8. Banksia Beach

8.1 Site description

The Solander Canal to Wrights Creek study area is at the northern extent of the SEMP area along the western coastline of Bribie Island and includes Banksia Beach (refer to Figure 39). The land tenure along the foreshore in this section is mostly esplanade reserve (with freehold land along the banks of Solander Canal).

White Patch is located just to the north of the study area and is of historical significance to Bribie Island residents, as it was the site where Matthew Flinders' ship first landed in 1799. A monument has been erected at Col Fisher Park in recognition of this event.

The northern side of Solander Canal features a concrete sea wall along the entrance with some vacant land and landscaped park directly adjacent (refer to Photo Plate 8-1, Photo Plate 8-2 and Photo Plate 8-3). A small number of mangroves have established along the north-western wall of the canal entrance. To the north of the sea wall is an area of sand bank developed out from the original shoreline.

Beyond this to the north is the Public Environmental Park and Shorebird Sanctuary, which features a beach and bird roosting site that is fenced off to prohibit public access (refer to Photo Plate 8-4). This area is regarded as an important site for wader birds, shorebirds and migratory birds. Inland of the foredunes is a small lagoon. The shoreline has well-developed vegetation north of this protected area. This artificial sand mound on the beach adjacent to Kakadu Beach residential development is identified as a critical roost by the Queensland Wader Study Group (Milton *et al*, 2009). It is known to be used by large numbers of shorebirds on king tides and there are records of the 'rare' beach stone-curlew nesting at this site. This area needs regular maintenance to retain its viability as a roosting site. Access is restricted by fences and signage; however it is reported to have one of the highest rates of disturbance when compared to any other roost studied during the project (Milton *et al*, 2009).

Along Banksia Beach there is some eroded foredune vegetation as well as exposed coffee rock in places. There is also a small area of mangrove dieback on the beach. Some trees have been felled in this area following storm damage. There is an offshore sandbank extending northwards.

The boat ramp at Banksia Beach features a sandbank to the south and beach build-up around the ramp (refer to Photo Plate 8-5 and Photo Plate 8-6) at the time of inspection.

Along the northern extent of Banksia Beach, Council has fenced off an area of the shoreline to restrict public access to the foreshore, and this has assisted the mangroves and groundcover to continue to establish well in this area (refer to Photo Plate 8-7). Adjacent to this fenced-off area is a basketball half-court, toilet block and sewage pump station, and sculpture installation. The sewage pump station is approximately three metres from the fenced-off rehabilitation area. A 750 mm diameter stormwater pipe is south of this infrastructure and fencing.

Wrights Creek forms the northern boundary of Banksia Beach comprises a wide shallow mouth with a small channel running along the eastern side of the mouth (refer to Photo Plate 8-8). Also at the northern end of the beach there is a tidal drain/canal with a weir across its entrance

where it joins Wrights Creek, and a bridge connecting the park areas on each side. Mangroves have established along this canal that is bordered by a revetment wall consisting of vertical corrugated asbestos sheeting and a concrete capping beam. Sand has been placed in areas adjacent to the wall where the corrugated asbestos sheeting has been exposed. Council is aware of the presence of asbestos at this location. Potential health risks are being contained and monitored with a future plan to remove the material at the same time as maintenance works are undertaken in the area.

A Coastal Management District over Land is mapped along the shoreline and some esplanade and park areas in this section (refer to Appendix B).

LEGEND

- Main Road
- Footpath
- Stormwater Pipe
- Cadastral Boundary
- Community Facility
- Foreshore Reserve
- Section 86 Permits
- Jetty/Pier/Pontoon
- Boat Ramp/Works/Access
- Culvert/Bridge/Weir/Groyne/Wall
- Marina/Building
- Channel/Canal
- Dredging Area
- Beach Nourishment
- Seawall

1:5,500 (at A3)

0 25 50 100 150 200 250

Metres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56

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Moreton Bay Regional Council
Shoreline Erosion Management Plan

Banksia Beach - Locality Plan

Job Number	41-22291
Revision	0
Date	FEB 2011

Figure 39

4-6 Innovation Parkway, Birtinya QLD 4575 T 61 7 5413 8100 F 61 7 5413 8199 E W www.ghd.com.au

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Data source: MBRC Quickbird Image and Council Infrastructure, 2009; DERM, Moreton Bay DCDB, 2009, Section 86 Permits, 2010. Created by: S Potts

Photo Plate 8-1 Solander Canal

Source: GHD 21/12/2009 13:30

Photo Plate 8-2 Solander Canal entrance sea wall

Source: GHD 21/12/2009 13:45

Photo Plate 8-3 North of Solander Canal

Source: GHD 21/12/2009 13:46

Photo Plate 8-4 Public Environmental Park and Shorebird Sanctuary

Source: GHD 21/12/2009 13:50

Photo Plate 8-5 Shoreline south of boat ramp

Source: GHD 21/12/2009 13:56

Photo Plate 8-6 Banksia Beach boat ramp

Source: GHD 21/12/2009 14:00

Photo Plate 8-7 Fenced rehabilitation area

Source: GHD 21/12/2009 10:15

Photo Plate 8-8 Wrights Creek canal entrance

Source: GHD 21/12/2009 10:19

8.2 Historical shoreline changes

Reference to the analysis of aerial photography shown in Figures 38 and 39 indicates that in the late 1980s / early 1990s, Dux Creek was heavily modified by the development of the Pacific

Harbour Canal Estate and is now known as Solander Lake. The Solander Lake originally covered an area to the north of what is now the Pacific Harbour canals (approximately where the Voyagers canal northern loop is located). In 1985, Solander Drain was constructed as part of the Solander Lake development to allow for tidal flushing of Solander Lake. In 1989, the Solander Lake development was converted into a canal estate with tidal navigable access via Dux Creek to Pumicestone Passage.

The 1990 aerial photography shows the recent completion of the northern bank of the canal as part of earthworks to widen and realign the creek mouth, and construction of a concrete revetment. At the southern end of Banksia Beach, the modified shoreline closely mirrored the pre-construction shoreline, although the canal construction works moved the creek mouth a small distance north. The photography does indicate that artificial nourishment of the southernmost 500m of the beach (north of the canal entrance) was included as part of the earthworks.

By 1999 an artificial wader bird habitat had been created in the nourishment area, and vegetation had started to stabilise. By 2009, the photography shows that there has been some redistribution of the nourishment sediment further north, but that there is still a significant unvegetated area seaward of the habitat area.

In the centre section of Banksia Beach, the tidal channel passes very close to the beach and the nearshore zone is very narrow, creating a shoreline indentation. The tidal channel is bordered on its western side by a large submerged sand shoal. An assessment of the aerial photography reveals that there has been a slight movement in the position of the tidal channel, with the sand shoal migrating towards Banksia Beach (refer to Figure 40 and Figure 41). It should be noted that minor changes to the shape of the shoal have also been observed, indicating that sediments are being redistributed in all directions. The changes do not appear to be uniform and are the result of the complex interaction of wave and tidal currents. Due to the submergence of the shoal, it is difficult to quantify the migration without survey data, however eastern movement appears to be in the order of 25m over the last 50 years.

The shoreline indentation, located in the vicinity of the intersection of Solander Esplanade and Sunderland Drive, is evident in the 1958 and all subsequent aerial photography, establishing that it is not a recent phenomenon. A boat ramp was constructed close to the southern end of the indentation. South of this area, stabilisation of the shoreline can be observed in photography from 1990 onwards. It is likely that this has been caused by the northern migration of sand from the previously mentioned beach nourishment at the southern end of the beach. The boat ramp and stormwater outlets that cross the beach have acted as small groynes, trapping sediment on their southern sides and confirming that the net sediment transport in this area is towards the north. However, the influence of these structures on the shoreline has been localised, indicating that the sediment transport rates are also quite low.

There is evidence of beach lowering, with the exposure of coffee rock and the root systems of several mature trees. Very small erosion scarps are located in scour pockets along the length of the beach. These scour pockets are generally caused by structures such as stormwater outlets, and eroded banks are exacerbated by uncontrolled pedestrian movements. It is noted that areas that previously exhibited small erosion scarps are now showing significant recovery and vegetation establishment following the erection of fencing. In addition, there appears to have

been some artificial nourishment or beach scraping to protect the erosion scarp close to where coffee rock has been exposed.

On average, the shoreline for the majority of Banksia Beach appears to have receded between 5 and 10m over the record of photography, although this does appear to increase further north along the beach. This recession has not been uniform, and sediment supply to the beach appears to be sporadic and in the form of sediment slugs or pulses. The aerial photography shows that sand supply to the beach is in the form of sand bars which are attached at their landward end to the beach. These sand bars then slowly rotate to become shore parallel where they slowly migrate onshore. There is evidence of this occurring at present along Banksia Beach, with the very small and shallow lagoons that form between the sand bars and the beach providing an ideal location for the establishment of mangroves. These pockets of mangroves can be observed at numerous locations along the beach, and will trap sand as it is transported along the coast. However, this may result in scour pockets as these downdrift areas are then deprived of sediment.

The northern end of Banksia Beach is fronted by a wide nearshore sand flat. Historically, Wrights Creek channel flowed in a southerly direction across this sand flat. Slight migration of the channel is evident prior to 1990, particularly at the edge of the sand flat where Wrights Creek merges with the main tidal channel in Pumicestone Passage. However, by 1990, a small artificial channel had been created to provide a secondary connection between Pumicestone Passage and the Pacific Harbour Canal Estate, presumably to improve water quality in the canal. This connection caused a significant increase in the tidal compartment of the creek, resulting in increased tidal currents within the creek channel. This had the impact of scouring out the channel, accordingly a deeper, straighter and more well defined channel was created.

Start at the same time the artificial channel was created, significant modification of the parkland adjoining the sand flat was made (indicated by the hatch area in Figure 40). All vegetation was removed, and the shoreline appears to have been straightened. Since this time, the shoreline has been reasonably stable, with small localised pockets of erosion and accretion. The aerial photography indicates that the net sediment transport is still to the north in this area, with slugs of sand observable along the shoreline.

LEGEND

Shorelines

1958 — 1975 — 1982 — 1990 — 1999 — 2003 — 2007 — 2009

1:5,500 (at A3)

0 25 50 100 150 200 250

Metres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56

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Moreton Bay Regional Council
Shoreline Erosion Management Plan

Banksia Beach - Shorelines

Job Number	41-22291
Revision	0
Date	FEB 2011

Figure 40

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Data source: MBRC Quickbird Image 2009 and Council Infrastructure, 2009. Created by: S Potts

4-6 Innovation Parkway, Birtinya QLD 4575 T 61 7 5413 8100 F 61 7 5413 8199 E W www.ghd.com.au

LEGEND

Vegetation Lines

1958
1975
1982
1990
1999
2003
2007
2009

1:5,500 (at A3)

0 25 50 100 150 200 250

Metres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56

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Moreton Bay Regional Council
Shoreline Erosion Management Plan

Banksia Beach - Vegetation Lines

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Figure 41

4-6 Innovation Parkway, Birtinya QLD 4575 T 61 7 5413 8100 F 61 7 5413 8199 E W www.ghd.com.au

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Data source: MBRC Quickbird Image 2009 and Council Infrastructure, 2009. Created by: S Potts

8.3 Longshore transport

This section presents details of the potential longshore transport for this particular section of the coastline with both the annual southerly, northerly, and net transport movements shown as well as the seasonal variations. Just as the annual calculations are based on the average wind climate over the period of record for the full 12 months, the seasonal calculations are based on the average wind climate over the period of record for that particular season.

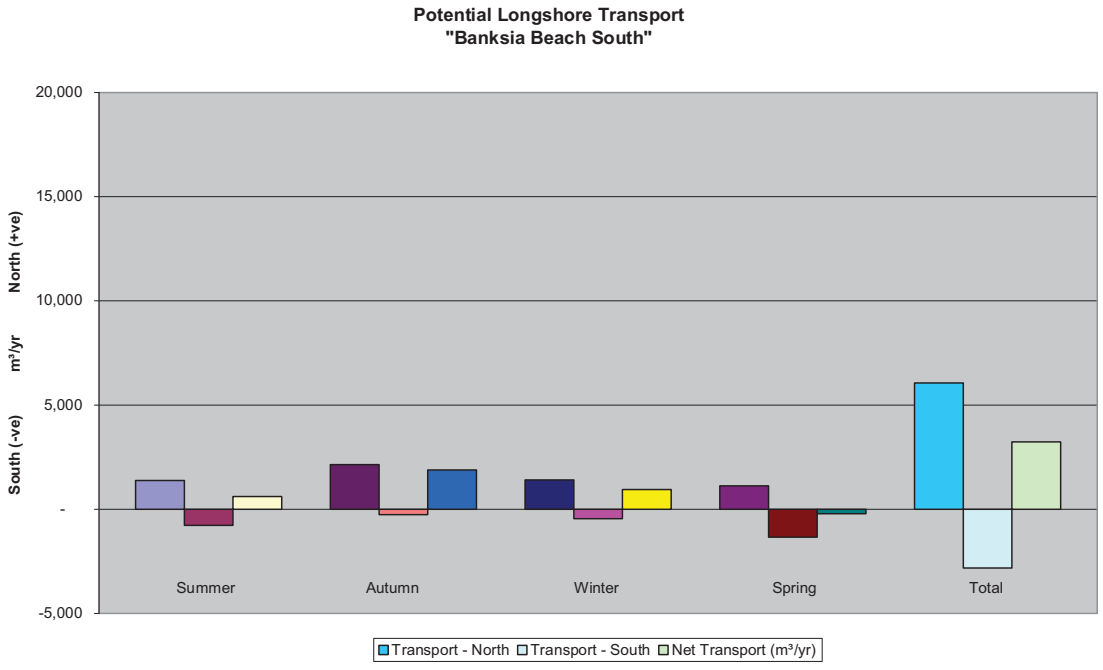
The seasons are defined as follows:

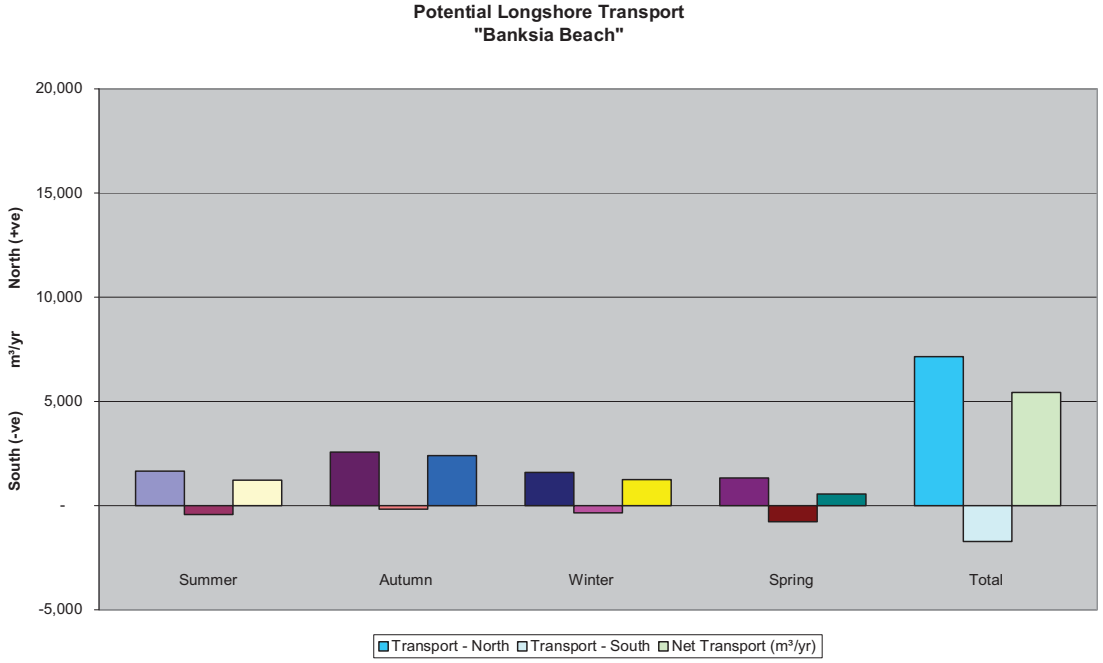
- Summer – December, January, February;
- Autumn – March, April, May;
- Winter – June, July, August; and
- Spring – September, October, November.

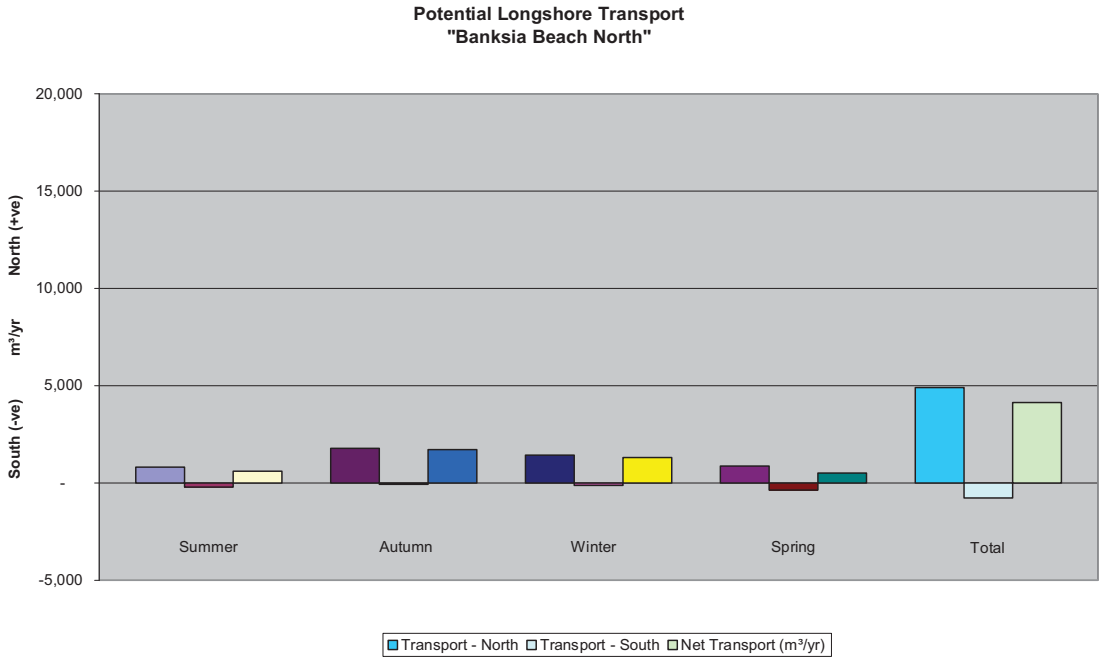
For this section of the coast the following observations can be made (refer Figure 42):

- The transport rates along Banksia Beach are relatively small as this beach is largely sheltered from waves from the south;
- The transport rates are higher than for Sylvan Beach due to the increased exposure to winds from the south-westerly sector; and
- Banksia Beach North is less exposed to the northerly sector than the southern part of the beach and this is reflected in the reduced net southerly transport.

Figure 42 Banksia Beach – Longshore Transport




Potential Longshore Transport
"Banksia Beach"
20,000
15,000
10,000
5,000
-
-5,000
North (+ve)
m³/yr
South (-ve)
Summer
Autumn
Winter
Spring
Total
Transport - North
Transport - South
Net Transport (m³/yr)


Potential Longshore Transport
"Banksia Beach North"
20,000
15,000
10,000
5,000
-
-5,000
North (+ve)
m³/yr
South (-ve)
Summer
Autumn
Winter
Spring
Total
Transport - North
Transport - South
Net Transport (m³/yr)