

The Gold Coast Seaway

The Nerang River discharges into a large tidal waterway called the Broadwater, which is connected to Moreton Bay in the north by a series of tidal channels. It opens to the ocean at the Gold Coast Seaway, which is a trained entrance constructed in 1986. Previously, the entrance to the Broadwater was known as the Southport Bar.

Unstable beginnings

The Southport Bar has a history of northward migration under the influence of longshore drift. (To find out more about this process refer to *Longshore drift* information sheet). The river entrance has steadily migrated northwards at a rate of between 20 and 40 metres per annum. It was located at Surfers Paradise in 1840 and entered the ocean just south of SeaWorld's present location in 1924. This ongoing movement has progressively eroded South Stradbroke Island.

The entrance has also varied in depth and width, creating hazardous navigational conditions and resulting in a significant number of boating accidents. This was an impediment to the recreational and commercial development of the Gold Coast, see Box 1.

Design

Planning and design of the Gold Coast Seaway was informed by the nation's longest reliable records of wave and coastal data, which was collected by the Beach Protection Authority. It was also based on four key modelling studies:

- ◆ Entrance layout
- ◆ Structural stability of training walls
- ◆ Wave penetration
- ◆ Discharge of treated sewage effluent

Box 1. A town lost...



A plan prepared for a 1934 land sale at Moondarewa—Queensland State Archives. Use of the Estate map of Southport East was approved with permission of the Department of Environment and Resource Management, Queensland 2011.

Moondarewa was a coastal town established on Stradbroke Island, as evidenced on 1880 cadastres.

In 1984 it sat in the centre of the Southport Bar, lost forever to the volatile Nerang River entrance. This is a clear illustration of the obstacle that the untrained Bar presented to development of the Broadwater and adjacent land.

Sand bypassing:

Moving sand (either mechanically or hydraulically) from one area to another across a barrier to natural sand transport (e.g. harbour).

Construction

There were six key components of the project:

Training walls

- ◆ Approximately one million tonnes of imported rock
- ◆ Two layers of 20 tonne concrete cubes armoured with rock of sizes up to 15 tonnes (25 tonne cubes used at the exposed head of each training wall)
- ◆ 4,500 cubes used in total

Dredging

- ◆ 4.5 million cubic metres

Closure of the old entrance

- ◆ Undertaken by three dredges

Sand bypassing system

- ◆ Ten jet pumps positioned 11 metres below mean sea level at 30m intervals along a trestle, which extends 490 metres into the sea
- ◆ 250 metres south of the Seaway entrance

Revegetation

- ◆ 70 hectares across South Stradbroke Island and Wave Break Island

Sewage outfall

- ◆ 10 separate diffuser pipes 30 metre centres along the northern entrance training wall

Operation

- ◆ Up to 500 cubic metres is pumped across the Seaway per hour
- ◆ The sand bypass system runs up to five days per week on an as-needs basis, with the capacity to run unattended overnight and continuously at peak capacity if required
- ◆ It typically operates on a combination of any four to seven pumps

Design facts

- Objective: To stabilise the entrance channel to the Broadwater, with minimal impact on the adjacent coastline
- Cost: \$A50m
- Timeline: 1981—Broadwater Plan released
1984—Training walls constructed
1985—New entrance constructed, old entrance closed off
1986—Completion, officially opened May 31



Aerial view of the Gold Coast Seaway (Source: Skyepics 2011)

Today, the Gold Coast Seaway facilitates safe transit between the Broadwater and the ocean for recreational and commercial vessels.

An improvement in water quality due to increased tidal exchange has enhanced biodiversity in the Broadwater. The Broadwater also has a greater capacity for flood relief. New clearance provides a minimum depth of 4.6 metres at low tide.

The sand bypassing system, ongoing dredging and construction of Wave Break Island have ensured that the entrance to the Broadwater was stabilised without detriment to surrounding beaches.

References:

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