



Fraser Coast  
REGIONAL COUNCIL

# Maryborough Mangrove Management Strategy



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## Introduction

This strategy provides the basis for management of mangroves (marine plants) on a section of the Mary River in Maryborough between the Public Jetty in Wharf Street downstream to the Brolga Theatre on Kent Street. It was developed in recognition of the important environmental values of mangrove areas protected under State legislation and the need to actively manage this high use public area. Mangroves in this area have become re-established since the cessation of earlier historical uses of the river bank here for wharf and industrial purposes. A further area downstream from the Brolga Theatre to Moreton St is included in the strategy to allow for future works and maintenance of stormwater outlets in this area. Two sections of riverbank downstream from Moreton Street in Aubinville are included as offset areas.

In the Wharf Street to Brolga Theatre area mangroves will continue to be retained. However operational works is proposed in order to maintain views of the river from various locations, to allow public surveillance of the boardwalk and public jetty and allow for future construction of two fishing platforms and a riverbank amphitheatre. Mangroves to be retained will continue to function as marine habitat, contribute to natural scenic amenity and play an important role in maintaining bank stability and erosion control. The Mangrove Management Strategy is a key component of management in this area and will contribute to community benefit by increasing sustainable public use of the river bank area.

Within the offset areas existing mangroves are relatively undisturbed apart from the effects of natural flood events. They are located within and adjacent to Council managed land including road reserve and Council owned freehold land at the Maryborough Airport and the Aubinville Wastewater Treatment Plant (WTP). Here mangroves and buffer areas will be rehabilitated and protected for further mangrove community development including landward colonisation should sea levels rise.

Only land that is within or adjacent to Council controlled land is included within the strategy. Management of mangroves adjacent to existing Council infrastructure such as jetties and drains is documented in the Strategy. The Strategy is intended to fulfil the requirements of the Sustainable Planning Act 2009, the Fisheries Act 1994 and the 2009 Codes for self-assessable development of minor impact works and maintenance works that involve removal, destruction or damage to marine plants. It will be supported by detailed Site-based Operational Plans that will specify the agreed on-ground works to be undertaken under this strategy.

Public consultation December 2010 – January 2011  
Adopted by Council on 15 June 2011

# Section1

## *Background*

The Department of Employment, Economic Development and Innovation, Fisheries Queensland is responsible for implementing the provisions of the Fisheries Act 1994 (Fisheries Act). This strategy is a joint project between Fraser Coast Regional Council and Fisheries Queensland and is intended to fulfil requirements under the Fisheries Act and the Sustainable Planning Act 2009 (SPA). The strategy has been developed with the aim of meeting the policy target of Fish Habitat Management Operational Policy FHMOP 001 to:

1. Maintain the relative distribution of each of the components of the marine plant community state-wide to 90% or greater of the distribution levels that existed in 1990.
2. Maintain the extent of marine plant distribution within local government areas at 80% or greater of the level that existed in 1990 for all natural areas and to 50% or greater of 1990 levels for constructed areas.

The main strategy area, located on a bend of the Mary River is situated on the boundary of the Maryborough City Centre Wharf Street and Community precincts identified in the Maryborough City Plan. The planning scheme includes an intention for development to be restricted to low key community and recreational facilities which will compliment the river bank. Under the planning scheme the area is intended to be left as open as possible so that views of the river will not be obstructed.

The river bank area adjacent to the city centre of Maryborough has been the focus of intensive activity since the 1840's. In the early years the river bank was a thriving wharf area with port facilities suitable for shallow draught sailing ships (Figure 1). Whilst the area was once one of Australia's largest and busiest ports in the lead up to Federation, during the early 1900's it became evident that the Maryborough port site was becoming increasingly unsuitable for larger steam powered vessels. The bulk of shipping was redirected to a new jetty which was completed in 1916 in nearby Urangan, Hervey Bay. Nevertheless the wharf area at Maryborough continued to host river traffic associated with ship building (up until the 1970's) and the timber industries (up until the 1990's).

Since the 1990's there have been changes to the local economy away from previous industrial uses of the area towards a more tourist oriented focus. A large number of heritage listed buildings which were constructed as part of the old portside area have been preserved. These architectural assets are highly valued by the community with protection formalised in the Maryborough City Plan Wharf Street Precinct Code. Remains of the old timber wharf structures and the working port railway line are still present. At the downstream end is the Brolga Theatre constructed in 2000 as a regional theatre and convention centre for the Fraser Coast Region on a site with magnificent views of the river. The building is styled to reflect the sawmill that previously stood on the site and celebrate its industrial heritage. Other attractions include the Queens Park botanical gardens and the more recently constructed Mary River Parklands, Public Jetty and the Queens Wharf deck built to match one of the original timber wharves overlooking the Mary River.

Queens Park was originally part of the Mary River wharf reserve. In 1865 the Council proposed that all the portion of the Wharf Reserve not required for shipping purposes be gazetted for use as a public garden and for recreation purposes. Major attractions noted at the time

included sweeping views of the Mary River which continue to attract visitors today. The place has social significance as a long used and popular reserve for public recreation. Historical and ongoing social values of the park are recognised by listing under the Queensland Heritage Act 1992. Many of the buildings in the Wharf Street precinct are also heritage listed places under the Act.

The main strategy area was the subject of the 2007 Maryborough 'Bridge to Brolga' Concept Plan adopted by Council. The area includes all of the land under Council control within the Lower River Promenade Precinct identified in the Concept Plan. The Concept Plan identifies some key community issues that include the need for more public infrastructure on the river bank to support recreational activities such as canoeing and fishing and a new outdoor amphitheatre on the river bank adjacent to the Brolga Theatre. Another aspect of the vision is an emphasis on high quality public amenity and viewing opportunities, maximising the outlook, water views and relationship to the key surrounding features, particularly the Brolga Theatre, Queens Park, Wharf Street and the Mary River Parklands.

The Bridge to Brolga Concept Plan identified improvements that could be made to public access through the area and allow increased public utilisation. In particular the activation of the formal pedestrian corridor along the river bank and extension all the way through to the Brolga Theatre was highlighted as a major priority. Currently the pathway terminates in the vicinity of the Rowing Shed and it is proposed to extend this in future to link along the lower river bank to the Brolga Theatre with the wharf Street restaurant precinct. Another pedestrian link is proposed between the Brolga Theatre and Queens Park via a pedestrian bridge across the railway line to extend along the Queens Park terrace to take advantage of views from the Park over the Mary River.

Mangrove communities were largely excluded from the wharf area during 150 years of intensive industrial uses. However since the 1990's mangroves have recolonised this part of the river bank due to the decrease in the intensity of industrial activity. In the Concept Plan it is noted that mangroves in some parts are limiting pedestrian access, visual connections to the water and are a public safety concern. The river and its natural features are noted as a key environmental attraction and one of the major priorities is to develop and implement a Mangrove Management Strategy for the river reach in line with the broad vision of the Concept Plan.

Council is responsible for managing the recreation and open space facilities located on the river bank and must ensure that these comply with Australian Design Standards relative to public safety. Crime Prevention through Environmental Design (CPTED) principles were developed by the Queensland Government to guide local Councils in the design and maintenance of built environments in ways that lessen or prevent the incidence of crime and promote public safety. Relevant issues in the Brolga Theatre to Wharf Street area are encouragement of people to enter and use the area, passive surveillance to ensure that public spaces remain visible to people in adjoining areas who are able to see what is happening, avoiding the creation of hidden places and encouragement for users to care and to act if a safety issue arises.

These principles are incorporated into existing infrastructure by the creation of an inviting and distinctive area of public open space within the Lower River Promenade with connectivity from the adjacent Brolga, Queens Park and Portside areas. The promenade provides pedestrian and cycle access from the Rowing Club through to Wharf St. The promenade is visible over much of its length from the pedestrian path along the edge of Queens Park and the Wharf St footpath in the Portside area. Lighting, access ramps, stairways and street furniture has been installed in particular high use areas including within the vicinity of Queens Wharf and the Public Jetty. Considerable resources are expended by Council towards maintaining the area in terms of lighting, landscaping, cleaning, and rubbish removal. Plantings of trees and shrubs and retention of trees have increased the amenity of the area and are pruned and maintained in line with CPTED principles of avoiding hidden places and allowing for passive surveillance.

Future plantings and maintenance of vegetation will continue to incorporate these community safety principles. Mangrove management will be one component of this activity given the proximity of mangroves to public infrastructure and the fact that mangrove vegetation tends to increase in density and extent from time to time. Areas where mangrove modification is proposed to comply with CPTED principles are within the Boardwalk, Queens Wharf and Public Jetty areas. Sightlines from the bank to the boardwalk, Queens Wharf and Public Jetty will also be maintained as well as views of the river itself.



**Figure 1 Mary River & Wharves circa 1908** (Image sourced from Picture Queensland, State Library of Queensland. This image is free of copyright restrictions)

## **Strategy details**

A major aim of this strategy is to specify how mangrove vegetation will be managed in high use public areas while retaining natural environmental amenity as well as educational and fisheries habitat values. The total strategy area is divided into seven (7) Riverbank Units (RBU's). This includes five RBU's adjacent to the inner city between lower Wharf Street and the Brolga Theatre and two RBU's downstream which are nominated for maintenance of existing Council stormwater infrastructure and as mangrove retention and offset areas. The strategy includes overall objective and descriptions and management actions for each RBU (Section 2).

Some areas of natural mangrove growth within the strategy area are designated for retention to ensure that marine habitat, natural scenic amenity and bank stability are maintained. Other mangrove areas will be managed to maintain public infrastructure such as stormwater outfalls and jetties. It is also proposed to modify mangroves in order to meet community requirements for passive recreation, safe river access and protection of views from various points on the bank. New facilities impacting on mangroves will be limited to those areas designated during the life of this strategy.

It is proposed to develop and gain approval for Site-based Operational Plans for each RBU in the strategy. The operational plans will specify the detail of actual on-ground work that will be carried out to implement the management actions specified for each RBU. They will include details on selective hedging and trimming of lower growing species (i.e. *Aegiceras corniculatum* river mangrove), strategic pruning and trimming of saplings (various species), crown lifting of taller mangrove trees (i.e. *Avicennia marina* grey mangrove) and removal of some plants if required as a last resort (i.e. *Excoecaria agallocha* blind-your-eye mangrove adjacent to high use areas). The operational plans will reflect the general requirements of the 2009 Codes for self-assessable development (MP02 and MP06) and also specify a staged approach for operational works to include a process for input from Fisheries staff. Site-based Operational Plans will also include details of vegetation management and revegetation works to be conducted in mangrove offset areas to increase their effectiveness as buffers.

Once endorsed by Fisheries Queensland the strategy will guide operational work on mangroves in the strategy area and agreed actions identified in the Site-based Operational Plans will be undertaken as self assessable works. The document will be subject to regular review to incorporate new issues as they arise and as the city grows. One such potential issue is the future development of a large 174 hectare area of land adjacent to the river bank in Granville opposite RBU7. The Mary Harbour proposal includes a 2 kilometre long area of riverbank with existing mangroves along its entire length. If the proposal is approved then it is likely that this river bank flood/open space buffer along with the mangroves will come under public management and be included under a revised Mangrove Management Strategy.

The current strategy area includes freehold land owned by Council, reserve land under the trusteeship of Council, road reserve land under the management of Council and adjacent unsurveyed land within the watercourse of the Mary River (Appendix 2). The whole area is subject to flooding and it is acknowledged that individual flood events usually at long intervals have the potential to radically alter the physical form of mangroves in this area. The latest flood event in January 2011 resulted in a significant reduction in mangroves adjacent to the Brolga Theatre (RBU 5) and Queens Park (RBU 4). Mangroves in these areas are unlikely to recover to their pre flood extent for at least four or five years. Larger and denser mangroves further upstream towards the Queens Wharf and the Public Jetty suffered less damage and are likely to recover relatively quickly.

Existing infrastructure within the strategy area includes eight stormwater drain outlets (Appendix 3), a public jetty, a public viewing platform (Queens Wharf), a jetty and pontoon (rowing club), an elevated boardwalk and a waste water disposal outfall. New infrastructure proposed includes an outdoor amphitheatre located on the lower river bank adjacent to the Brolga Theatre (RBU 5) and two new platforms



for the use of sightseers and recreational fishers on the river bank below Queens Park (RBU 4). These are planned to be located in areas where gaps currently exist in mangroves and/or mangrove numbers are currently low. In order to protect these sites for future development it is proposed to control the growth and encroachment of mangroves in these particular areas and maintain present gaps so that the construction of infrastructure in the future will require minimal disturbance to mangroves. These limited areas are detailed in this strategy and gaps in the mangroves will also function to continue to allow public views of the river. All new infrastructure on the river bank will be subject to an assessment process at the appropriate time to with approvals obtained to ensure compliance with applicable legislation.

In addition to the inner city section of the strategy area a mangrove management offset area has been identified (RBU 7). This includes two sites located 1.5 km and 2.4 km downstream from the Brolga Theatre. Mangroves on these sites are located within and adjacent to Council managed land and together include a 680 metre length of riverbank. This area includes the riverbank adjacent to road reserve and Council owned freehold land at the Maryborough Airport and the Aubinville Wastewater Treatment Plant. The intention of Council is to retain and protect mangroves in this area from future development and allow for a landward shift in distribution of mangroves on the site as sea levels rise. This area is intended to function as an offset for mangroves that will be modified in other areas identified in this strategy. The overall effect of retaining mangroves within the offset areas and managing adjacent vegetated buffers will satisfy the requirements of Fish Habitat Management Operational Policy FHMOP 001 to maintain the relative distribution and extent of mangroves.

Four main mangrove species are present in the strategy area. These are *Avicenia marina* grey mangrove which grows up to 10 metres tall on the river edge, *Aegiceras corniculatum* river mangrove which grows up to 4 metres tall along the landward edge, *Excoecaria agallocha* blind-your-eye mangrove which grows up to 14 metres tall on the landward edge and *Hibiscus tiliaceus* cottonwood which grows up to 9 metres tall on the shoreline. Because of the nature of the bank and past modification and historical uses the width of mangrove habitat varies through the strategy area and is often very narrow. The mangrove community within the Brolga to Wharf Street area is better developed at the upstream end where the intertidal zone is at its widest. The tallest mangroves here are *Avicenia marina* grey mangrove with a few up to about 10 metres in height and a stem diameter at 1.2 metres above the ground of about 40 centimetres. Mangroves in the offset areas are generally taller and more abundant as past disturbance has been limited mainly to natural flood events.

Photo reference points have been established for each RBU and an initial series of photographs are saved in Council records (Appendix 1). These will be used as part of the monitoring and evaluation process where photos taken every 12 months will be compared with those taken previously and assessed against the objectives for each RBU. Apart from negotiations between the Council and Fisheries Queensland the strategy will be made available for external public and stakeholder consultation. This strategy has been formulated in recognition of the fact that bank and mangrove conditions may change from time to time. This may require a re-evaluation of mangrove management actions which could take the form of a major review of the strategy to be negotiated between the Council and Fisheries Queensland. Minor changes may be dealt with by agreement between the two parties in an addendum to be added to the existing strategy. It is intended that the strategy itself will be reviewed every three years. Where major works are proposed by Council that do not fit within the codes for self assessable development an application for a development approval is to be lodged for assessment by Fisheries Queensland.

It is anticipated that once the Site Based Operational Plans are approved, mangrove management will commence in the high public use area of RBU2, RBU1 and RBU3 in the vicinity of Queens Wharf, the Public Jetty and the Boardwalk. Work will then proceed in the area of RBU4 and RBU5 in the vicinity of the boardwalk and the Brolga Theatre where required. Revegetation works in the offset areas will also commence once the Site Based Operational Plans are approved.

## **References**

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Matthews, T.1995. *River of Dreams: A History of Maryborough & District*. R & J Mc Taggart and Co. Hervey Bay.

Maryborough City Council. 2007. *Maryborough City Plan*. Jan 2007 Amended Version.

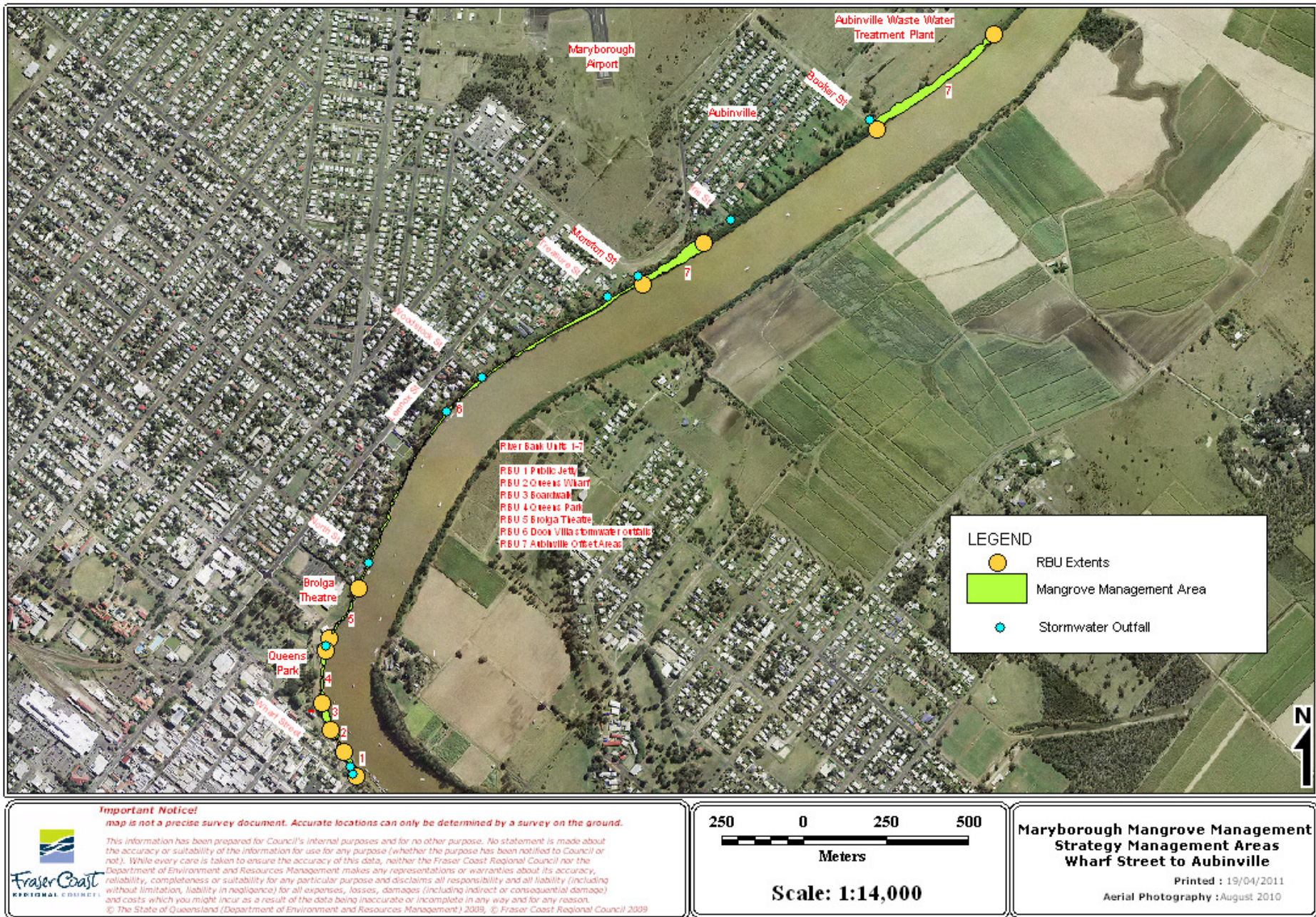
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The State of Queensland. 2007. *CPTED Guidelines for Queensland*: Brisbane. <http://www.police.qld.gov.au/programs/crimeprevention/>

The State of Queensland, Department of Employment, Economic Development and Innovation. 2009. *Code for self-assessable development, Maintenance works on existing lawful structures (other than powerlines and on-farm drains) in a declared fish habitat area or involving the removal, destruction or damage of marine plants*. Code number: MP02 April 2009.

The State of Queensland, Department of Employment, Economic Development and Innovation. 2009. *Code for self-assessable development, Minor impact works in a declared fish habitat area or involving the removal, destruction or damage of marine plants*. Code number: MP06 July 2009.

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Reprint No. 5.



**Figure 2 Map of whole strategy area including seven River Bank Units**

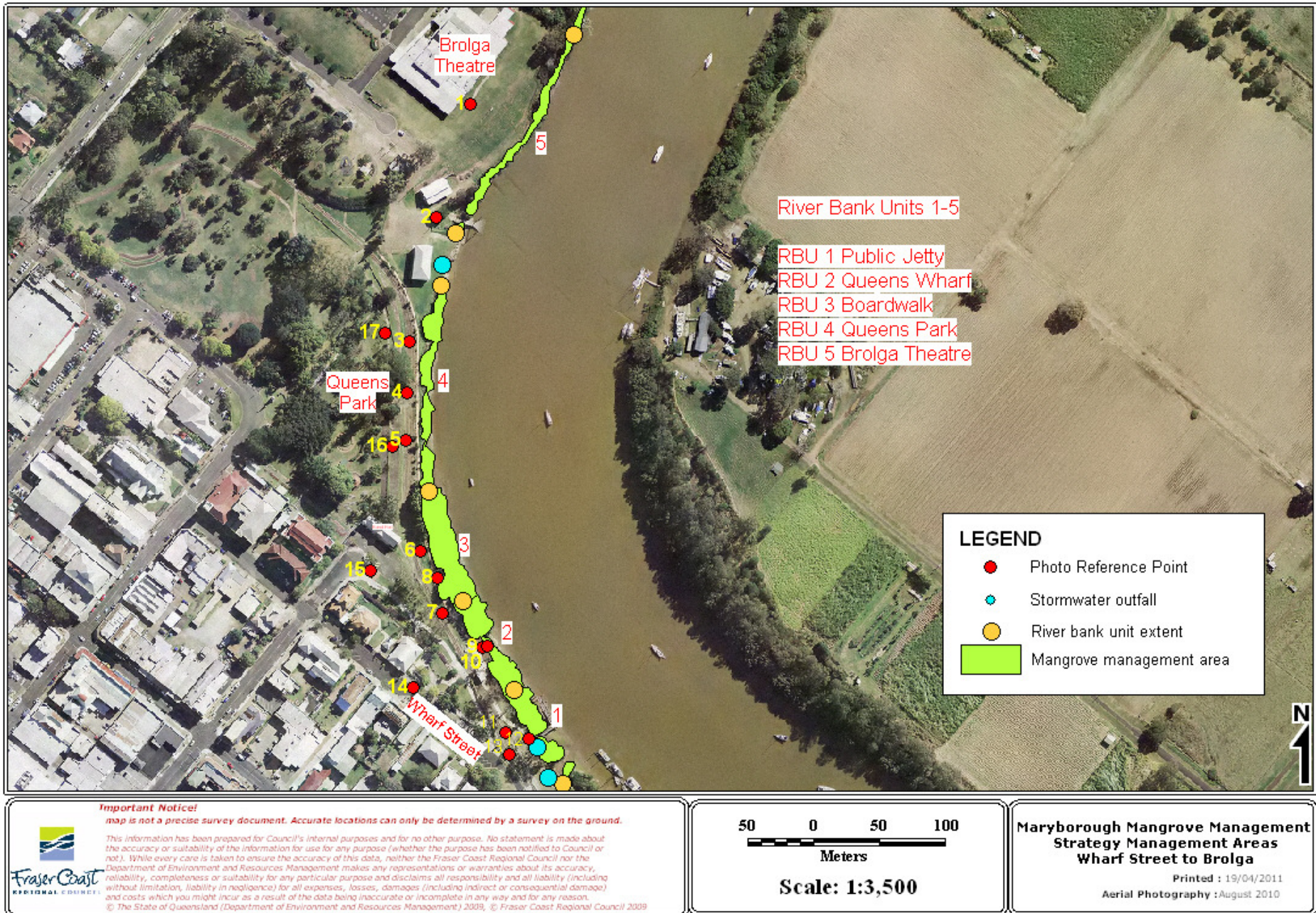


Figure 3 River Bank Units 1-5 from Wharf St to the Brolga Theatre

## Section 2

### Objectives

*Objective 1 – **Monitor extent and height of mangrove growth** to record baseline data, to determine if remedial actions are required to address threatening processes, protected areas are being maintained or enhanced and to determine if mangroves in multiple use zones will need modification i.e. impede infrastructure or sight lines within the following 12 months.*

- 1.1 Take photos from photo reference points every 12 months prior to planning of works in mangrove areas. Take additional photos after each flood event.
- 1.2 Undertake GIS analysis as aerial photography is updated to determine changes in extent of mangrove areas and remap mangrove areas if required to improve accuracy of mapping layer records.

*Objective 2 – **Preserve identified areas of mangroves** to ensure no net loss through protection and enhancement of designated mangrove areas in order to offset losses due to modification and maintenance of views and riverbank amenities.*

- 2.1 Identify areas of natural mangrove growth to be retained.
- 2.2 Aim for nil net loss of mangroves through promotion of growth in natural areas to offset losses due to maintenance, recreation including fishing, boat ramps and amenities and flooding.
- 2.3 Buffer planting of riparian vegetation adjacent to mangrove preservation areas to improve ecosystem function and allow for mangrove colonisation.

*Objective 3 – **Maintain historical amenity sightlines of the river** from key areas of the riverbank as identified in the Maryborough City Plan and the Bridge to Brolga Concept Plan.*

The river and its natural features were noted as a key environmental attraction. A balance will be established between the need to retain mangrove features in their natural form and to provide opportunities for the public to enjoy all of the natural amenity features of prominent locations.

- 3.1 To undertake strategic mangrove management in the following high use public areas:
  - Brolga Theatre building (maintain existing full view of the river from Brolga Theatre upper bank, glimpses from lower bank and mangrove free in the vicinity of the proposed riverbank outdoor amphitheatre).
  - Pedestrian pathway linking Brolga Theatre to Wharf St (maintain existing glimpses of the river from lower river bank edge).
  - Queens Park overlooking bank edge pathway (maintain partial view of the river from upper bank)
  - Wharf Street overlooking bank edge pathway– (maintain partial view of the river from upper bank)
  - Boardwalk adjacent to Queens Wharf – (allow a glimpse of the river from the boardwalk within a defined viewing arc)

- Queens Wharf – (maintain views of the river within a defined viewing arc from the outer edge of the platform, including upstream to Granville Bridge)
- Public Jetty – (provide for views of the public jetty from the river bank)

3.2 A detailed description of works is included in the Site-based Operational Plan for each RBU. All works to be carried out according to these plans to ensure compliance with the 2009 Codes for self-assessable development (MP02 and MP06).

*Objective 4 – **Provide access to river for recreational uses at strategic locations** to ensure liveability and provide economic and social prosperity. This includes access to the river for recreational fishing, tourist visitation and community events.*

- 4.1 Undertake mangrove management adjacent to the pedestrian pathway on the lower river bank edge linking the Brolga Theatre to Wharf Street and retain existing gaps for future viewing and fishing platforms/jetties (Bridge to Brolga Concept Plan).
- 4.2 Undertake mangrove management adjacent to the Brolga Theatre on the lower river bank edge when required to allow for construction and maintenance of an extended walkway and an outdoor amphitheatre (Bridge to Brolga Concept Plan).
- 4.3 A detailed description of works is included in the Site-based Operational Plan for each RBU. All works to be carried out according to these plans to ensure compliance with the 2009 Codes for self-assessable development (MP02 and MP06).
- 4.4 Install educational signage in high use areas where mangroves are retained and managed in order to inform recreational users of mangrove distribution, values and management arrangements. The aim is to highlight the presence of mangroves as a positive and necessary component of a natural and attractive experience of the Mary River bank.
- 4.5 Provide for surveillance of the public jetty and boardwalk from the river bank to ensure compliance with Crime Prevention Through Environmental Design (CPTED) principles.

*Objective 5 – **Protect Council assets and provide access to these assets** by maintaining clear areas around existing and future approved assets including jetties, pontoons, stormwater drain outlets, boardwalk and the outdoor amphitheatre.*

- 5.1 The area subject to works in this strategy is not within a declared Fish Habitat Area however works will involve the removal, damage or destruction of marine plants.
- 5.2 A detailed description of works is included in the Site-based Operational Plan for each RBU. All maintenance works to be carried out according to these plans and in compliance with Code for self-assessable development maintenance works on existing lawful structures (other than powerlines and on-farm drains) in a declared fish habitat area or involving the removal, destruction or damage of marine plants (MP02).

## ***Categories of Mangrove Management***

### **Protect Mangroves – Management Code 'PM'**

Areas where existing marine plant communities are maintained and natural processes, such as further colonisation and marine plant community development, are allowed to occur. These areas benefit from being linked to terrestrial vegetated buffers to provide long-term protection.

### **Restore Mangroves – Management Code 'RM'**

Areas where opportunities to enhance existing marine plant communities exist and actions may be taken to reduce or remove threatening processes to support natural regeneration.

### **Keep Free – Management Code 'KF'**

Existing mangrove-free areas are maintained in that treatment of the bank and maintenance activities need not specifically allow for colonisation of marine plants.

### **Modify Mangroves – Management Code 'MM'**

Areas where impacts to marine plants are minimised while meeting specific public use requirements and may include treatments that remove or modify mangroves. Site-based Operational Plans will identify the most appropriate treatments.

## ***RBU Management Strategies***

### **RBU 1 – PUBLIC JETTY**

**Description** – Public jetty and pontoon area. The jetty and pontoon area is L shaped with mangroves between the end of the jetty and the bank. Dominant species here are *Avicennia marina* grey mangrove, *Excoecaria agallocha* blind-your-eye mangrove and *Aegiceras corniculatum* river mangrove.

**Length – Approximately 75 metres**

**Photo Reference Point Locations -**

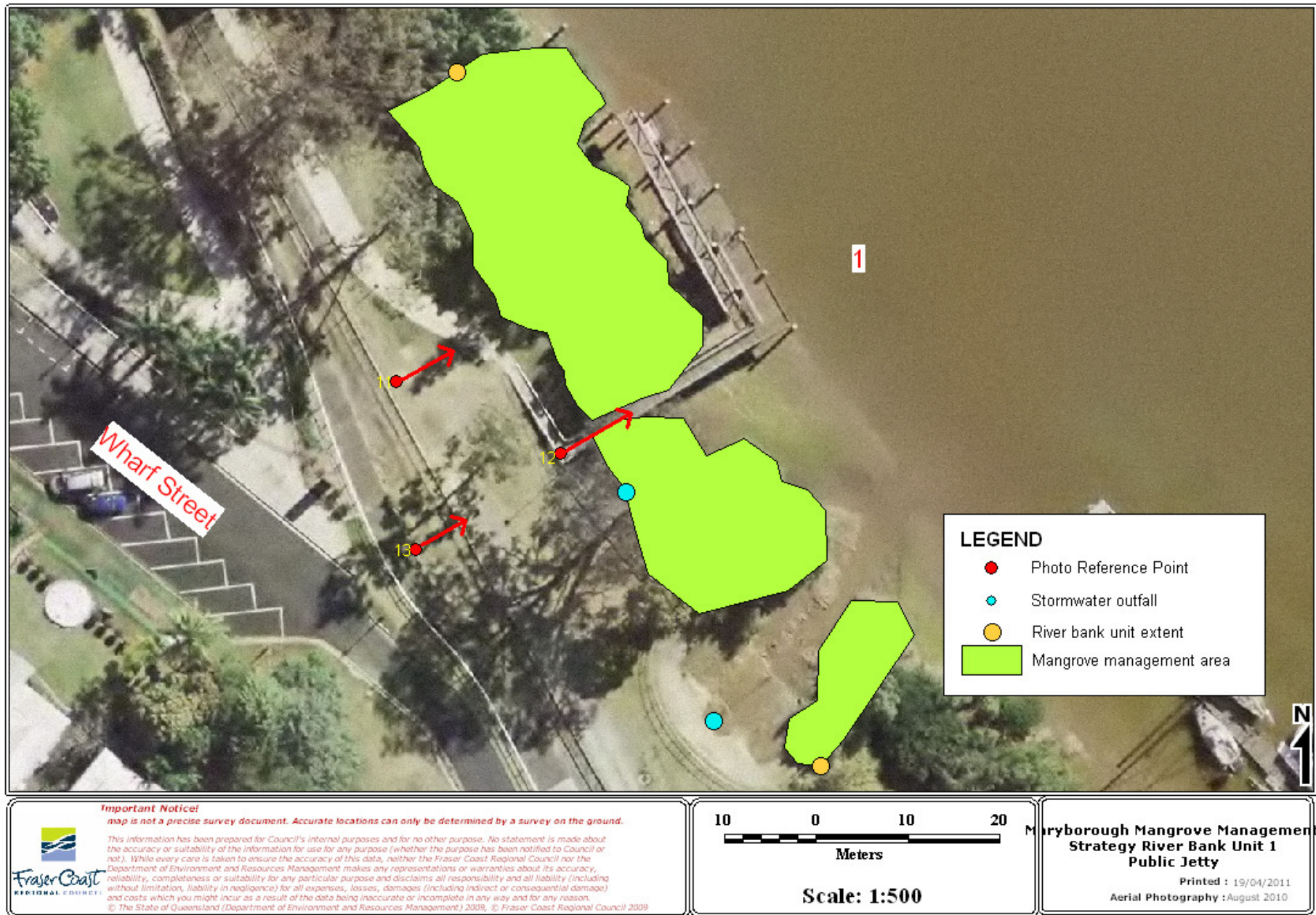
11	470523E 7175314N MGA94 Zone 56	Public Jetty from bank
12	470542E 7175308N MGA94 Zone 56	Public Jetty from bank edge
13	470525E 7175297N MGA94 Zone 56	Opposite Public Jetty from Wharf St footpath

**Summary of Proposed Mangrove Management (% of bank length):** MM 80, PM 20

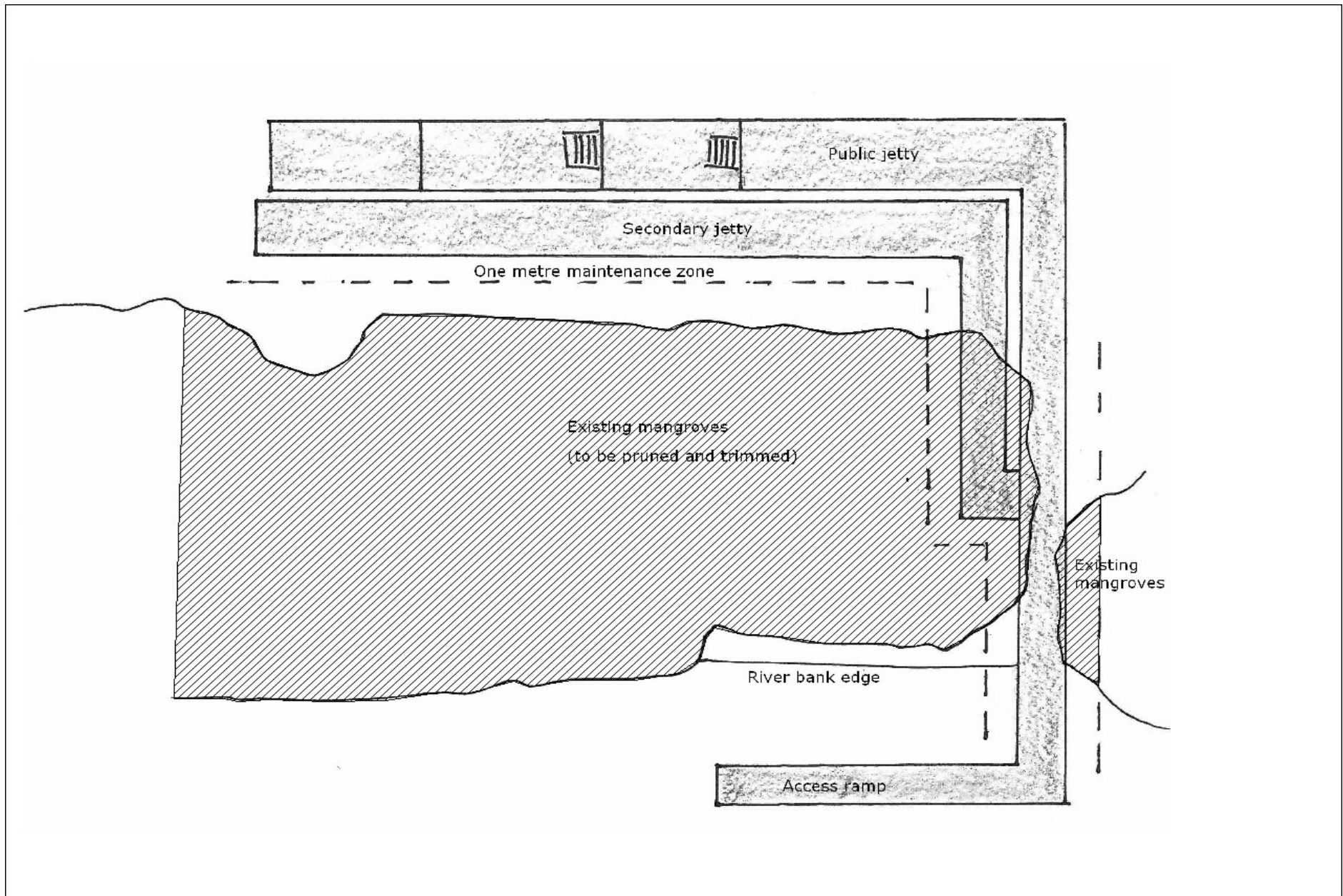
#### **Site Management**

<b>Strategy Objectives Relevant to this RBU</b>	<b>Management Action</b>	<b>Management Code</b>	<b>Priority</b>
<i>Monitor extent and height of mangrove growth</i>	Monitor extent and height of mangrove growth to determine if mangroves will impede infrastructure or sight lines within 12 months.		<b>VH</b>
<i>Provide access to river for recreational uses</i>	Modify mangrove growth by trimming between bank and public jetty to bank level to allow surveillance from bank of jetty and pontoon gangway (Plan 1). Modify individual tall mangroves by pruning to lift crown where possible.	<b>MM</b>	<b>VH</b>
<i>Protect Council assets and provide access to these assets</i>	Modify mangrove growth five metres in front and one metre either side of the stormwater discharge outlets as required to maintain drainage function (Self Assessable Code MP02).	<b>MM</b>	<b>H</b>
<i>Protect Council assets and provide access to these assets</i>	Modify mangrove growth within one metre of the public jetty structure as required for maintenance purposes (Plan 1) (Self Assessable Code MP02).	<b>MM</b>	<b>VH</b>
<i>Retain identified areas of mangroves</i>	Retain mangroves located outside of sightlines and install educational display board outlining the environmental services provided by mangroves and information about what mangrove species are present.	<b>PM</b>	<b>VH</b>





**Figure 4 River Bank Unit 1 Adjacent to Public Jetty and lower Wharf Street**



**Plan 1. Public Jetty proposed mangrove modification hatched (RBU 1)**

## RBUS 2 – QUEENS WHARF

**Description** – Public viewing platform over the rivers edge. Mangroves present dominated by *Avicennia marina* grey mangrove and *Hibiscus tiliaceus* cottonwood. Old tall *Avicennia marina* grey mangroves located either side of the platform are significant because of their size. Mangroves are actively colonising the area on the river side of the viewing platform.

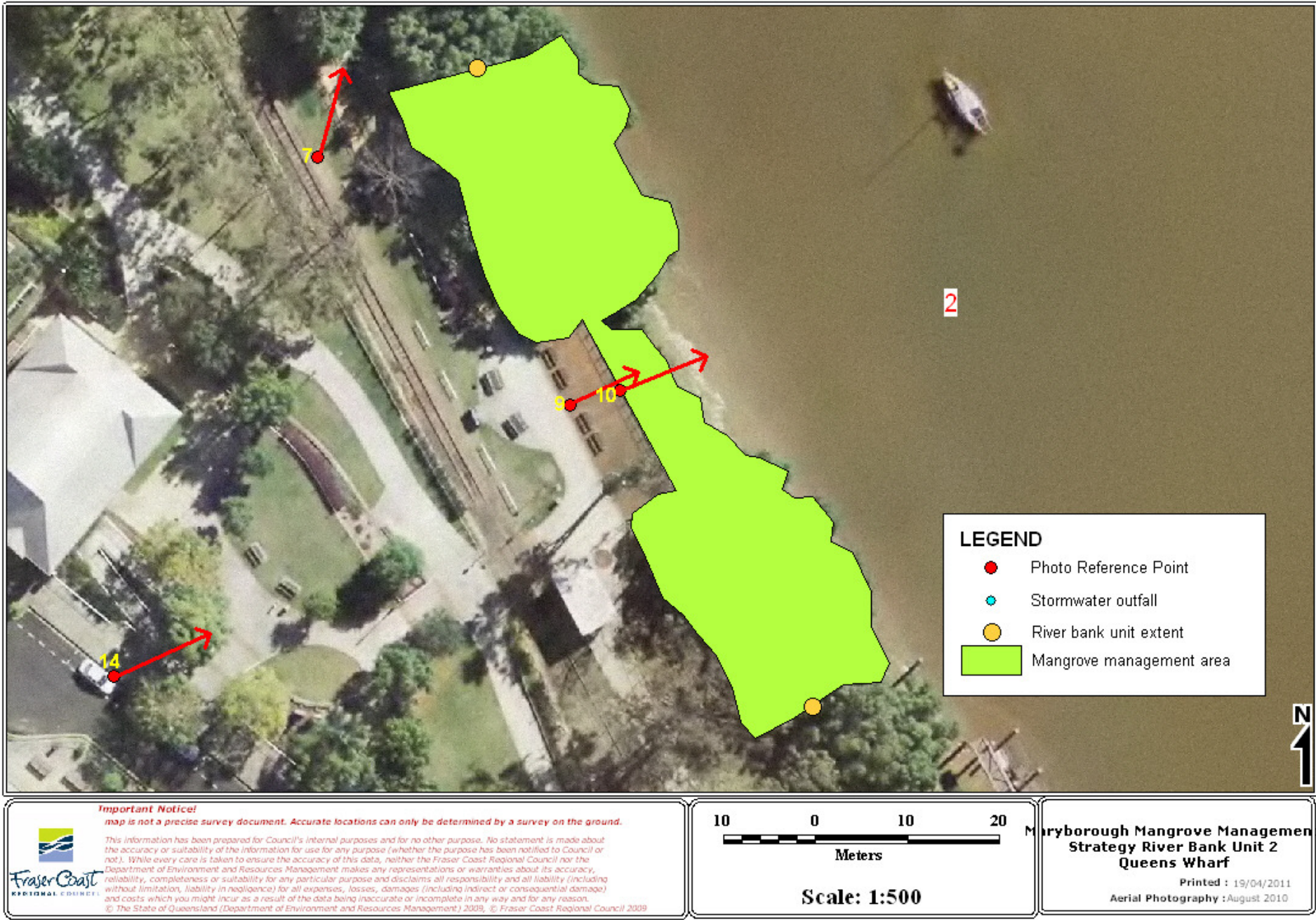
**Length** – Approximately 82 metres

**Photo Reference Point Locations** -      9      470505E 7175378N MGA94 Zone 56      Queens Wharf from bank edge  
    10      470509E 7175379N MGA94 Zone 56      Queens Wharf at waters edge

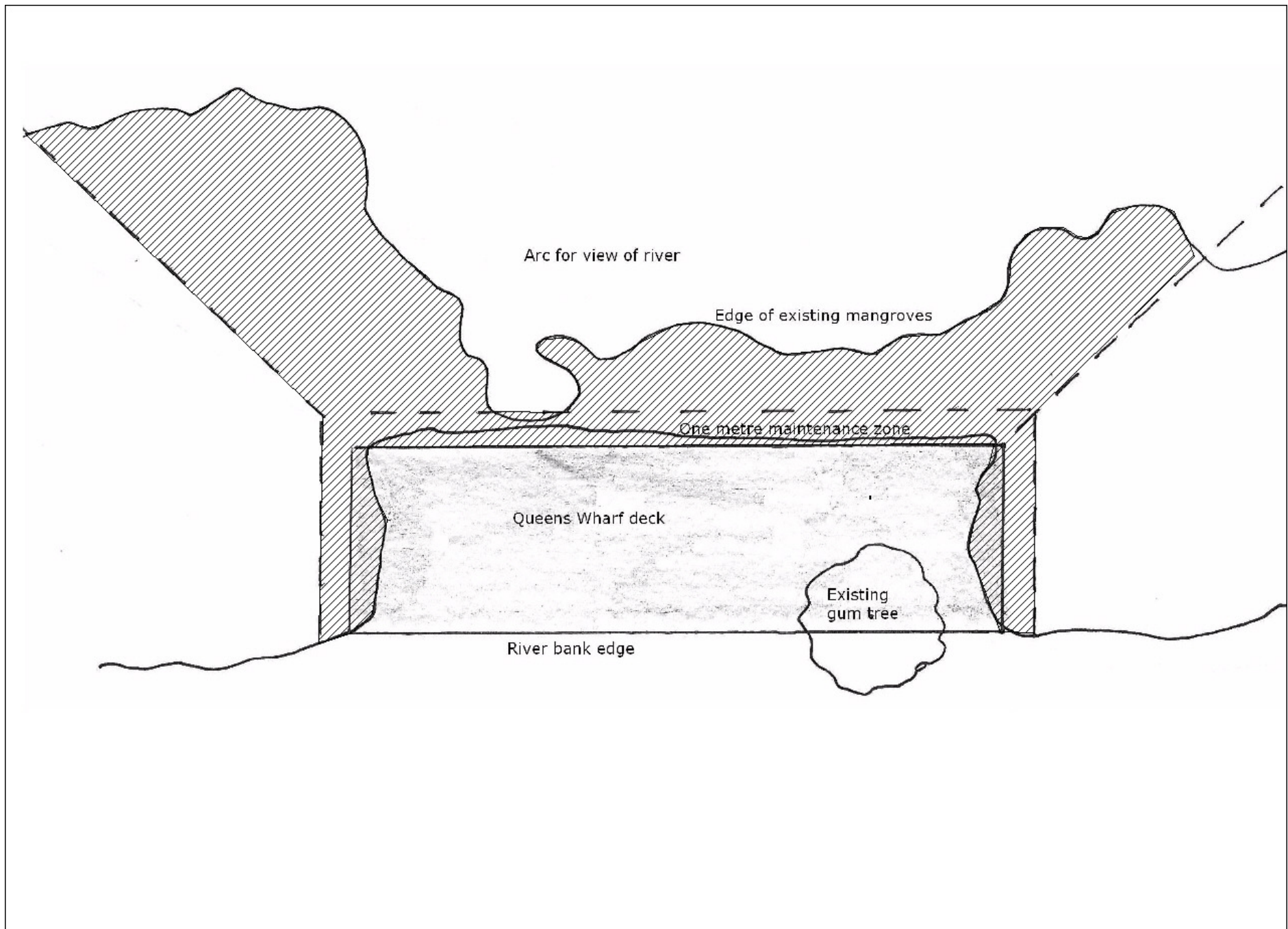
**Summary of Proposed Mangrove Management (% of bank length):** MM 80, PM 20

### Site Management

Strategy Objectives Relevant to this RBU	Management Action	Management Code	Priority
<i>Monitor extent and height of mangrove growth</i>	Monitor extent and height of mangrove growth to determine if mangroves will impede infrastructure or sight lines within 12 months.		<b>VH</b>
<i>Achieve amenity sightlines of the river</i>	Modify mangrove growth by hedging smaller mangroves in a 45 degree arc from front of wharf to achieve sight lines of the river (Plan 2). Crown lift tall old <i>Avicennia marina</i> grey mangroves.	<b>MM</b>	<b>VH</b>
<i>Protect Council assets and provide access to these assets</i>	Modify mangrove growth within one metre of the structure as required for maintenance purposes (Plan 2) (Self Assessable Code MP02).	<b>MM</b>	<b>VH</b>
<i>Retain identified areas of mangroves</i>	Retain mangroves located outside of sightlines and install educational display board outlining the environmental services provided by mangroves and information about what mangrove species are present.	<b>PM</b>	<b>VH</b>



**Figure 5 River Bank Unit 2 Adjacent to Queens Wharf**



**Plan 2. Queens Wharf area proposed mangrove modification hatched (RBU 2)**

## RBU 3 – BOARDWALK

**Description** – Between Excelsior band hall and Queens Wharf, incorporates river walk boardwalk section. Mangrove area here is wider than downstream. *Avicennia marina* grey mangrove and *Excoecaria agallocha* blind-your-eye present. *Hibiscus tiliaceus* cottonwood is dense around the boardwalk. A juvenile *Ficus benjamina* tree is a potential threat to the footings of the boardwalk where it connects to the bank at the upstream end. The river is currently (2010) just visible from the boardwalk.

**Length** – Approximately 87 metres

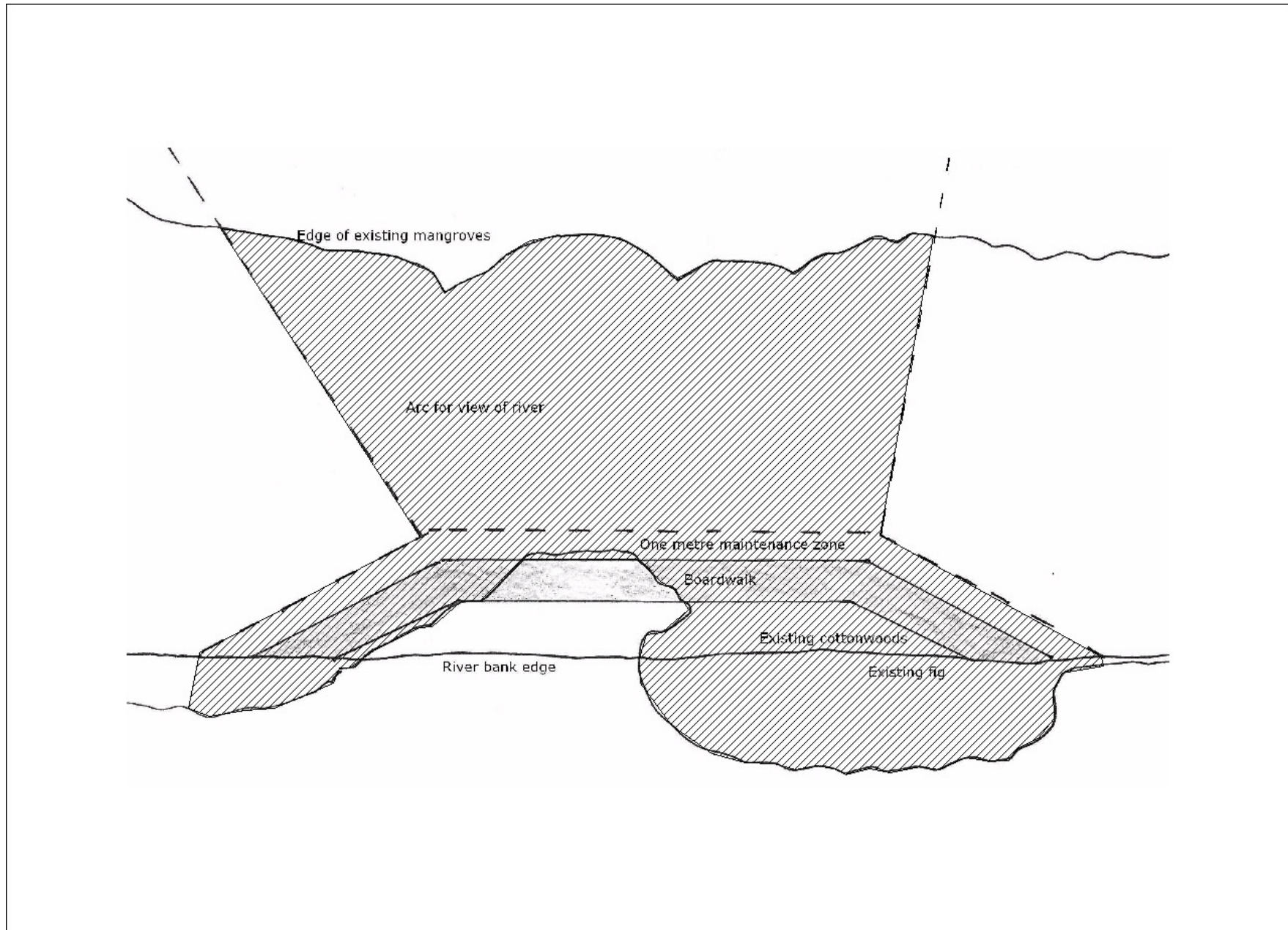
<b>Photo Reference Point Locations -</b>	6	470458E 7175450N MGA94 Zone 56	Downstream end of boardwalk
	7	470475E 7175404N MGA94 Zone 56	Upstream end of boardwalk
	8	470471E 7175431N MGA94 Zone 56	Boardwalk from lower bank
	15	470421E 7175436N MGA94 Zone 56	View from near end of Bazaar St

**Summary of Proposed Mangrove Management (% of bank length):** PM 80, MM 20

### Site Management

Strategy Objectives Relevant to this RBU	Management Action	Management Code	Priority
<i>Monitor extent and height of mangrove growth</i>	Monitor extent and height of mangrove growth to determine if mangroves will impede infrastructure or viewing lines within 12 months. Review photos from reference points.		<b>VH</b>
<i>Achieve amenity sightlines of the river</i>	Modify mangrove growth by hedging smaller <i>Aegiceras corniculatum</i> and <i>Hibiscus tiliaceus</i> adjacent to the boardwalk down to below boardwalk level to enable views of the river within the viewing arc (Plan 3). Modify individual tall mangroves in this area by pruning to lift crown where possible to maintain view.	<b>MM</b>	<b>VH</b>
<i>Provide access to river for recreational uses</i>	Prune <i>Hibiscus tiliaceus</i> between boardwalk and bank to enable passive surveillance from the bank. Remove existing juvenile <i>Ficus benjamina</i> tree and any other terrestrial vegetation necessary on the bank (comply with vegetation protection regulations).	<b>MM</b>	<b>VH</b>
<i>Protect and retain identified areas of mangroves</i>	Retain mangroves located outside of sightlines and install educational display sign outlining mangrove species present and environmental services provided by mangroves.	<b>PM</b>	<b>VH</b>
<i>Protect Council assets and provide access to these assets</i>	Modify mangrove growth within one metre of the boardwalk structure as required for maintenance purposes (Plan 3) (Self Assessable Code MP02).	<b>MM</b>	<b>VH</b>
<i>Selective removal of mangroves</i>	Identify and remove <i>Excoecaria agallocha</i> where there is a potential hazard for pedestrians.	<b>MM</b>	<b>VH</b>





**Plan 3. Boardwalk proposed mangrove modification area hatched (RBU 3)**



## RBU 4 – QUEENS PARK

**Description** – From Sailing Club to Excelsior band hall incorporates lower bank river walk. Mostly narrow mangrove belt at base of old wharf. Species dominated by *Aegiceras corniculatum* river mangrove, *Excoecaria agallocha* blind-your-eye and *Hibiscus tiliaceus* cottonwood. Three gaps in mangroves already partially exist and will be maintained. Good view of river surface from Queens Park currently exists. Mangrove modification will be undertaken only if opportunities to achieve views through the management of terrestrial vegetation have been exhausted. (Note: A boating speed limit sign is located at photo point 5 and mangrove management may be undertaken from time to time in the vicinity by Maritime Safety Queensland).

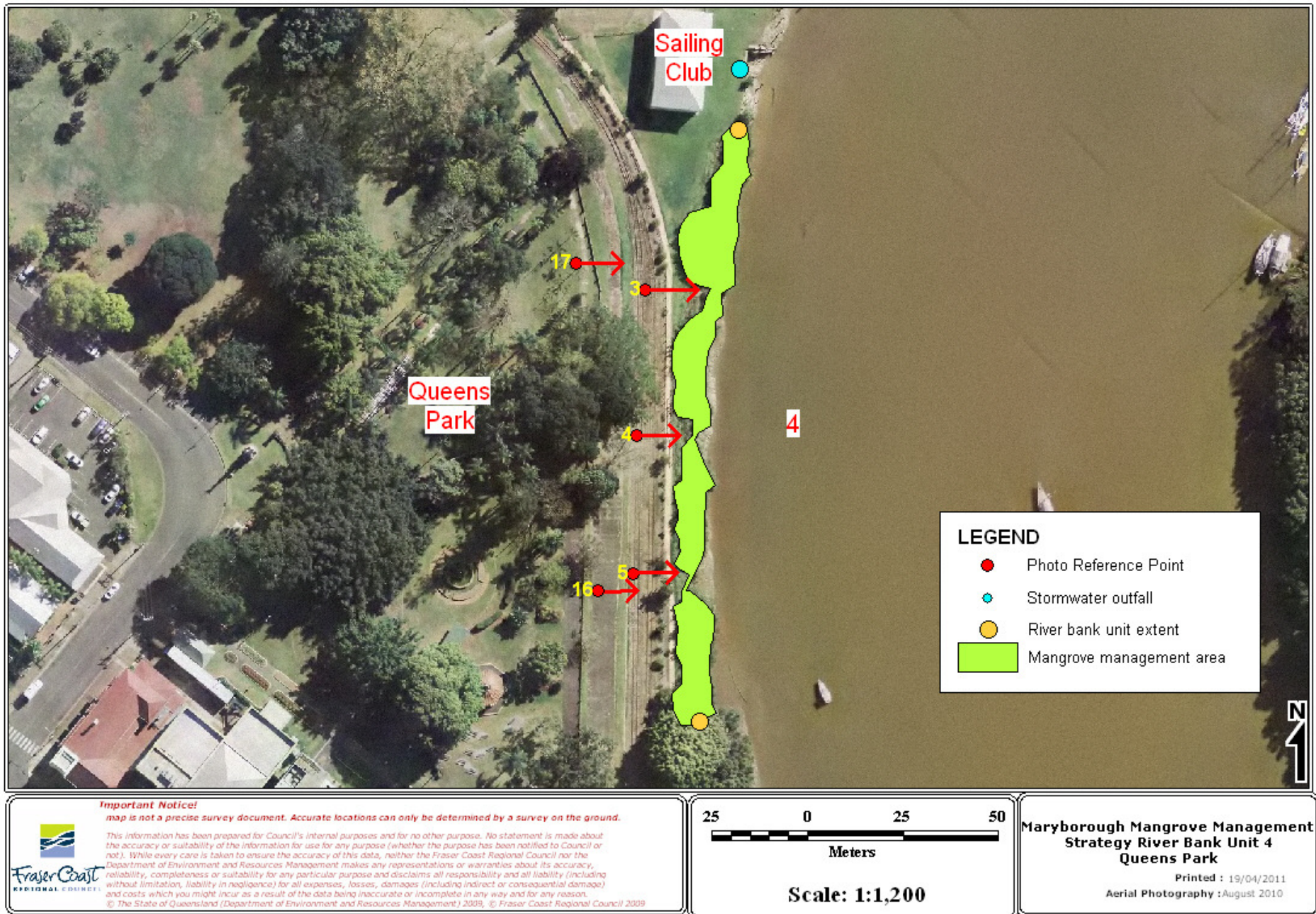
**Length** – Approximately 160 metres

<b>Photo Reference Point Locations</b> -	3	470450E 7175608N MGA94 Zone 56	Gap in mangroves 1
	4	470448E 7175570N MGA94 Zone 56	Gap in mangroves 2
	5	470447E 7175534N MGA94 Zone 56	Gap in mangroves 3
	16	470437E 7175529N MGA94 Zone 56	Queens Park 1
	17	470432E 7175615N MGA94 Zone 56	Queens Park 2

**Summary of Proposed Mangrove Management (% of bank length):** MM 75 MF 25

### Site Management

Strategy Objectives Relevant to this RBU	Management Action	Management Code	Priority
<i>Monitor extent and height of mangrove growth</i>	Monitor extent and height of mangrove growth to determine if mangroves will impede infrastructure or sight lines within 12 months. Review photos from reference points.		<b>VH</b>
<i>Achieve amenity sightlines of the river</i>	Modify mangrove growth by hedging within three existing clear areas (each 12 metres wide) at below bank height to retain current views of both reaches of river from walkway level.	<b>MM</b>	<b>VH</b>
<i>Achieve amenity sightlines of the river</i>	Modify mangrove growth by thinning and trimming to retain a view from Queens Park of at least 50% of the river surface i.e. the area roughly between midstream and the far bank of the river.	<b>MM</b>	<b>H</b>
<i>Protect Council assets and provide access to these assets</i>	When required remove mangroves within two existing clear areas (each 12 metres wide) to allow for construction and maintenance of fishing/viewing platforms (Self Assessable Code MP02).	<b>KF</b>	<b>L</b>



**Figure 7 River Bank Unit 4 Adjacent to Queens Park**

## RBU 5 – BROLGA THEATRE

**Description** – In front of Brolga Theatre and rowing club. Intertidal zone very narrow and scattered mangrove numbers low except at upstream end around rowing club pontoon (located at photo reference point 2).

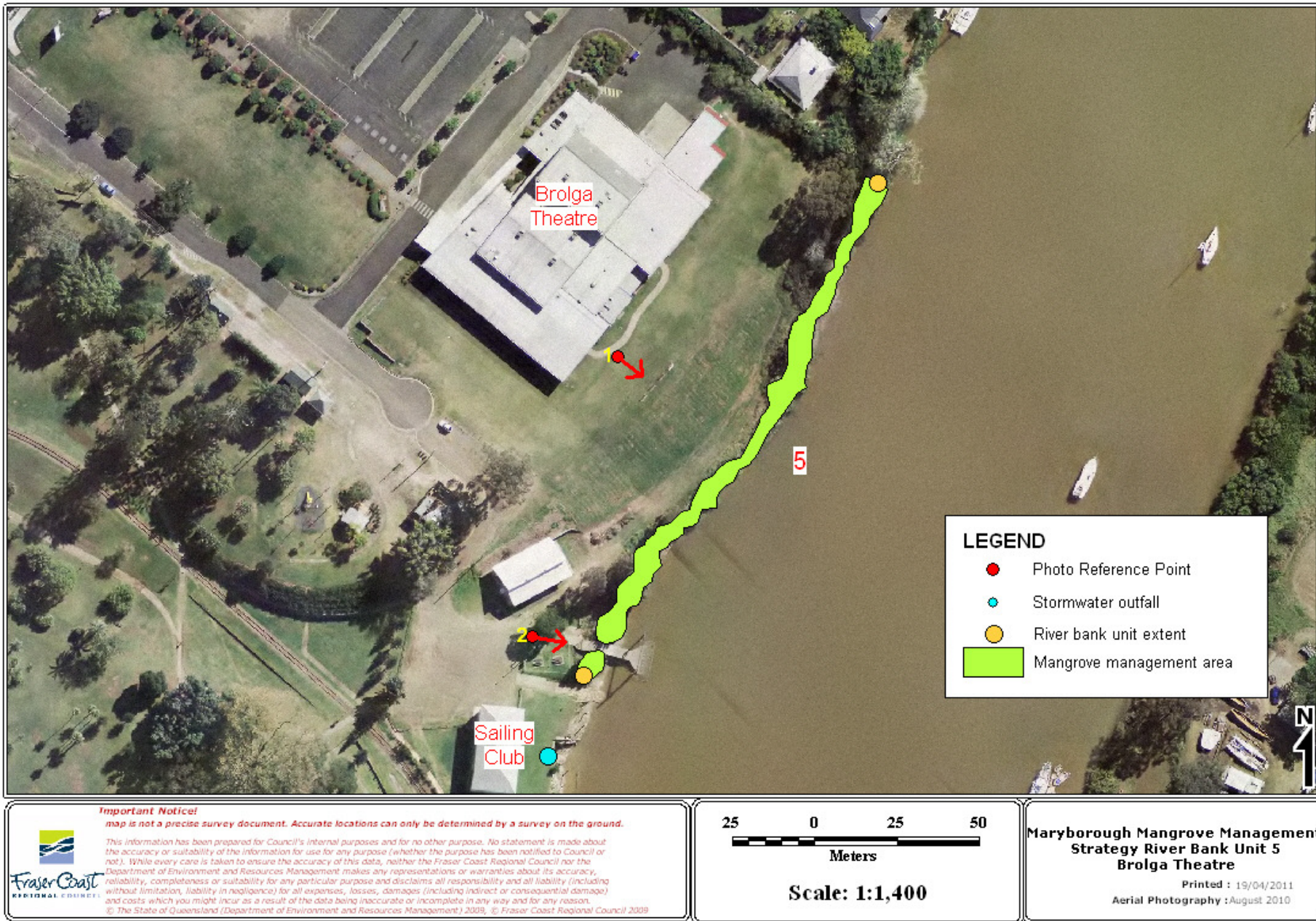
**Length** – Approximately 190 metres

**Photo Reference Point Locations** -     1     470496E 7175787N MGA94 Zone 56     Upper Brolga Theatre bank  
   2     470470E 7175702N MGA94 Zone 56     Rowing Club pontoon

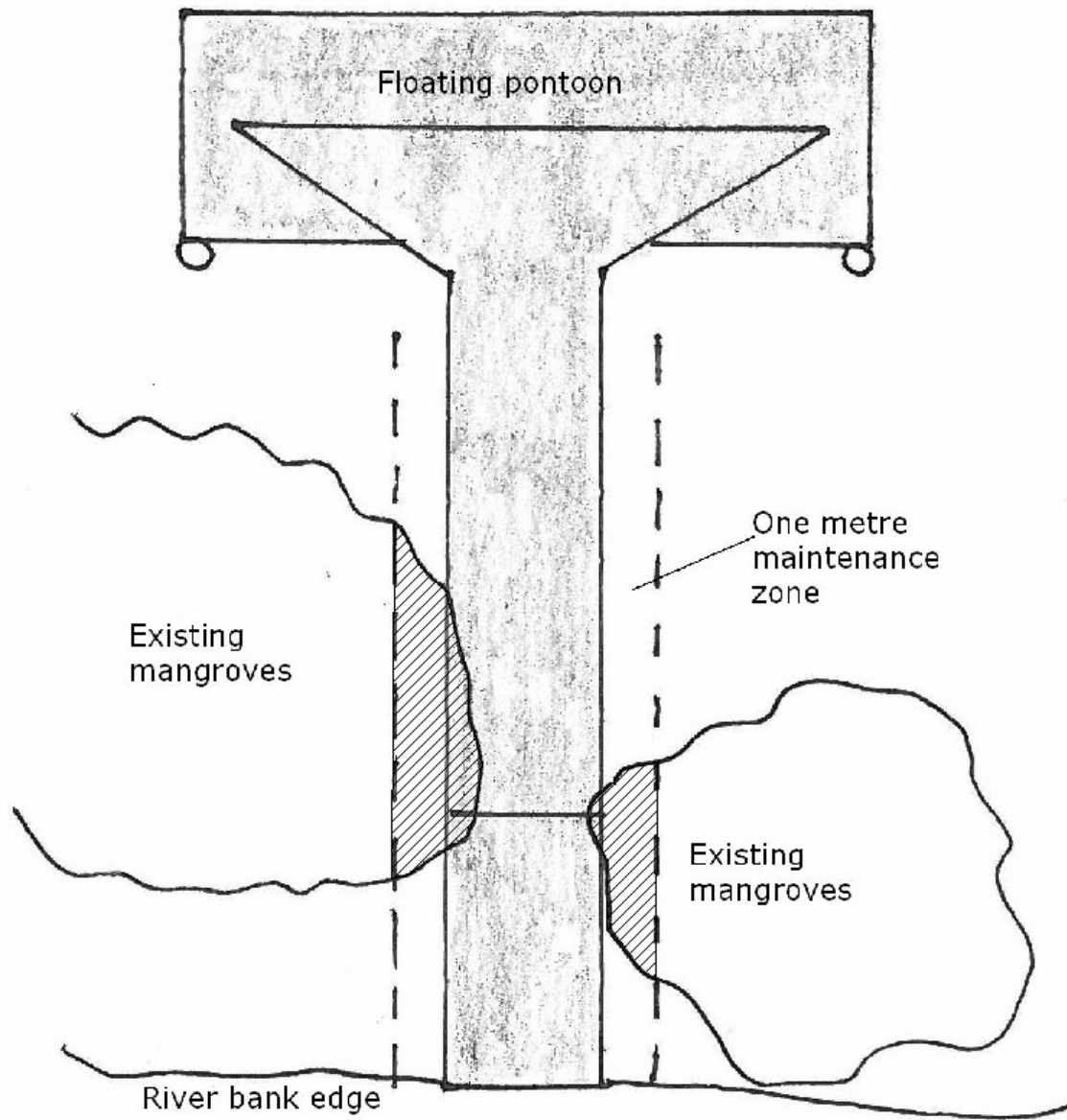
**Summary of Proposed Mangrove Management (% of bank length):** MM - 100

### Site Management

<b>Strategy Objectives Relevant to this RBU</b>	<b>Management Action</b>	<b>Management Code</b>	<b>Priority</b>
<i>Monitor extent and height of mangrove growth</i>	Monitor extent and height of mangrove growth to determine if mangroves will impede infrastructure or sight lines within 12 months. Review photos from reference points.		<b>VH</b>
<i>Maintain amenity sightlines of the river</i>	Modify mangrove growth by thinning and trimming of mangroves to maintain unrestricted view of the river from Brolga level.	<b>MM</b>	<b>VH</b>
<i>Maintain amenity sightlines of the river</i>	Modify mangrove growth by thinning and trimming of the mangrove populations to maintain sight lines of the river from lower bank.	<b>MM</b>	<b>H</b>
<i>Protect Council assets and provide access to these assets</i>	Modify mangroves to allow for maintenance of existing infrastructure consisting of the rowing club jetty and pontoon (Plan 4) (Self Assessable Code MP02).	<b>MM</b>	<b>H</b>
<i>Protect Council assets and provide access to these assets</i>	When required modify mangroves to allow for construction and maintenance of future amphitheatre identified in the Bridge to Brolga Plan (note that the proposed structure is to be located above the bank and only mangrove branches that encroach into this area are likely to be affected).	<b>MM</b>	<b>L</b>



**Figure 8 River Bank Unit 5 Brolga Theatre and Rowing Club jetty/pontoon**



**Plan 4. Rowing club jetty/pontoon mangrove modification area hatched (RBU 5)**

## RBU 6 – DOON VILLA STORMWATER OUTFALLS

**Description** – A narrow fringe of mangroves and other vegetation on a bank which is mostly steep and rocky. This area is mostly not under the control of Council apart from waste water outfall pipes located at the end of North, Woodstock, Treasure, and Moreton Streets and adjacent to Lennox Street. These pipes are located above high tide mark apart from the outfall at Lennox St. Maintenance requirements are minimal however repair of outfalls and aprons will involve limited disturbance to mangroves as allowed for in the relevant code. The main species present are scattered *Aegiceras corniculatum* river mangrove, *Excoecaria agallocha* blind-your-eye, *Avicennia marina* grey mangrove, *Casuarina glauca* swamp oak and *Hibiscus tiliaceus* cottonwood.

**Length – Approximately 1300 metres**

<b>Outfall Locations -</b>	1	470590E 7175915N MGA94 Zone 56	North Street
	2	470838E 7176372N MGA94 Zone 56	Lennox Street
	3	470942E 7176473N MGA94 Zone 56	Woodstock Street
	4	471324E 7176717N MGA94 Zone 56	Treasure Street
	5	471413E 7176780N MGA94 Zone 56	Moreton Street

**Summary of Proposed Mangrove Management (% of bank length):** PM 99 MM 1

### Site Management

Strategy Objectives Relevant to this RBU	Management Action	Management Code	Priority
<i>Monitor extent and height of mangrove growth</i>	Monitor extent and height of mangrove growth to identify and document the area to be protected from future development and restored and to determine if remedial actions are required to address threatening processes to areas being maintained and enhanced.		<b>VH</b>
<i>Protect Council assets and provide access to these assets</i>	Modify mangrove growth five metres in front and one metre either side of the stormwater discharge outlets and aprons as required to maintain disposal function (Self Assessable Code MP02).	<b>MM</b>	<b>VH</b>
<i>Protect Council assets and provide access to these assets</i>	Stormwater section to advise if any upgrades are planned.	<b>MM</b>	<b>L</b>



**LEGEND**

- Photo Reference Point
- Stormwater outfall
- River bank unit extent
- Mangrove management area

**Important Notice!**  
 map is not a precise survey document. Accurate locations can only be determined by a survey on the ground.

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100 0 100 200  
 Meters  
**Scale: 1:7,000**

**Maryborough Mangrove Management  
 Strategy River Bank Unit 6  
 Doon Villa Stormwater Outfalls**

Printed : 18/04/2011  
 Aerial Photography : August 2010

**Figure 9 River Bank Unit 6 Five Doon Villa stormwater outfalls**

## RBUS 7 – AUBINVILLE MANGROVE PROTECTION AREAS

**Description** – This RBU includes two areas of mangroves that are relatively undisturbed apart from natural flood events. Minor modification is evident adjacent to the wastewater outfall pipes. The two sites in this RBU are located 1.5 km and 2.4 km downstream from the Brolga Theatre. Mangrove species include *Aegiceras corniculatum* river mangrove, *Excoecaria agallocha* blind-your-eye, *Avicennia marina* grey mangrove, *Casuarina glauca* swamp oak, *Bruguiera gymnorhiza* large-fruited orange mangrove and *Hibiscus tiliaceus* cottonwood. The protected species *Quassia bidwillii* quassia is present at the Moreton Street end. This species is not a mangrove but is often found in river bank areas including adjacent to mangroves.

**Length – Approximately 680 metres**

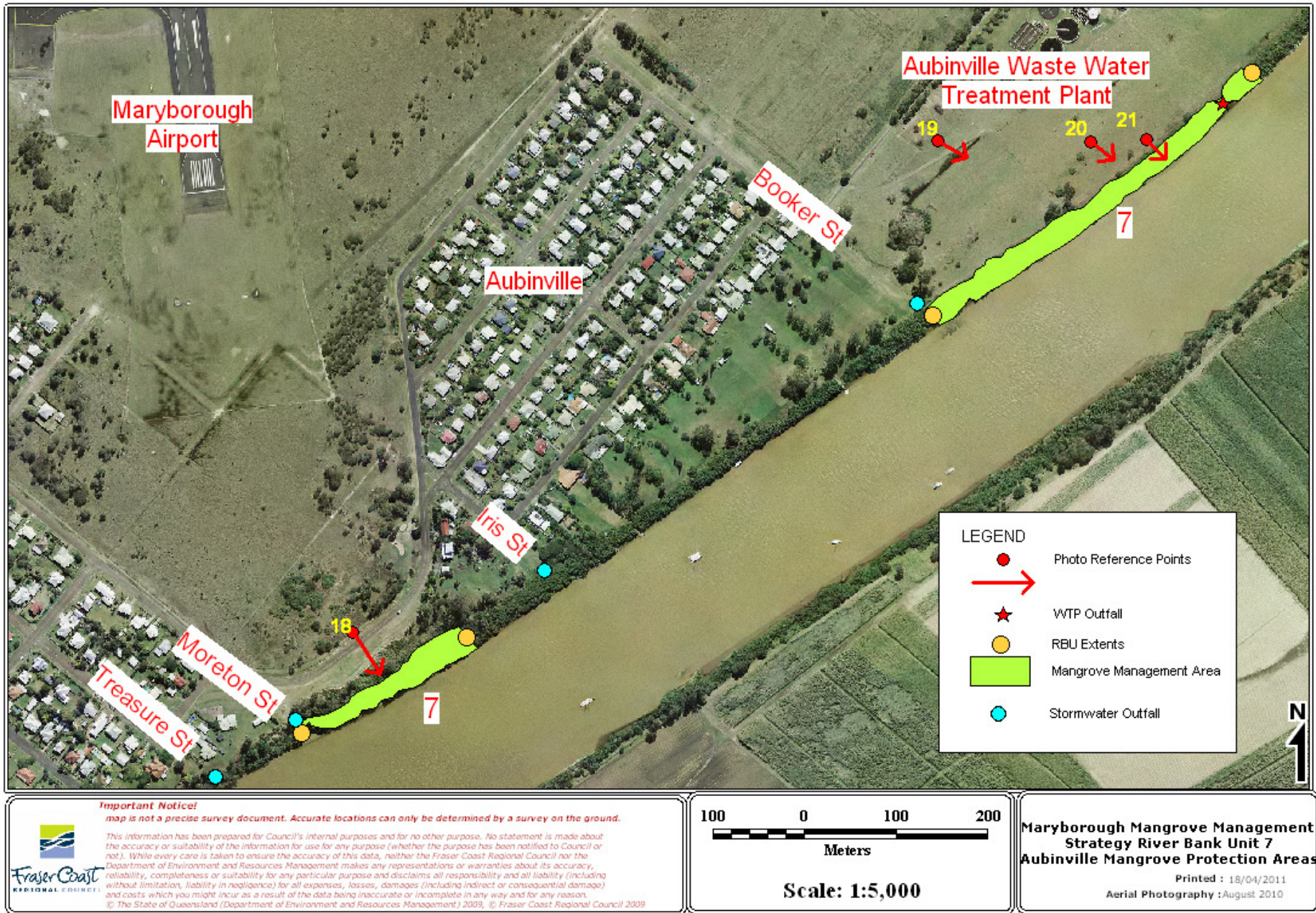
<b>Photo Reference Point Locations -</b>	18	471480E 7176880N MGA94 Zone 56	Moreton/Holbut St
	19	472135E 7177431N MGA94 Zone 56	WTP from upper bank
	20	472307E 7177430N MGA94 Zone 56	WTP from lower levee
	21	472370E 7177432N MGA94 Zone 56	WTP from lower bank

**Summary of Proposed Mangrove Management (% of bank length):** PM 98 MM 2

### Site Management

Strategy Objectives Relevant to this RBU	Management Action	Management Code	Priority
<i>Monitor extent and height of mangrove growth</i>	Monitor extent and height of mangrove growth to identify and document the area to be protected from future development and restored and to determine if remedial actions are required to address threatening processes to areas being maintained and enhanced.		<b>VH</b>
<i>Preserve identified areas of mangroves</i>	Install removable fencing if required to exclude grazing animals from within 20 metres of existing mangroves. Allow natural processes, such as further landward colonisation and mangrove community development to occur.	<b>PM</b>	<b>VH</b>
<i>Preserve identified areas of mangroves</i>	Enhance existing mangrove communities by encouraging natural regeneration, weed control and buffer planting of adjacent terrestrial vegetation where this has previously been removed.	<b>RM</b>	<b>VH</b>
<i>Protect Council assets and provide access to these assets</i>	Modify mangrove growth five metres in front and one metre either side of the wastewater discharge outlets as required to maintain disposal function (Self Assessable Code MP02). Additional mangrove modification within a six metre wide cleared area on the upstream side to allow for vehicle access and outlet maintenance.	<b>MM</b>	<b>VH</b>





**Figure 10 River Bank Unit 7 Two mangrove protection areas in Aubinville**

# Appendix 1 Photo reference points

Photo Reference Point Locations MGA94 Zone 56

1 470496E 7175787N Upper Brolga Theatre bank (RBU 5)



2 470470E 7175702N Rowing Club pontoon (RBU5)



3 470450E 7175608N Gap in mangroves 1(RBU4)



4 470448E 7175570N Gap in mangroves 2 (RBU4)



5 470447E 7175534N Gap in mangroves 3 (RBU4)



6 470458E 7175450N Downstream end of boardwalk (RBU3)



7 470475E 7175404N Upstream end of boardwalk (RBU3)







Downstream



Upstream



Downstream



Upstream

11 470523E 7175314N Public Jetty from bank (RBU1)



12 470542E 7175308N Public Jetty from bank edge (RBU1)





13 470525E 7175297N Opposite Public Jetty from Wharf St footpath (RBU1)



14 470453E 7175348N Opposite Queens Wharf from Wharf St footpath (RBU2)



15 470421E 7175436N View from near end of Bazaar St (RBU3)



16 470437E 7175529N Queens Park 1 (RBU4)



17 470432E 7175615N Queens Park 2 (RBU4)



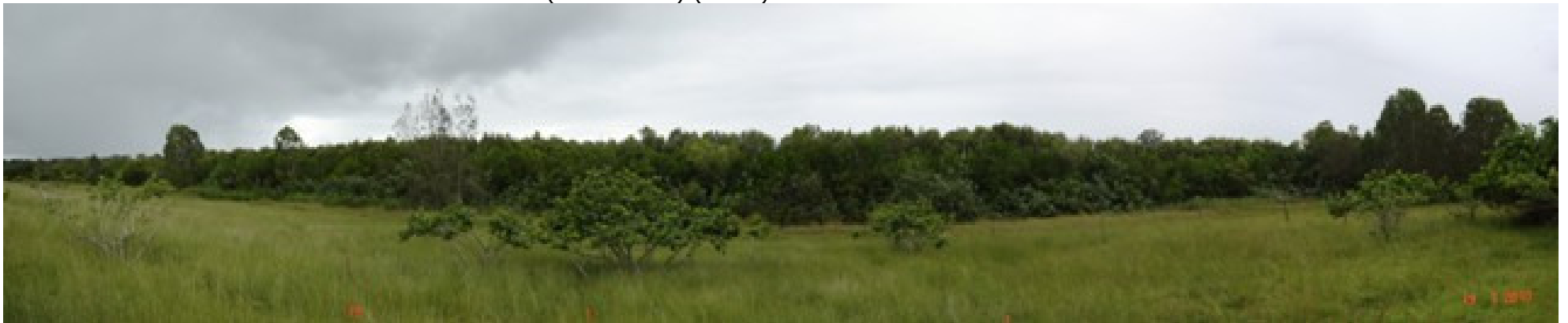
18 471480E 7176880N Aubinville (between Moreton and Holbut Streets) (RBU6)



19 472135E 7177431N Aubinville WTP (upper bank) (RBU7)



20 472307E 7177430N Aubinville WTP (lower levee) (RBU7)





## Appendix 2 List of properties in the strategy area

Watercourse Mary River

2SP214656 (Brolga Theatre, Council freehold)

2SP212864 (Rowing Club building, reserve)

4SP212864 (Rowing Club pontoon, reserve)

8M20307 (Sailing Club building, surrounding open area and boat ramp) private freehold excluded from strategy area apart from maintenance of storm water outfall which passes under the property

1PER4429 (Sailing Club lease area)

286M20339 (Railway, Maryborough Wharf Branch, lands lease)

7SP185926 (reserve at Wharf Street end)

8SP185926 (Queens Wharf, reserve)

9RP74505 (Aubinville waste water treatment plant, Council freehold)

Road reserve between Moreton and Holbut St (entrance road to Aubinville adjacent to Council freehold lot 7SP170865)

Road reserves adjacent to Mary River at end of March Street, Wharf St, North St, Lennox St, Woodstock St, Treasure St, Moreton St and Booker St.

### Appendix 3 Summary of all stormwater outfalls in strategy area

Location	RBU	Description	Elevation	Mangroves
March St	1	~1.5 m d pipe with concrete headwall and apron	Below high tide	yes
Wharf St	1	~1 m d pipe with concrete headwall	Below high tide	yes
North St	6	~ 0.9 m d pipe with concrete headwall and apron	Pipe above high tide - apron to below high tide	Yes adjacent to apron
Lennox St	6	~ 0.5 m d pipe (This outlet may be relocated 40 upstream in future when pipe needs replacing)	Below high tide	yes
Woodstock St	6	~ 0.8 m d pipe with concrete headwall and apron	Pipe above high tide - apron to below high tide	Yes adjacent to apron
Treasure St	6	~ 0.5 m d pipe with collapsed spoon drain below	Pipe and spoon drain above high tide	no
Moreton St	6	~ 0.9 m d pipe with concrete headwall and apron	Pipe above high tide - apron to below high tide	Yes adjacent to apron
Booker St	7	~0.9 m d pipe with concrete headwall – above open unlined drain	Pipe above high tide – drain below high tide	Yes in unlined drain

**Note: Two further outfalls exist in close proximity but outside the strategy area. These are a major outfall from Queens Park entering the river below high tide mark from under the Sailing Club freehold lot and a small outfall at the end of Iris St in Aubinville which is above high tide mark. They will be managed according to the requirements of MP02.**