

# Northern Gold Coast Beach Protection Strategy: Improving beach width

The primary objective of the Northern Gold Coast Beach Protection Strategy (including the Narrowneck Artificial Reef) was to widen the beach and dunes to accommodate storm erosion and sea level rise.

Narrowneck is a stretch of coastline between Surfers Paradise and Main Beach. The name Narrowneck refers to the narrow stretch of foreshore between the surf and the Nerang River (Figure 1). It has a history of high levels of erosion during storm events. In 1999 construction of an artificial reef began at Narrowneck as part of the Northern Gold Coast Beach Protection Strategy. The reef was completed in 2000.



Figure 1. Narrowneck mid-1950s (Source: GCCC)



Figure 2. Salient visible in an aerial photograph (Source: Google Maps, 2009)

## How the Northern Gold Coast Beach Protection Strategy Works

As part of this strategy, the beach at Narrowneck was nourished with over one million cubic metres of sand. This sand was largely dredged from Marine Stadium, to the North. A temporary pipeline was placed down Seaworld Drive and through the dune corridors to facilitate this process. The artificial reef was designed to decrease wave energy and thus the potential for storm waves to strip the newly placed sand off the upper beach. Specifically, this occurs when waves break and dissipate across any submerged structure. This coastal control structure also traps sand moving along the coast, creating a build up of sand on the beach to the south of the reef (refer to *Longshore drift: Coastal process on the Gold Coast information sheet*). This creates a salient (bulge) where the coastline is protected by the reef, as is evident in Figures 2 and 3.

Figure 3. Salient visible in Digital Timex image captured 27 September 2010 by Coastal Coms



Extensive digital imagery, hydrographic survey and observational monitoring tells us that beach widening has been achieved. Since construction, the beach at Narrowneck has widened by about 40 metres, and maintained this width for over a decade (Figures 4 and 5).



Figure 4. Beach profile at Narrowneck in 1996, before artificial reef construction (Source: GCCC)



Figure 5. Beach profile at Narrowneck in 2010, a decade after artificial reef construction (Source: GCCC)

### The Verdict

The beach shape at Narrowneck appears to have reached an equilibrium (or ideal) because it responds naturally to and recovers from storms. Some erosion is expected in extreme events; however, when this occurs the reef is expected to help the beach recover in months, rather than years, see Figure 6.



Aerial view of the reef looking south along the coast (Source: Skyepics 2011)

Since the reef was established, the A-line Sea wall—our coastline’s last line of defence—has not been exposed. Narrowneck Artificial Reef, a major part of the Northern Gold Coast Beach Protection Strategy, has been validated in the scientific community as a success.

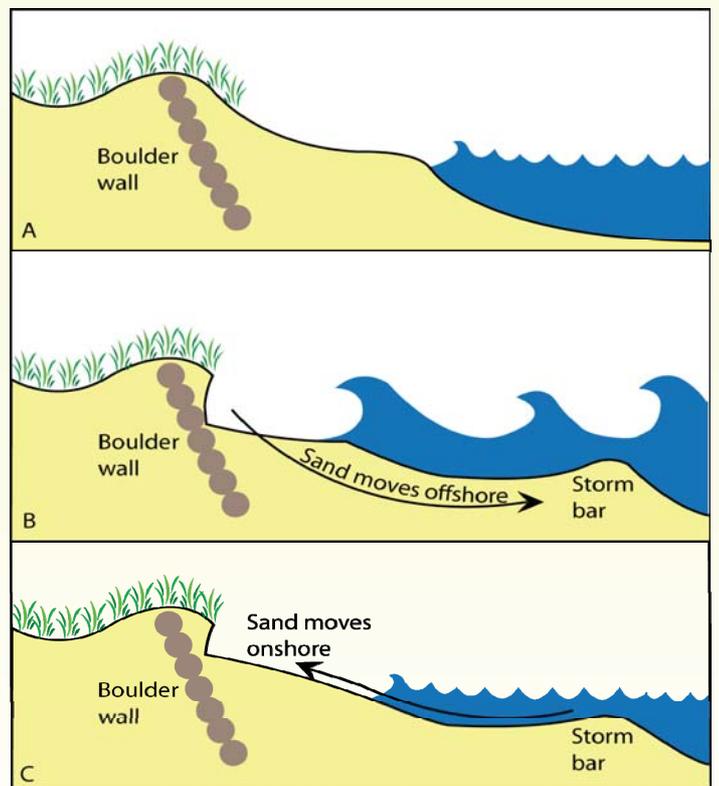


Figure 6. Beach erosion and accretion  
 A) Normal beach profile  
 B) During storm conditions, larger waves result in sand eroded from the beach and the formation of a storm bar  
 C) During calm conditions, sand from the storm bar is transported back onto the visible beach

Reference  
 1. DELFT 1970. *Coastal erosion and related problems Gold Coast, Queensland, Australia: Conclusions and recommendations, Vol. 1*, DELFT Hydraulics Laboratory, The Netherlands.