and south-east Queensland. The most abundant species recorded include the introduced Cane Toad and House Gecko, the Eastern Water Dragon and the Black-headed Flying Fox. Other species observed include the Broad-palmed Rocketfrog, the Brisbane Short-necked Turtle, and the arboreal gecko, Dtella. Due to the low ecological value of this section of Kedron Brook (lack of vegetation to provide habitat, and presence of exotic and common flora and fauna species only), it is not anticipated that the construction of the tunnel will have significant impacts on terrestrial flora and fauna. Furthermore, it is proposed to landscape the area after the cut and cover operations, which will maintain the value of Kedron Brook as a wildlife corridor.

Vegetation at Kalinga and Ross Parks consists of a mosaic of scattered remnant trees and planted native trees, with an understorey of mown grass, or mulch with planted native herbs. This area has moderate habitat value due to the presence of Kedron Brook, and some large trees with hollows near Sandgate Road, which are likely to be important habitat trees for arboreal mammals, bats and hollow nesting birds. Mammals observed during the fauna surveys include Gould's Wattled Bat, Eastern Broad-nosed bat, White-striped Mastiff Bat, Long-eared Bat, Common Ringtail Possum, Common Brushtail Possum, Black-headed flying fox. It is anticipated that construction of the tunnel, and the use of Kalinga and Ross Parks for construction site works, will have moderate impacts on flora and fauna due to the clearance of large trees across the parks, including a group of Eucalypts immediately south of Kedron Brook. This would result in a loss of habitat for possums, bats and hollow nesting birds. However, it is expected this fauna will be able to relocate to other areas of Kalinga and Ross Parks during construction.

Landscaping is proposed and would seek to mitigate impacts by revegetating areas which are disturbed from construction works. Areas damaged from the cut and cover operations would include a minimum of 2m of topsoil ontop of the tunnel structure, and the planting of native trees and vegetation to re-instate the existing habitat. The southern end of Ross Park, located north of the proposed tunnel, and south of Kedron Brook between Sandgate Road and the railway line will be re-landscaped as wetlands for flood mitigation.

Within the vicinity of Kalinga and Ross Parks, Kedron Brook and Enoggera Creek there may be some localised disruption to fauna during construction due to the noise and light generated by construction activities. However, this effect should be minimal, given the noise and light generated currently by traffic and nearby activities in the area.

Along the Lutwyche Road corridor there is expected to be a drawdown of groundwater in the alluvial soils due to dewatering for tunnel boring, where trees that are subject to Vegetation Protection Orders (VPOs) are growing. These include one large and mature fig (*Figus benjamina)* at Wallace Place Park and three mature trees at Kedron Park Hotel, one crows ash (*Flindersia australis*) and two figs (*Figus benjamina*). Figs have roots systems that cover extensive areas and are noted as having surface root systems. These trees may experience a loss of water as a result of the drawdown of groundwater. Other trees, including a group of hoop pines (*Araucaria cunninghamii*) at Clarke Park may also be affected by the draw down. Between Kedron and Toombul, a special boring maching (Earth Pressure Balance Machine) is proposed for the westbound and eastbound mainline tunnels to ensure draw down is not an issue along this corridor.

The widening of the existing bridge at Gympie Road should have minimal long term effects on the movement of fauna, particulary birds, along the Kedron Brook open space corridor, given that the bridge will be as low as, and only 1.5m wider than the existing. There will be a minor loss of habitat across the Kedron Brook catchment,

due to the construction of piles, however this is unlikely to have a significant impact, as the banks are dominated by weed species.

The new crossings either side of the Horace Street bridge will be elevated (6-12m in height) to minimise impacts to the fringing mangrove community and allow the movement of fauna along Enoggera Creek. Piles will be located to avoid disturbance to the mangroves on both banks of Enoggera Creek, however they may require some pruning. If pruning is required, there may be some loss of habitat for fauna using the fringing mangroves, though this is unlikely to lead to a reduction in species diversity or abundance.

Overall, the project will result in long-term impacts on terrestrial flora and fauna at Kalinga and Ross Parks, however this is not expected to be significant as species found are common and widespread across Brisbane. The project will not cause any impact to species listed under either the Environment Protection and Biodiversity Conservation Act 1999 or the Nature Conservation Act 1992.

5.2 Aquatic Flora and Fauna

Potential impacts on aquatic flora and fauna will occur at the southern and north-western connections, where bridges cross Enoggera Creek and Kedron Brook, respectively and at the north-eastern connection, where it is proposed to divert the existing Kedron Brook Tributary. There will be two new bridges at Enoggera Creek, and at Kedron Brook, the existing Gympie Road bridge will be widened.

Works associated with the construction and modification of the bridges may have minor localised impacts on aquatic flora and fauna, although no significant ecological impacts are expected after the project is completed.

5.2.1 Widening of bridges

The Gympie Road bridge will be widened by approximately 1.5m to accommodate increased traffic volumes associated with the project. The bridge will be widened using the existing bridge structure, with extra piles and extended headstocks, to accommodate additional bridge decking.

The Gympie Road section of Kedron Brook has poor habitat value due to the total removal of riparian vegetation for flood mitigation and channelisation, and subsequently the banks are now dominated by exotic grasses and weeds. Nevertheless, the inwater vegetation and presence of small pools and riffles provides some habitat value to aquatic organisms. The piles will be positioned on either side of the channel, and are not proposed to penetrate the water. Therefore, the widening of the bridge is expected to have the following impacts only:

- Removal of vegetation for construction of the additional piles and headworks;
- Increased shading of riparian and aquatic vegetation in areas adjacent to the widened bridge, which can give rise to a reduction in the time period in which plants are exposed to sunlight. These could have adverse effect on growth rates and plant survival due to reduced rates of photosysnthesis.

There will be little impact on aquatic flora at Kedron Brook as a result of the removal of vegetation for piles, as remnant riparian vegetation has already been removed, and banks are dominated by exotic grasses.

Effects relating to increased shading of aquatic vegetation will be minor, as the area affected is very small, and will not be permanently overshadowed, as the sun moves from the east to the west throughout the day.

5.2.2 Construction of new bridges

Two new bridges will be constructed across Enoggera Creek, either side of the existing Horace Street bridge, to connect the tunnel with the eastbound and westbound lanes of the ICB. Areas of vegetation remain along the banks of Enoggera Creek, and are dominated by mangrove species. This vegetation forms a very narrow, but continuous band along the creek.

The bridges will be designed as high level flyovers, elevated 6 to 12m in height above ground level. This will allow construction without removing existing mangroves, though some pruning may be required. Piles will be located to avoid disturbance to the mangroves on both banks of Enoggera Creek. Therefore, the following impacts are anticipated:

- Pruning and trimming of mangroves to accommodate bridge construction, site access and movement;
- Shading of mangroves in the area under and adjacent to the new bridge.

The construction of the new bridges over Enoggera Creek will have a limited affect on fringing mangrove communities. Pruning may result in some loss of habitat for fauna using the fringing mangroves, however this will be only a short-term minimal disruption, and is unlikely to lead to a reduction in species diversity or abundance. Following the construction of the bridges, the mangroves will regenerate in the disturbed areas, under the existing conditions at the site.

The construction of the bridge connecting the tunnel to the eastbound lanes of the ICB will have a lesser impact as the alignment of the bridge runs parallel with Enoggera Creek, and does not enter the fringing vegetation along the banks of the creek. Much of the vegetation on the southern banks of Enoggera Creek is regrowth vegetation, having regrown following the construction of the ICB.

Effects relating to the shading of mangroves will be minor, as the area affected by the new bridges is small and will not be permanently overshadowed.

A full marine plant survey will need to be undertaken prior to construction and a marine plant removal permit application submitted to DP&F for approval. Although Enoggera Creek is not part of a FHA, marine plants have important habitat value and minimal disturbance is required.

The removal of marine plants can increase turbidity within the creek which can potentially impact upon fauna. This potential disturbance is short term and will have no long term impact on associated fauna. The pruning of the small area of mangroves will have minimal impact on the local marine community and associated fauna.

Other potential impacts on aquatic flora and fauna are associated with potential pollutants and sediment in stormwater runoff from construction activities and vehicles. Hydrocarbons and other construction materials/chemicals can have a detrimental impact on aquatic flora and fauna. Mitigation measures to ensure that this does not occur will be detailed in Chapter and 8 on Hyrdogeology. Stormwater issues are dealt with in Chapter 7 on Surface Water.

Potential Acid Sulphate Soils (PASS) could also impact upon water quality and therefore aquatic flora and fauna. PASS would need to be appropriately managed during construction activities. Chapter 6 on Topography, Geology and Soils detail proposed mitigation measures.

5.2.3 Diversion of Kedron Brook Tributary

To allow construction of the cut and cover tunnel approaching the north-eastern connection in Toombul, diversion of the small tributary of Kedron Brook at Kalinga Park will be required. The tributary has low aquatic

habitat value due to the fragmented nature of the riparian zone, the abundance of weeds and a weir structure limiting aquatic fauna movement.

Construction works, which will involve excavation for the cut and cover tunnel and the excavation of 2m of earth at the southern end of Ross Park for the proposed wetlands, will result in the removal of the tributary south of Kedron Brook. The tributary will be re-instated as part of the landscape and revegetation plan after construction of the tunnel, and will flow over the cut and cover, and along the western side of the railway line into Kedron Brook.

The diversion of the tributary is not anticipated to have any significant ecological impacts on aquatic flora and fauna, as the aquatic habitat value is low, being dominated by exotic grasses and weeds, and has already been disturbed by construction of the weir.

5.3 Spoil Placement Areas

Placement of spoil within the Port of Brisbane sites is not anticipated to have any significant impact on ecological resources at these sites. The spoil placement site at Clunies Flat has been significantly disturbed and cleared of all remnant native vegetation, and the Fisherman Islands site is currently being reclaimed and does not have any habitat values.

Placement of spoil within the Brisbane Airport site will involve some loss of habitat for common and widespread species. The Industrial Park site has been cleared of original vegetation and revegetated with common and exotic species of both flora and fauna.

As the sites considered for the placement of spoil from the project have been significantly disturbed and cleared of orginal vegetation, there will be very little impact on flora and fauna values at these sites.

5.3.1 Fire Ants

The spoil placement areas for the Project, at the Port of Brisbane and Brisbane Airport, are located within a Red Imported Fire Ant restricted area, and as such there is the potential for the Project to facilitate the colonisation of new areas by the ant. Fire ants are attracted to areas of freshly disturbed soil, which will be the case at the spoil placement areas. As trucks will be returning to the tunnel construction site, from the restricted area, there is a need to implement procedures to ensure fire ants are not spread from the restricted to unrestricted areas.

6. Proposed Mitigation Measures

Mitigation measures that will be used to minimise impacts of the project are listed below. These mitigation measures have been developed in recognition of the impacts likely to be caused by the project.

6.1.1 Detailed Design

A landscape and revegetation plan is proposed as part of the design phase and will be directed to restore areas disturbed during construction of the project, including replacing vegetation removed during the cut and cover operations, and enhancing areas where vegetation was scarce to begin with. There will be a minimum of 2m of topsoil on top of the cut and cover to plant trees. The landscape and revegetation plan will use local native species, as a priority. Non native species will only be used where the use of these species is consistent with existing landscaping.

Wetlands are proposed at the southern end of Ross Park, south of Kedron Brook between Sandgate Road and the railway line, for flood mitigation measures. The removal of trees here will not be replaced.

6.1.2 Construction Phase

During construction of the project it is proposed to:

- Implement sedimentation and erosion control plans to reduce sediment leaving the project construction sites in surface water run-off and entering Enoggera Creek, Kedron Brook and stormwater systems;
- Inspect tree hollows in Ross and Kalinga Parks prior to site clearance to determine the presence of arboreal mammals and bats, and implement a relocation plan for any fauna found.
- Clearly distinguish between vegetation to be removed and that to be retained to minimise loss of habitat and mark areas of vegetation to be retained;
- Avoid damage to the root zones of adjacent trees during construction - locate vehicle access, material storage and the cleaning of plant and equipment away from adjacent trees;
- Check construction site works, such as trenches and culverts, each morning and after periods of inactivity to ensure fauna are not trapped or likely to be harmed by construction activities;
- Ensure all native fauna is protected (including snakes) and shall not be intentionally harmed as a result of the construction works or worker actions;
- Where mangrove removal cannot be avoided, ensure site conditions are suitable for the recolonisation of mangroves once construction is completed;
- Include a minimum of 2m of topsoil on top of the cut and cover tunnel;
- Revegetate disturbed areas with local native species, within four weeks of disturbance;
- Where vegetation is cleared for bridges at Enoggera Creek and Kedron Brook, tree roots will be retained to help stabilise the site and to maintain bank stability;
- Undertake an assessment of the fig trees at Wallace Place Park, for health, prior to commencement of the tunnel excavation to develop a management plan for the on-going health of those trees;
- Water and fertilise figs to encourage root growth, up to 6 months before the tunnel construction reaches the location of the trees;
- Continue watering of the trees, following tunnel excavation under Lutwyche Road, to allow roots to continue to grow and develop; and

- Regularly monitor the health of the trees for two growing seasons after excavation has passed under Wallace Place Park, to monitor response to groundwater drawdown.

6.1.3 Red Imported Fire Ants

Controls on the movement of soil from unrestricted to restricted areas do not exist. However, trucks will be moving (returning) from the restricted area of the spoil placement area to the construction sites in Bowen Hills and Toombul, which are outside the restricted area. The following management actions will be taken to manage fire ants in the project:

- Spoil placement areas will be inspected to determine whether fire ants are present at the sites;
- Spoil placement areas will be inspected on a monthly basis, during the placement of spoil to monitor the presence of the fire ants;
- Regular contact will be maintained with the Brisbane City Council Fire Ant Control Officer and the DPI&F Fire Ant Control Centre;
- A Risk Management Plan will be prepared to manage the movement of high risk material (soil), and the plan will be approved by DPI&F;
- Liaison will occur with both the Brisbane City Council Fire Ant Control Officer and the DPI&F Fire Ant Control Centre during the planning phase of the project, to agree on mitigation measures and management plans for the management of fire ants during the construction of the project; and
- An inspection system of vehicles leaving the spoil placement area will be implemented to ensure vehicles are free of loose soil or other material that may be capable of containing fire ants.

7. References

Anderson J. A. (1999) Basic Decision Support System for Management of Urban Streams – Development of the Classification System for Urban Streams, National River Health Program, Urban Sub-program, Report No. 1, LWRRDC Occasional Paper 8/99.

Brisbane City Council, (2003) A Guide to the Natural Assets Local Law: Protecting our Valuable Natural Assets, Brisbane City Council, Brisbane.

Brisbane City Council (2004) Breakfast/Enoggera Creek Waterway Management Plan.

Brisbane City Council, Brisbane City Biodiversity Strategy: Actions today for the 21st Century.

Brisbane City Council (2005) *Platypus Species Profile*.

Brisbane City Council (2000), *Brisbane City Plan 2000*, Natural Assets Planning Scheme Policy, Volume 2.

Cogger, H.G. (2000) *Reptiles and Amphibians of Australia*, Sixth Edition, New Holland, Sydney.

Cropper, S. (1993) *Management of endangered Plants.* CSIRO, Canberra.

Department of Environment and Heritage - EPBC Act Protected Matters Database (2005) http://www.deh.gov.au

Department of Environment and Heritage (2006) *Mixophyes iteratus* (Southern Barred Frog, Giant Barred Frog) Species Profiles - http://www.deh.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=1944

Environmental Protection Agency (EPA) (2005) *Platypus*. http://www.epa.qld.gov.au/nature_conservation/wildlife/native_animals/platypus/

Kedron Brook Catchment Network (2005) www.kedronbrook.org.au

Melville, S. (2001) *An Assessment of Fauna Habitat along Kedron Brook.* Report to Wildlife Preservation Society of Queensland. December 2001.

Menkhorst and Knight (2004) *A Field Guide to the Mammals of Australia*, Second Edition, Oxford University Press, Melbourne.

Pizzey, G. and Knight, F. (1997) *Field Guide to the Birds of Australia*, Angus and Robertson, Australia.

Robinson, M. (2000) A Field Guide to Frogs of Australia: From Port Augusta to Fraser Island, Including Tasmania. Reed New Holland, Frenchs Forest.

Serena, M. (2000) *Platypus – Protecting their Habitat on Private Land.* Land for Wildlife Note No. 13.

Strahan, R. (1995) *The Mammals of Australia*, Reed, Sydney.

Tyler, M. J. (1997) *The Action Plan for Australian Frogs*. Wildlife Australia Endangered Species Program, Canberra.

WBM Oceanics Australia (1999) *Kedron Brook Water Quality Assessment.* Report prepared for Brisbane City Council.

WBM Oceanics Australia (2000) *Proposed Port Expansion at Fisherman Islands – Draft Impact Study*. Report prepared for the Port of Brisbane Corporation.

Appendix A Terrestrial Flora Species

- **Table A-1 Terrestrial Flora Species from Field Surveys, Queensland Herbarium and EPBC databases**

Botanical Name	Common Name	Status	Source	1. Kalinga Park	2. Melrose Park	3. Kedron Brook	5. Wallace Park	8. Windsor Memorial Park	6. Clarke Park	7. Windsor Quarry Park	9. Windsor State School	Spoil Placement Sites
Abutilon grandifolium	Hairy Abutilon	Intro	QH									X
Acacia disparrima	hickory wattle	C(Q)	fs	x	x	x				x		
Acacia fimbriata	Brisbane wattle	C(Q)	fs, QH		x							
Acacia irrorata	green wattle	C(Q)	QH									
Acacia maidenii	Maiden's wattle	C (Q)	QH									X
Acacia podalyriifolia	Queensland silver wattle	C(Q)	fs			x						
Acianthus fornicatus	pixie caps	C(Q)	QH									
Acronychia imperforata	Beach Acronychia	C(Q)	QH									X
Acrostichum speciosum	mangrove fern	C(Q)	fs	x								
Aegiceras corniculatum	River Mangrove	C(Q)	fs QH	X								X
Aeschynomene indica	Budda Pea	C(Q)	QH									X
Agapanthus sp.	agapanthus	Intro	fs							x		
Agave sp.		Intro	fs							x		
Ageratum houstonianum	blue billygoat weed	Intro	fs			x						
Albizia lebbeck	Indian siris	Intro	fs		x							
Allocasuarina littoralis	black she-oak	C(Q)	fs		x							
Alphitonia excelsa	red ash	C(Q)	fs		x							X
Alstonia constricta	Bitter Bark	C(Q)	QH									X
Anagallis arvensis	pimpernel	Intro	QH									
Angophora woodsiana	-	C(Q)	QH									
Araucaria cunninghamii	hoop pine	C(Q)	fs	x	x	x		x	x			
Aristida calycina	Dark Wiregrass	C(Q)	QH									X
Arthraxon hispidus	hairy-joint grass	V (A)	EPBC									
Arthrochilus irritabilis	leafy elbow orchid	C(Q)	QH									
Asparagus aethiopicus	asparagus fern	Intro C3	fs	x								
Asparagus officinalis	Asparagus	Intro	QH									X
Astrotricha latifolia	-	C(Q)	QH									
Avicennia marina var	grey mangrove	C(Q);	fs	x								

Botanical Name	Common Name	Status	Source	1. Kalinga Park	2. Melrose Park	3. Kedron Brook	5. Wallace Park	8. Windsor Memorial Park	6. Clarke Park	7. Windsor Quarry Park	9. Windsor State School	Spoil Placement Sites
australasica		F										
Baccharis halimifolia	groundsel bush	Intro C2	fs	x								X
Baloskion tenuiculme	-	C(Q)	QH									
Bauhinia sp.		Intro	fs	x								
Bidens pilosa	Cobbler's Pegs	Intro	QH									X
Bosistoa selwynii	heart-leaved bosistoa	V (A)	EP BC									
Bosistoa transversa	three-leaved bosistoa	V (A)	EP BC									
Brasenia schreberi	Water Shield	R (Q)	QH									X
Bromus catharticus	prairie grass	Intro	QH									X
Bruguiera gymnorhiza	Large Fruit Organe Mangrove	C(Q)	QH									X
Burmannia disticha	-	C(Q)	QH									
Callistemon salignus	White Bottle Brush	C(Q)	QH									X
Callistemon viminalis	bottlebrush	C(Q)	fs	x	x					x		
Callitris columellaris	white cypress pine	C(Q)	fs					x				
Canavalia rosea	Coastal Jack Bean	C(Q)	QH									X
Carex inversa	Knob Sedge	C(Q)	QH									X
Cassia javanica	apple blossom tree	C(Q)	fs							x		
Castanospermum australe	black bean	C(Q)	fs	x								
Cassytha filiformis	Love Vine	C(Q)	QH									X
Casuarina glauca	swamp oak	C(Q)	fs/ QH	x								X
Celtis sinensis	Chinese celtis	Intro C3	fs	x								
Cenchrus echinatus	Mossman Rivergrass	Intro	QH									X
Centaurium tenuiflorum	Branched or Slender Centuary	Intro	QH									X
Ceriops tagal	Yellow or Spurred Mangrove	QH										X
Chamaesyce dallachyana	-	C(Q)	QH									X

Botanical Name	Common Name	Status	Source	1. Kalinga Park	2. Melrose Park	3. Kedron Brook	5. Wallace Park	8. Windsor Memorial Park	6. Clarke Park	7. Windsor Quarry Park	9. Windsor State School	Spoil Placement Sites
Chenopodium ambrosioides	Mexican tea	Intro	QH									X
Chloris gayana	Rhodes grass	Intro	fs/ QH	x								X
Chloris truncate	Windmill grass	C(Q)	QH									X
Chloris virgata	Feathertop Rhodes grass	Intro	QH									X
Christella dentata	Downy Wood Fern	C(Q)	QH									X
Chrysocephalum apiculatum	Common Everlasting Yellow Buttons	C(Q)	QH									X
Cinnamomum camphora	camphor laurel	Intro C3	fs	x								
Citrus australis	Australian Round Lime	C(Q)	QH									x
Commelina diffusa	wandering jew	Intro	fs			x						
Commersonia bartramia	-	C(Q)	QH									
Conyza canadensis var. pusilla	Canadian Fleabane	Intro	QH									x
Corchorus cunninghamii	native jute	E (A)	EP BC									
Cordyline sp.			fs				x					
Cortaderia selloana	Pampus grass	Intro	QH									x
Corymbia citriodora	spotted gum	C(Q)	QH									
Corymbia citriodora ssp variegata (F)	spotted gum	C(Q)	fs							x		
Corymbia intermedia	pink bloodwood	C(Q)	fs, QH		x							
Corymbia tessellaris	Moreton Bay Ash	C(Q)	fs	x	x	x						
Corymbia torelliana*	cadaghi	C(Q); GE	fs	x		x						
Cosmos bipinnatus	cosmos	Intro	QH									x
Crassocephalum crepidioides	thickhead	Intro	QH									x
Crotalaria incana	Woolly Rattlepod	Intro	QH									x
Crotalaria medicaginea var. neglecta	Trefoil Rattlepod	C(Q)	QH									x
Crotalaria Montana var. angustifolia	-	C(Q)	QH									x
Crotalaria pallida var.	Streaked	Intro	QH									x

Botanical Name	Common Name	Status	Source	1. Kalinga Park	2. Melrose Park	3. Kedron Brook	5. Wallace Park	8. Windsor Memorial Park	6. Clarke Park	7. Windsor Quarry Park	9. Windsor State School	Spoil Placement Sites
obovata	Rattlepod											
Crotalaria pallida	streaked rattlepod	Intro	fs			x						
Cryptostylis hunteriana	leafless orchid	V (A)	EP BC									
Cucumis myriocarpus	prickly paddy melon	Intro	QH									
Cupaniopsis anacardioides	tuckeroo	C(Q)	fs/ QH	x	x	x				x		x
Cyclospermum leptophyllum	Slender Celery	Intro	QH									x
Cynanchum carnosum	Mangrove Milkweed	-	QH									x
Cynodon dactylon	Green Couch/ Bermuda grass	Intro	QH									X
Cyperus aggregatus	Infatedscale Flatsedge	Intro	QH									x
Cyperus eragrostis	umbrella sedge	Intro	fs/ QH			x						x
Cyperus exaltatus	Tall Flat Sedge	C(Q)	QH									x
Cyperus involucratus	Umbrella sedge	Intro	QH									x
Cyperus iria	Rice flatsedge	C(Q)	QH									x
Cyperus laevigatus	makaloa	C(Q)	QH									x
Cyperus platystylis	-	C(Q)	QH									
Daviesia umbellulata	-	C(Q)	QH									
Delonix regia	poinciana	Intro	fs	x		x						
Dietes bicolor	dietes	Intro	fs							x		
Dietes grandiflora	wild iris	Intro	fs						x	x		
Digitaria didactyla	Queensland blue couch	Intro	QH									
Diplocyclos palmatus	Native bryony	C(Q)	QH									x
Doodia caudata	rasp fern	C(Q)	QH									
Drosera spatulata	-	C(Q)	QH									
Dysphania littoralis	Red crumbweed	C(Q)	QH									x
Echinochloa colona	Awnless barnyard grass	Intro	QH									x
Echinochloa crus-galli	Barnyard grass	Intro	QH									x
Echinochloa telmatophila	Swamp barnyard grass	C(Q)	QH									x
Elaeocarpus obovatus	Blueberry ash	C(Q)	QH									x
Elaeocarpus dulcis	Chinese water	C(Q)	QH									x

Botanical Name	Common Name	Status	Source	1. Kalinga Park	2. Melrose Park	3. Kedron Brook	5. Wallace Park	8. Windsor Memorial Park	6. Clarke Park	7. Windsor Quarry Park	9. Windsor State School	Spoil Placement Sites
	chestnut											
Eleocharis minuta	-	Intro	QH									x
Elodia canadiensis	elodea	Intro	fs			x						
Elymus multiflorus	-	C(Q)	QH									x
Epaltes australis	Epaltes	C(Q)	QH									x
Eragrostis interrupta	-	C(Q)	QH									x
Eragrostis pilosa	Soft lovegrass	Intro	QH									x
Eragrostis sororia	Lovegrass	C(Q)	QH									x
Eragrostis tenuifolia	Elastic grass	Intro	QH									x
Eremophila debilis	Winter applie	C(Q)	QH									x
Erigeron karvinskianus	seaside daisy	Intro	fs							x		
Erythrina crista-galli	cock's comb coral tree	Intro	fs	x	x	x						
Eucalyptus acmenoides	white mahogany	C(Q)	QH									
Eucalyptus carnea	broad leaved white mahogany	C(Q)	QH									
Eucalyptus fibrosa	broad leaved red ironbark	C(Q)	QH									
Eucalyptus major	Queensland grey gum	C(Q)	fs	x								
Eucalyptus microcorys	tallowwood	C(Q)	fs	x								
Eucalyptus resinifera	red mahogany	C(Q)	QH									
Eucalyptus robusta	swamp mahogany	C(Q)	fs		x	x						
Eucalyptus saligna	Sydney blue gum	C(Q)	fs	x	x	x						
Eucalyptus seeana	narrow leaved red gum	C(Q)	QH									
Eucalyptus siderophloia	grey ironbark	C(Q)	fs	x	x	x						
Eucalyptus tereticornis	Queensland blue gum	C(Q)	fs	x	x	x				x		
Eucalyptus tindaliae	Tindale's strinybark	C(Q)	QH									
Eugenia uniflora	Surinam cherry	Intro	fs	x								
Euphorbia cyathophora	Dwarf poinsettia	Intro	QH									x
Evolvulus pilosus		Intro	fs							x		
Excoecaria agallocha	Milky mangrove	C(Q)	QH									x
Exocarpos cupressiformis	Native cherry/ cherry ballart	C(Q)	QH									x
Exocarpos latifolius	Native cherry	C(Q)	QH									x
Ficus benjamina	weeping fig	Intro	fs								x	

Botanical Name	Common Name	Status	Source	1. Kalinga Park	2. Melrose Park	3. Kedron Brook	5. Wallace Park	8. Windsor Memorial Park	6. Clarke Park	7. Windsor Quarry Park	9. Windsor State School	Spoil Placement Sites
Ficus hillii	weeping fig	Intro	fs			x	x	x	x			
Ficus macrophylla	Moreton bay fig	C(Q)	fs		x							
Ficus rubiginosa	rock fig	C(Q)	fs	x		x				x		
Ficus rubiginosa desf.	Port Jackson fig	C(Q)	QH									x
Flagellaria indica	Flagellaria	C(Q)	QH									x
Flindersia australis	crow's ash	C(Q)	fs								x	
Gaillardia pulchella var. picta	firewheel	Intro	QH									x
Gazania rigens	gazania	Intro	fs				x		x			
Geitonoplesium cymosum	Scrambling lily	C(Q)	QH									x
Gladiolus	Gladioli	C(Q)	QH									x
Glinus oppositifolius	Slender carpetweed	C(Q)	QH									x
Glycine tomentella Hayata	Woolly glycine	C(Q)	QH									x
Glochidion ferdinandii	cheese tree	C(Q)	fs, QH		x					x		
Grevillea robusta	silky oak	C(Q)	fs	x		x						
Haloragis exalata subsp. velutina	-	V(A, Q)	QH									x
Halosarcia pergranulata subsp. queenslandica	-	C(Q)	QH									x
Helianthus annuus	sunflower	Intro	QH									x
Hibiscus trionum	Bladder ketmia	Intro	QH									x
Harpullia pendula	tulipwood	C(Q)	fs			x						
Hydrocharis dubia	frogbit	V (A)	EP BC									
Hydrocotyle paludosa	a pennywort	C(Q)	QH									
Indigofera circinella	-	Intro	QH									
Ipomoea cairica	coast morning glory	Intro	fs	x		x						
Jacaranda mimosaefolia	jacaranda	C(Q)	fs	x					x	x		
Jagera pseudorhus	foambark	C(Q)	fs	x								
Juncus sp.		C(Q)	fs			x						
Lantana montevidensis	Creeping lantant	Intro	QH									x
Lepidium virginicum	Virginian Peppercress	Intro	QH									x
Leptochloa fusca	Brown beetle grass	C(Q)	QH									x

Botanical Name	Common Name	Status	Source	1. Kalinga Park	2. Melrose Park	3. Kedron Brook	5. Wallace Park	8. Windsor Memorial Park	6. Clarke Park	7. Windsor Quarry Park	9. Windsor State School	Spoil Placement Sites
Leptospermum trinervium	Paper bark tea tree	C(Q)	QH									x
Lindsaea ensifolia subsp. agatii	-	C(Q)	QH									x
Lindsaea fraseri	-	C(Q)	QH									
Liriope muscari	liriope	Intro	fs							x		
Livistonia chinensis	Chinese fan palm	Intro	fs		x							
Lobelia membranacea	-	C(Q)	QH									x
Lomandra hystrix	creek matrush	C(Q)	fs, QH		x							
Lophostemon confertus	brush box	C(Q)	fs		x	x			x			
Lophostemon sauveolens	swamp box	C(Q)	fs	x								
Ludwigia octovalvis	willow primrose	C(Q)	fs			x						
Ludwigia peploides subsp. montevidensis	water primrose	Intro	fs			x						
Macadamia integrifolia	macadamia nut	V (A)	EP BC									
Macaranga tanarius	blush macaranga	C(Q)	fs							x		
Macfadyena unguis-cati	cat's claw vine	Intro C2	fs	x								
Macroptilium lathyroides	phasey bean	Intro	fs			x						
Mangifera indica	mango tree	Intro	fs							x		
Marsilea costulifera	-	C(Q)	QH									x
Megathyrsus maximus	guinea grass	Intro	fs/ QH	x		x						x
Melaleuca bracteata	black tea tree	C(Q)	fs							x		
Melaleuca leucadendra	broad leaved tea tree	C(Q)	fs	x		x						
Melaleuca linariifolia "Claret Tops"	flaxleaf paperbark	C(Q)	fs						x			
Melaleuca quinquenervia	paper barked tea tree	C(Q)	fs/ QH	x								x
Melinis repens	Red natal grass	Intro										x
Michelia figo	port wine magnolia	Intro	fs							x		
Micromelum minutum	-	C(Q)	QH									x
Microtis	-	C(Q)	QH									x
Monotoca scoparia	prickly broom	C(Q)	QH									

Botanical Name	Common Name	Status	Source	1. Kalinga Park	2. Melrose Park	3. Kedron Brook	5. Wallace Park	8. Windsor Memorial Park	6. Clarke Park	7. Windsor Quarry Park	9. Windsor State School	Spoil Placement Sites
	heath											
Monstera sp		Intro	fs				x					
Muehlenbeckia gracillima	-	-	QH									x
Murraya paniculata	mock orange	Intro	fs	x								
Myoporum boninense subsp. australe	-	C(Q)	QH									x
Myriophyllum aquaticum	parrots feather	C(Q); GE	fs			x						
Najas tenuifolia	Water nymph	C(Q)	QH									x
Nicandra physalodes	Apple of peru	Intro	QH									x
Nicotiana glauca	Tree tabaco	Intro	QH									x
Notelaea ovata	a native olive	C(Q)	QH									x
Ochna serrulata	ochna	Intro	fs	x								
Parsonsia velutina	-	C(Q)	QH									x
Paspalum conjugatum	sourgrass	Intro	QH									x
Paspalum dilatatum	paspalum	Intro	fs			x						
Passiflora foetida	Stinking Passion Flower	Intro	QH									x
Pavonia hastata	-	Intro	QH									x
Pennisetum alopecuroides	swamp foxtail	Intro	fs							x		
Pennisetum setaceum	fountain grass	Intro	QH									
Persicaria attenuata	smartweed	C(Q)	fs, QH			x						
Persicaria decipiens	smartweed	C(Q)	fs			x						
Persicaria hydropiper	smartweed	C(Q)	QH									x
Persicaria subsessilis	-	C(Q)	QH									x
Phoenix roebelenii	dwarf date palm	Intro	fs		x					x		
Phragmites australis	common reed	C(Q)	QH									
Physalis ixocarpa	Annual ground cherry	Intro	QH									x
Pinus elliottii	slash pine	Intro	fs			x						
Pittosporum revolutum	hairy pittosporum	C(Q)	fs/ QH	x								x
Plectranthus parviflorus	-	C(Q)	QH									x
Plumbago auriculata	plumbago	Intro	fs							x		
Polygonum aviculare	wireweed	Intro	QH									x
Polymeria calycina	-	C(Q)	QH									x
Pratia concolor	Poison Partía	C(Q)	QH									x

Botanical Name	Common Name	Status	Source	1. Kalinga Park	2. Melrose Park	3. Kedron Brook	5. Wallace Park	8. Windsor Memorial Park	6. Clarke Park	7. Windsor Quarry Park	9. Windsor State School	Spoil Placement Sites
Pseudanthus orientalis	-	C(Q)	QH									
Psidium sp	guava	Intro	fs			x						
Pterostylis ophioglossa	snake tongue greenwood	C(Q)	QH									
Raphiolepis indica	indian hawthorn	Intro	fs							x		
Rapistrum rugosum	turnip weed	Intro	QH									
Raphanus raphanistrum	Wild Raddish	Intro	QH									x
Rhizophora stylosa	Spotted Mangrove / Red Mangrove	C(Q)	QH									x
Ricinus communis	castor oil plant	Intro	fs	x								
Rosa cv. Excelsa	-	Intro	QH									x
Rubus parvifolius	Pink-flowered Native Rasberry	C(Q)	QH									x
Ruellia tweediana	-	Intro	QH									
Rumex brownii	Swamp dock	C(Q)	QH									x
Ruppia maritima	Sea Tassel	C(Q)	QH									x
Salsola kali	Soft Roly-Poly	C(Q)	QH									x
Schefflera actinophylla*	Queensland umbrella tree	C(Q); GE	fs	x								
Schenkia australis	-	C(Q)	QH									x
Schizachyrium microstachyum	-	Intro	QH									x
Senna pendula	easter cassia	Intro	fs	x								
Senna septemtrionalis	-	Intro	QH									x
Sesuvium portulacastrum	Sea Pursland	C(Q)	QH									x
Setaria parviflora	-	Intro	QH									x
Setaria sphacelata	South African pigeon grass	Intro	fs			x						
Sida cordifolia	flannel weed	Intro	QH									
Sisyrinchium sp.	scourweed	Intro	QH									x
Solanum chrysotrichum	-	Intro	QH									
Solanum physalifolium	-	Intro	QH									
Sonchus oleraceus	Common Sowthistle	Intro	QH									x
Sorghum bicolor	Forage Sorghum, Grain Sorghum	Intro	QH									x
Sorghum halepense	Johnson Grass	Intro	fs			x						
Spathodea	African tulip tree	Intro	fs	x								

Botanical Name	Common Name	Status	Source	1. Kalinga Park	2. Melrose Park	3. Kedron Brook	5. Wallace Park	8. Windsor Memorial Park	6. Clarke Park	7. Windsor Quarry Park	9. Windsor State School	Spoil Placement Sites
campanulata		C2										
Spergularia rubra	Sand Spurry	Intro	QH									x
Sphagneticola trilobata	Singapore daisy	Intro C3	fs	x								
Spiranthes sinensis	Ladies' Fesses	C(Q)	QH									x
Spirodela punctata	Thin Duckweed	C(Q)	QH									x
Sporobolus elongatus	Slender Rat's Tail Grass	C(Q)	QH									x
Stenocarpus sinuatus	wheel of fire	C(Q)	fs	x								
Stenotaphrum secundatum	Buffalo Grass	Intro	QH									x
Stobilanthes sp.	goldfussia	Intro	fs			x						
Stylidium debile	an orchid	C(Q)	QH									
Syagrus romanzoffianum	queen palm	Intro	fs		x				x	x		
Syzygium leuhmannii	small leaved lily pilly	C(Q)	fs			x						
Tecoma capensis	-	Intro	QH									x
Tetragonia tetragonioides	New Zealand Spinach	C(Q)	QH									x
Tipuana tipu	pride of Bolivia	Intro	fs	x								
Trachelospermum jasminoides	star jasmine	Intro	fs							x		
Tridax procumbens	Tridax daisy	Intro	QH									x
Triglochin microtuberosum	-	C(Q)	QH									x
Triglochin striatum	Streaked Arrowgrass	C(Q)	QH									x
Typha orientalis	cumbungi	C(Q)	fs/ QH			x						x
Urochloa foliosa	-	C(Q)	QH									x
Verbena bonariensis	purpletop	Intro	QH									x
Verbena incompta	-	Intro	QH									x
Verbena litoralis	-	Intro	QH									x
Villarsia exaltata	-	C(Q)	QH									
Vitex trifolia	-	C(Q)	QH									x
Waterhousia floribunda	weeping lily pilly	C(Q)	fs	x		x				x		
Wikstroemia indica	The bush	C(Q)	QH									x
Wollastonia biflora	-	C(Q)	QH									x
Xanthium spinosum	-	Intro	QH									x
Zieria smithii	-	C(Q)	QH									x

Botanical Name	Common Name	Status	Source	1. Kalinga Park	2. Melrose Park	3. Kedron Brook	5. Wallace Park	8. Windsor Memorial Park	6. Clarke Park	7. Windsor Quarry Park	9. Windsor State School	Spoil Placement Sites

Status:

E = Endangered

V = Vulnerable

R = Rare

C = Common

CV= Cultivated Variety

NA = Not applicable - not a Queensland endemic

(Q) Nature Conservation (Wildlife) Regulation 1994 (Queensland Government)

(A) - Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth of Australia)

intro - introduced species

QH - Queensland Herbarium

fs - field survey

F = subject to the Fisheries Act 1994

x - recorded or observed at site

Appendix B Terrestrial Fauna Species

- **Table B-1 Terrestrial Fauna Species observed during Field Surveys, 2005-2006**

Common Name	Species Name	Status	13/14. Ross/ Kalinga Parks	11. Northey Street	12. Mercer Park	15. Clunie Flats	16. Viola Place
Birds							
Common Mynah	Acridotheres tristis	C	X	X			
Clamorous Reed-warbler	Acrocephalus stentoras	C	X				
Australian Bush-turkey	Alectura lathami	C	X	X			
Pacific Black Duck	Anas superciliosa	C	X	X	X		X
Darter	Anhinga melanogaster	C	X		X		
Great Egret	Aredea alba	C Mig (A)				X	
Cattle Egret	Aredea ibis	C mig (A)				X	
Intermediate Egret	Ardea intermedia	C	X		X	X	
Masked Woodswallow	Artamus personatus	C				X	
Striated Heron	Butorides striatus	C	X				
Sulphur-crested Cockatoo	Cacatua galerita	C	X				
Galah	Cacatua roseicapilla	C	X				
Pheasant Coucal	Centropus phasianinus	C	X				
Golden-headed Cisticola	Cisticola excilis	C			X	X	
Feral Pigeon	Columba livia	C	X	X			
Black-faced Cuckoo-shrike	Coracina novaehollandiae	C		X			
Torresian Crow	Corvus orru	C	X	X	X	X	
Pied Butcherbird	Cracticus nigrogularis	C	X				
Grey Butcherbird	Cracticus torquatus	C	X				
Laughing Kookaburra	Dacelo novaeguineae	C			X		
Mistletoebird	Dicaeum hirundinaceum	C	X				
Spangled Drongo	Dicrurus bracteatus	C	X			X	
White-faced Heron	Egretta novaehollandiae	C		X			
Blue-faced Honeyeater	Entomyzon cyanotis	C	X				
Common Koel	Eudynamys scolopacea	C		X			
Dollarbird	Eurystomus orientalis	C	X				
Dusky Moorhen	Gallinula tenebrosa	C	X				
Buffed-banded Rail	Gallirallus philippensis	C		X			
Peaceful Dove	Geopelia striata	C	X				

Common Name	Species Name	Status	13/14. Ross/ Kalinga Parks	11. Northey Street	12. Mercer Park	15. Clunie Flats	16. Viola Place
Mangrove Gerygone	Gerygone levigaster	C		X		X	
Brown Gerygone	Gerygone mouki	C		X			
Magpie-Lark	Grallina cycanoleuca	C	X	X			X
Australian Magpie	Gymnorhina tibicen	C	X	X			
Brahminy Kite	Haliastur indus	C				X	
Whistling Kite	Haliastur sphenurus	C				X	
Fairy Martin	Hirundo ariel	C	X		X		
Welcome Swallow	Hirundo neoxena	C	X		X		
Tree Martin	Hirundo nigricans	C	X			X	
White-throated Needletail	Hirundapus caudacutus	C mig (A)	X				
Brown Honeyeater	Lichmera indistincta	C		X			
Superb Fairy-wren	Malurus cyaneus	C	X	X			
Red-backed Fairy-wren	Malurus melanocephalus	C				X	
Noisy Miner	Manorina melanocephala	C	X		X		
Crested Pigeon	Ocyphaps lophotes	C	X	X	X		X
Olive-backed Oriole	Oriolus sagittatus	C	X				
Australian Pelican	Pelecanus conspicillatus	C		X		X	
Little Pied Cormorant	Phalacrorax melanoleucos	C	X				
Little Black Cormorant	Phalacrorax sulcirostris	C	X				
Pied Cormorant	Phalacrorax varius	C				X	
Little Friarbird	Philemon citreogularis	C		X			
Pale-headed Rosella	Platycercus adscitus	C	X		X		
Purple Swamphen	Porphyrio pophyrio	C	X		X		
Willie Wagtail	Rhipidura leucophys	C	X	X	X		X
Figbird	Sphecotheres viridis	C	X	X			
Spotted-turle Dove	Streptopelia chinensis	C	X	X			
Australian White Ibis	Threskiornis molucca	C			X	X	
Straw-necked Ibis	Threskiornis spinicollis	C	X	X	X	X	
Scaly-breasted Lorikeet	Trichoglossus chlorolepidotus	C	X				
Rainbow Lorikeet	Trichoglossus haematodus haematodus	C	X	X	X		
Masked Lapwing	Vanellus miles	C	X	X			X
Silvereye	Zosterops lateralis	C		X		X	
Total Number of Avian Species (61)			41	26	16	17	6
Amphibians							
Cane Toad	Bufo marinus	Intro	X	X	X	X	X

Common Name	Species Name	Status	13/14. Ross/ Kalinga Parks	11. Northey Street	12. Mercer Park	15. Clunie Flats	16. Viola Place
Beeping Froglet	Crinia parinsignifera	C	X				
Striped Marsh Frog	Limnodynastes peronii	C	X				X
Graceful Treefrog	Litoria gracilenta	C	X				
Broad-palmed Rocketfrog	Litoria latopalmata	C	X		X		
Striped Rocket Frog	Litoria nasuata	C					X
Eastern Sedge Frog	Litoria phallanx	C	X				X
Total Number of Amphibian Species (7)			6	1	2	1	4
Mammals							
Gould's Wattled Bat	Chalinolobus gouldii	C	X				
Common Bentwing Bat	Miniopterus schreibersii	C		X			
Long-eared Bat	Nyctophilus spp	-	X				
Common Ringtail Possum	Pseudocheirus peregrinus	C	X	X			
Black-headed Flying Fox	Pteropus alecto	C	X	X	X	X	X
Black Rat	Rattus rattus	C	X	X			
Eastern Broad-nosed Bat	Scotorepens greyii	C	X				
White-striped Mastiff Bat	Tadarida australis	C	X	X			
Common Brushtail Possum	Trichosurus vulpecula	C	X				
Total Number of Mammalian Species (9)			8	5	1	1	1
Reptiles							
Fence Skink	Cryptoblepharus virgatus	C	X	X	X		
Copper-tailed Skink	Ctenotus taenulatus	C	X				
Dtella	Gehyra dubia	C	X		X		
Nobbi Dragon	Gemmatophora nobbi	C	X				
Asian House Gecko	Hemidactylus frenatus	C	X	X	X		
Bynoe's Gecko	Heternotia bynoeii	C					
Skink	Lampropholis sp.	C		X			
Skink	Lygisaurus sp.	C		X			
Eastern Water Dragon	Physignathus leseurii	C	X	X	X		
Brisbane Short-necked Turtle	Emydura macquarii signata	C	X		X		
Total Number of Reptilian Species (10)			7	5	5	0	0
Total Number of Species Recorded			62	37	22	19	11

Status:

E = Endangered

V = Vulnerable

(Q) Nature Conservation (Wildlife) Regulation 1994 (Queensland Government)

(A) - Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth of Australia)

Common Name	Species Name	Status	13/14. Ross/ Kalinga Parks	11. Northey Street	12. Mercer Park	15. Clunie Flats	16. Viola Place

R = Rare

C = Common

Intro = introduced species, not a Queensland endemic

Mig = Migratory

x - recorded or observed at site

Table B-2 Terrestrial Fauna Species from Wildnet and Queensland Museum, 2005

Species Name	Common Name	Status	Source	Study Area	Spoil Sites
Birds					
Acanthiza chrysorrhoa	yellow-rumped thornbill	C	Wild	X	
Accipiter cirrhocephalus	Collared sparrowhawk	C	Wild/QM	X	
Accipiter fasciatus	Brown goshawk	C	Wild/QM	X	
Accipiter novaehollandiae	Grey goshawk	R (Q)	QM	X	
Acridotheres tristis	common myna	Intro	Wildnet	X	
Acrocephalus stentoreus		C	QM	X	
Alcedo azurea		C	QM	X	
Alectura lathami	Australian brush-turkey	C	Wildnet	X	
Anas gracilis	grey teal	C	Wildnet	X	
Anas platyrhynchos	mallard	Intro	Wildnet/QM	X	
Anas superciliosa	Pacific black duck	C	Wildnet/QM	X	
Ardea alba	great egret	C, Mig (A)	Wildnet	X	
Ardea ibis	cattle egret	C , Mig (A)	Wildnet	X	
Ardea novaehollandiae	White-faced heron	C	QM	X	
Ardea pacifica	White-necked heron	C	Wild/QM	X	
Artamus cyanopterus	Dusky woodswallow	C	QM	X	
Aviceda subcristata	Pacific baza	C	Wildnet	X	
Burhinus grallarius	Bush stone curlew	C	QM	X	
Butorides striatus	Striated heron	C	Wild/QM	X	
Cacatua galerita	sulphur-crested cockatoo	C	Wildnet	X	
Cacatua roseicapilla	galah	C	Wildnet	X	
Cacomantis variolosus		C	QM	X	
Calidris acuminata		C	QM	X	
Calidris tenuirostris	Great knot	C	QM		X
Centropus phasianinus	Pheasant coucal	C	Wildnet/QM	X	
Charadrius leschenaultii	Greater Sand Plover	C	QM		X
Charadrius ruficapillus	Red-capped Plover	C	QM		X
Chenonetta jubata	Australian wood duck	C	Wildnet	X	
Chrysococcyx lucidus	Shining bronze cuckoo	C	Wild/QM	X	
Cisticola exilis	golden-headed cisticola	C	Wildnet/QM	X	X
Colluricincla harmonica	Grey Shrike-Thrush	C	QM		X
Columba livia	Rock dove	Intro	QM	X	
Coracina novaehollandiae	black-faced cuckoo-shrike	C	Wildnet/QM	X	X
Coracina papuensis	White bellied cuckoo-shrike	C	Wild/QM	X	
Corvus coronoides	Australian raven	C	Wild	X	
Coturnix chinensis	-	C	QM	X	
Coturnix ypsilophora	Brown quail	C	QM		X
Cracticus nigrogularis	pied butcherbird	C	Wild	X	
Cygnus atratus	Black swan	C	Wild/QM	X	
Dacelo leachii	blue-winged kookaburra	C	Wild	X	

Species Name	Common Name	Status	Source	Study Area	Spoil Sites
Dacelo novaeguineae	laughing kookaburra	C	Wild/QM	X	
Dicaeum hirundinaceum	Mistletoe bird	C	Wild/QM	X	
Dicrurus bracteatus	spangled drongo	C	Wild/QM	X	
Egretta novaehollandiae	white-faced heron	C	Wild	X	
Egretta intermedia		C	QM	X	
Elanus axillaris	Black-shouldered kite	C	Wild/QM	X	
Elseyornis melanops		C	QM	X	
Entomyzon cyanotis	blue-faced honeyeater	C	Wildnet	X	
Ephippiorhynchus asiaticus		C	QM	X	
Erythrogonys cinctus	Red-kneed Dotterel	C	QM		X
Eudynamys scolopacea	common koel	C	Wild/QM	X	
Eurystomus orientalis	dollarbird	C	Wild/QM	X	
Falco berigora	Brown Falcon	C	QM		X
Falco cenchroides	Nankeen kestrel	C	Wild/QM	X	
Falco longipennis	Australian hobby	C	Wild/QM	X	
Gallinula tenebrosa	dusky moorhen	C	Wildnet;/QM	X	
Gallirallus philippensis	buff-banded rail	C	Wildnet	X	
Gerygone levigaster	Mangrove gerygone	C	QM	X	X
Glossopsitta pusilla	little lorikeet	C	Wildnet	X	
Grallina cyanoleuca	magpie-lark	C	Wildnet/QM	X	
Gymnorhina tibicen	Australian magpie	C	Wildnet/QM	X	
Gygis alba	White Tern	C	QM		X
Haliaeetus leucogaster	White bellied fish eagle	C	QM	X	X
Haliastur sphenurus	Whistling Kite	C	QM		X
Hirundo neoxena	welcome swallow	C	Wildnet/QM	X	
Hydroprogne caspia		C	QM	X	
Hypoleucos varius	Pied shag/ pied cormorant	C	QM	X	X
Ixobrychus minutus		C	QM	X	
Lichenostomus fasciogularis	Mangrove honeyeater	C	Wild/QM	X	X
Lichmera indistincta	Brown honeyeater	C	Wild/QM	X	
Malurus lamberti	Variegated fairy wren	C	Wild/QM	X	
Malurus melanocephalus	Red-backed Fairy-wren	C	QM		X
Melithreptus gularis	Black-chinned honey eater	R(Q)	Wildnet	X	
Meliphaga lewinii	Lewin's honeyeater	C	Wildnet	X	
Monarcha melanopsis	Black-faced monarch	C	Wild/QM	X	
Myiagra rubecula	Leaden flycatcher	C	Wild/QM	X	
Neochmia temporalis	Plum-headed finch	C	Wild/QM	X	
Ninox novaeseelandiae	Southern boobook	C	Wild/QM	X	
Nycticorax caledonicus	Nankeen night heron	C	Wild/QM	X	
Ocyphaps lophotes	crested pigeon	C	Wildnet	X	
Pachycephala pectoralis	Golden whistler	C	Wild/QM	X	

Species Name	Common Name	Status	Source	Study Area	Spoil Sites
Pachycephala rufiventris	Rufous whistler	C	Wild/QM	X	
Pardalotus striatus	Spotted pardalote	C	Wild/QM	X	
Passer domesticus	House sparrow	Intro	Wild/QM	X	
Pelecanus conspicillatus	Australian pelican	C	Wild/QM	X	
Petrochelidon ariel	Fairy Martin	C	QM		X
Petrochelidon nigricans		C	QM	X	
Phalacrocorax melanoleucos	little black cormorant	C	Wildnet	X	
Phalacrocorax sulcirostris	little black cormorant	C	Wildnet/QM	X	X
Philemon corniculatus	Noisy friarbird	C	Wild/QM	X	
Platycercus adscitus	pale-headed rosella	C	Wildnet	X	
Pluvialis dominica	American Golden Plover	C	QM		X
Pluvialis fulva		C	QM	X	
Podargus strigoides	Tawny frogmouth	C	QM	X	
Porphyrio porphyrio	Purple swamphen	C	QM	X	
Porzana pusilla		C	QM	X	
Psophodes olivaceus	eastern whipbird	C	Wildnet	X	
Ptilinopus magnificus		C	QM	X	
Ptilinopus regina		C	QM	X	
Ptilinopus superbus	Superb fruit dove	C	Wild/QM	X	
Puffinus pacificus	Wedge-tailed Shearwater	C	QM		X
Rallus pectoralis	Lewin's rail	R(Q)	QM	X	
Rhipidura fuliginosa	grey fantail	C	Wildnet	X	
Rhipidura leucophrys	willie wagtail	C	Wildnet/QM	X	
Streptopelia chinensis	spotted turtle-dove	Intro	Wildnet/QM	X	
Scythrops novaehollandiae	channel-billed cuckoo	C	Wildnet/QM	X	
Sphecotheres viridis	figbird	C	Wildnet/QM	X	
Stercorarius parasiticus	Artic jaeger	C	Wild/QM	X	
Sterna bergii		C	QM	X	
Sturnus vulgaris	common starling	Intro	Wildnet/QM	X	
Taeniopygia bichenovii	Owl finch	C	QM		X
Threskiornis spinicollis	Straw-necked Ibis	C	QM		X
Todiramphus macleayii	Forest kingfisher	C	Wild/QM	X	
Todiramphus sanctus	Sacred kingfisher	C	Wild/QM	X	
Trichoglossus chlorolepidotus	scaly-breasted lorikeet	C	Wildnet	X	
Trichoglossus haematodus	rainbow lorikeet	C	Wildnet/QM	X	
Turnix varia	Painted button-quail	C	Wild/QM	X	
Tyto alba	Barn owl	C	Wild/QM	X	
Tyto capensis	African Grass Owl	C	QM		X
Vanellus miles	masked lapwing (northern subspecies)	C	Wildnet/QM	X	
Zosterops lateralis	silvereye	C	Wildnet/QM	X	
Zoothera heinei	-	C	QM	X	

Species Name	Common Name	Status	Source	Study Area	Spoil Sites
Mammals					
Isoodon macrourus	northern brown bandicoot	C	Wildnet/QM	X	
Lepus capensis	Cape hare	Intro	QM	X	
Macropus Dorsalis	Black-stiped Wallaby	C	QM	X	
Miniopterus australis	Little bent-wing bat	C(Q)	QM	X	
Miniopterus schreibersii	Eastern bent-wing bat	C	QM	X	
Mormopterus norfolkensis	East Coast Freetail Bat	C	QM	X	
Mormopterus planiceps	Little mastiff bat	C(Q)	QM	X	
Mustela putorius	ferrett	Intro	QM	X	
Mus musculus	house mouse	C	QM	X	
Nyctophilus gouldi	Gould's Long-eared Bat	C	QM	X	
Phascogale tapoatafa	Brush-tailed Phascogale	C	Wild/QM	X	
Petaurus norfolcensis	Squirrel Glider	C	QM	X	
Pseudocheirus peregrinus	Common Ringtail possum	C	QM	X	
Pteropus alecto	Black flying fox	C	QM	X	
Pteropus poliocephalus	Grey-headed flying fox	V (A)	QM	X	
Pteropus scapulatus	Little red flying fox	C	QM	X	
Rattus norvegicus	brown rat	C	QM	X	
Rattus rattus	black rat	C	QM	X	
Rhinolophus megaphyllus	Eastern horse shoe bats	C	QM	X	
Saccolaimus flaviventris	Yellow bellied sheathtail bat	C	QM	X	
Scoteanax rueppellii	Greater broad-nosed bat	C	QM	X	
Scotorepens greyii	little broad-nosed bat	C	Wild/QM	X	
Scotorepens orion	Eastern broad-nosed bat	C	QM	X	
Tachyglossus aculeatus	short-beaked echidna	C	Wild/QM	X	
Trichosurus vulpecula	Common brushtail possum	C	Wild/QM	X	
Reptiles					
Amphibolurus nobbi	nobbi	C	QM	X	
Antaresia marculoss	Spotted python	C	QM	X	
Anomalopus leuckartii	lizard	C	QM	X	
Anomalopus verreauxii	lizard	C	QM/Wildent	X	
Boiga irregularis	▪ brown tree snake	C	Wildnet/QM	X	
Cacophis harriettae	White crowned snake	C	Wild/QM	X	
Cacophis krefftii	-	C	QM	X	
Cacophis squamulosus	-	C	QM	X	
Calyptotis scutirostrum	-	C	Wild/QM	X	
Carlia vivax	-		QM	X	
Chelonia mydas	green sea turtle		QM	X	
Chelodina expansa	-		QM	X	
Chelodina longicollis	Eastern snake-necked turtle	C	QM	X	
Chlamydosaurus kingii	-		QM	X	
Cryptophis nigrescens	-	C	Wild/QM	X	

Species Name	Common Name	Status	Source	Study Area	Spoil Sites
Cryptoblepharus gerrardii	Pink-tounged lizard	C	Wild/QM	X	
Cyclodomorphus virgatus	-		QM	X	
Delma plebeia	Common delma	C	Wild/QM	X	
Dendrelaphis punctulata	▪ common tree snake	C	Wildnet/QM	X	
Diplodactylus vittatus	▪ wood gecko	C	Wildnet/QM	X	
Demansia psammophis	Yellow-faced whip snake	C	QM	X	
Denisonia devisi	-		QM	X	
Elseya latisternum	-		QMQM	X	
Eulamprus martini	-		QM	X	
Eulamprus quoyii	-		QM	X	
Eulamprus tenuis	-		QM	X	
Furina diadema	-		QM	X	
Hemiaspis signata	-		QM	X	
Hemidactylus frenatus	House gecko	Intro	QM	X	
Hoplocephalus stephensii	-		QM	X	
Hypsilurus spinipes	-		QM	X	
Hydrophis elegans	Bar-bellied sea snake	C	QM	X	X
Lialis burtonis	▪ Burton's legless lizard	C	Wild	X	
Lampropholis delicata	-	C	Wild/QM	X	
Lialis burtonis	Leg-less lizard		QM	X	
Morelia spilota	Carpet python	C	Wild/QM	X	
Ophioscincus ophioscincus	-	C	QM	X	
Pogona barbata	▪ bearded dragon	C	Wild/QM	X	
Physignathus lesueurii	-	C	QM	X	
Pseudechis porphyriacus	Red-bellied black snake	C	QM	X	X
Pseudonaja textilis	Common or eastern brown snake	C	QM	X	X
Ramphotyphlops nigrescens	-		QM	X	
Ramphotyphlops proximus	-		QM	X	
Ramphotyphlops wiedii	-		QM	X	
Tiliqua scincoides	▪ eastern blue-tongued lizard	C	Wild/QM	X	
Tropidonophis mairii	▪ freshwater snake	C	Wild/QM	X	
Tropidechis carinatus	-		QM	X	
Varanus gouldii	Sand monitor	C	Wild/QM	X	
Vermicella annulata	-		QM	X	
Amphibians					
Bufo marinus	Cane toad	Intro	QM	X	
Adelotus brevis	Tusked frog	V(Q)	QM	X	
Crinia signifera	Common eastern froglet	C	QM	X	
Limnodynastes ornatus	Ornate borrowing frog	C	QM	X	
Limnodynastes peronii	Striped marshfrog	C	QM	X	
Limnodynastes salmini	Salmon striped frog	C	QM	X	
Limnodynastes	Scarlet Sided	C	QM	X	

Species Name	Common Name	Status	Source	Study Area	Spoil Sites
terraereginae	Pobblebonk				
Pseudophryne major	Great Brown Broodfrog	C	QM	X	
Cyclorana alboguttata	Greenstripe frog	C	QM	X	
Litoria caerulea	Green tree frog	C	QM	X	
Litoria fallax	Eastern sedgefrog	C	QM	X	
Litoria gracilenta	Graceful treefrog	C	QM	X	
Litoria latopalmata	Broad palmed rocketfrog	C	QM	X	
Litoria peronii	Emerald spotted treefrog; Peron's treefrog	C	QM	X	

Status:

E = Endangered

V = Vulnerable

R = Rare

C = Common

CV= Cultivated Variety

Intro = introduced, not a Queensland endemic

Source:

Q) Nature Conservation (Wildlife) Regulation 1994 (Queensland Government)

(A) - Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth of Australia)

QM – Queensland Museum database

Wildnet – Wildnet database

x - recorded or observed at site

Appendix C Aquatic Fauna

Table C-1 Fish Species observed during the Field Surveys, 2006

Common Name	Species Name	Status	13/14. Ross/ Kalinga Parks	11. Northey Street	12. Mercer Park
Waterway			Kedron Brook	Enoggera Creek	Kedron Brook
Long-finned Eel	Anguilla reinhardtii	Common	X		X
Freshwater Catfish	Tandanus tandanus	Common	X		
Bony Bream	Nematalosa erebi	Common	X		X
Spangled Perch	Leiopotherapon unicolor	Common	X		X
Swordtail	Xiphophorus helleri	Intro	X		
Mullet		Intro	X	X	
Mosquitofish	Gambusia affinis	Intro	X		X
Rainbow Fish		Common	X		X
Guppies	Poecilia reticulata	Intro	X		X
Banded Toado	Marilyna pleurosticta	Common		X	

Table C-2 Fish Records from the Queensland Museum, 2005

Family	Species	Common Name	Location	Status	Likelihood of Presence
Fish					
Ceratodontidae	Neoceratodus forsteri	Australian Lungfish	Breakfast Creek at Bowen Bridge Brisbane	Vulnerable under EPBC (1999)	only in upstream areas or after significant flooding events
Ceratodontidae	Neoceratodus forsteri	Australian Lungfish	Enoggera Ck at Wilston footbridge Brisbane	Vulnerable under EPBC (1999)	only in upstream areas or after significant flooding events
Anguillidae	Anguilla reinhardtii	Marbled Eel	Breakfast Ck Brisbane River	Common	Not likely
Anguillidae	Anguilla reinhardtii	Marbled Eel	Breakfast Ck Brisbane River	Common	Not likely
Clupeidae	Nematalosa erebi	Bony Bream	Breakfast Creek Brisbane River	Common	Likely
Ariidae	Arius graeffei	Lesser Salmon Catfish	Breakfast Creek Brisbane River	Common	Likely
Plotosidae	Euristhmus lepturus	Long-tailed Catfish	Breakfast Ck Brisbane River	Common	Likely
Antennariidae	Antennarius striatus	Striped Anglerfish	Breakfast Creek Brisbane River	Common	Not likely
Poeciliidae	Gambusia holbrooki	Mosquitofish	Breakfast Ck at Picot St Herston	Introduced	Possibly
Ambassidae	Ambassis marianus	Estuary Perchlet	Breakfast Ck Brisbane River	Common	Likely
Sparidae	Acanthopagrus australis	Yellowfin Bream	Breakfast Creek Brisbane River	Common	Likely

Family	Species	Common Name	Location	Status	Likelihood of Presence
Ephippidae	Platax teira	Teira Batfish	Breakfast Ck Brisbane River	Common	Not likely
Chaetodontidae	Chelmon rostratus	Beaked Coralfish	Breakfast Ck Brisbane River	-	Not Likely
Mugilidae	Liza subviridis	Green-back Mullet	Breakfast Ck Brisbane River	Common	Likely
Mugilidae	Mugil cephalus	Sea Mullet	Breakfast Ck Brisbane River	Common	Likely
Gobiidae	Mugilogobius stigmaticus	Mangrove Goby	Breakfast Creek Brisbane River	Common	Likely
Eleotrididae	Butis butis	Bony snouted Gudgeon	Breakfast Creek Brisbane River	Common	Likely
Eleotrididae	Gobiomorphus australis	Striped Gudgeon	Kedron Brook Brisbane	Common	Not Likely
Eleotrididae	Hypseleotris compressus	Empire Gudgeon	Schultz Canal at Rail Bridge Toombul	Common	Not Likely
Eleotrididae	Hypseleotris compressus	Empire Gudgeon	Kedron Brook at Kedron Sports Club Brisbane	Common	Not Likely
Trichiuridae	Trichiurus lepturus	Hairtail	Breakfast Creek Brisbane River	-	Not Likely
Crustacea					
Parastacidae	Cherax dispar	-	Kedron Brook, Brisbane	Common	1985

- **Table C-3 Fish Records from the Kedron Brook Catchment Network for Lutwyche stretch of Kedron Brook, 2003 -2005**

Family	Species	Common Name	Location	Status	Likelihood of Presence
Eleotrididae	Gobiomorphus australis	Striped Gudgeon	Lutwyche stretch Kedron Brook	Common	Likely
Poeciliidae	Xiphophorus maculatus	Platys	Lutwyche stretch Kedron Brook	Introduced	Likely
Poeciliidae	Gambusia dominicensis	Mosquito fish	Lutwyche stretch Kedron Brook	Introduced	Likely
Poeciliidae	Xiphophorus helleri	Swordtails	Lutwyche stretch Kedron Brook	Introduced	Likely
Anguillidae	Unspecified	Eel	Lutwyche stretch Kedron Brook	Introduced	Likely
Mugilidae	Unspecified	Freshwater mullet	Lutwyche stretch Kedron Brook	Introduced	Likely

Source: Fish Snapshot Surveys in Kedron Brook over 2003 -2005, spreadsheet. Downloaded from http://www.kedronbrook.org.au/__data/page/12814/Fish_Snapshot_results.xls

Appendix D – Aquatic Flora

- **Table D-1 Aquatic Flora Species from Aquatic Field Surveys**

Species Name	Botantical Name	Status	17. Enoggera Creek	18. Kedron Brook, Gympie Road	19. Kedron Brook, Kalinga Park	20. Kedron Brook, Toombul	21. Kedron Brook Tributary
Avicennia marina	Grey mangrove		X			X	
Aegiceras corniculatum	River mangrove		X			X	
Tithonia diversifolia	Japanese sunflower	Intro	X				
Wedelia trilobata	Singapore daisy	Intro	X				
Ipomea indica	Blue morning glory	Intro	X				
Celtis sinensis	Chinese elm	Intro	X				
Ricinus communis	Castor oil plant	Intro	X				
Imperta cylindriva	Blady grass	Intro	X				
Egeria densa	Dense waterweed			X			
Typha sp	Bulrushes			X			
Myriophyllum sp.	milfoil			X			
Ludwigia peploides	Water primrose			X			
Brachiaria mutica	Para grass			X			
Hibiscus tiliaceus	Native hibiscus	C(Q)			X		X
Eucalyptus tereticornis	Queensland Blue gum				X		X
Cinnamomum camphora	Camphor laurel				X		X
Celtis sinensis	Chinese elm				X		X
Lophostemon confertus	Brushbox				X		X
Waterhousea sp.	waterhousea				X		X