Reconstructing Cardwell
Erosion Protection and Beach Nourishment Information Sheet

Why do we need an erosion protection structure and beach nourishment?

Protection of the natural environment along the Cardwell foreshore and the Bruce Highway through Cardwell is critical and will preserve the town’s infrastructure, amenity and access.

An erosion protection structure needs to be constructed on the eastern side of Victoria Street to protect the highway and natural environment and form a barrier against coastal erosion. An erosion protection structure in this location will need to be:

- a flexible structure that can adapt to changing conditions during a storm event
- resilient and capable of withstanding very strong storm events
- relatively easy and cost effective to maintain and repair.

The foreshore and beach at Cardwell is an iconic feature of the Cardwell landscape and a valuable community asset. The foreshore needs to be rebuilt to return our community’s iconic feature. This will be achieved through sufficient sand replacement that will nourish the beach and reinnate a natural dune and beach system. It will also ensure that:

- a foreshore is created for the development of amenities such as a shared pathway, picnic and recreation facilities
- a natural beach area is available for community use
- natural coastal processes on Cardwell beach can continue with minimal interference from man-made structures which can cause accelerated erosion in adjacent areas
- a natural buffer is provided against erosion from future storm events.

The erosion protection structure and sufficient beach nourishment will work together to provide a high level of resilience. There will be a high level of protection for the highway and natural environment, as well as high beach amenity and an improved foreshore. In the event of a future storm the beach nourishment provides a buffer to protect the foreshore and highway, and is able to recover naturally as shown in the natural beach evolution series of diagrams (refer to the diagram on the inside of this document)

Operation Queenslander

The Department of Transport and Main Roads is working together with Cassowary Coast Regional Council to deliver reconstruction of Victoria Street (Bruce Highway) and the Cardwell foreshore, as part of Operation Queenslander.

Operation Queenslander is the largest reconstruction effort in Queensland’s history, rebuilding communities, fixing infrastructure and restoring regional economies after flooding and cyclone events in 2010/11.

The project is part of the Cardwell Esplanade and Marine Infrastructure Recovery (CEMIR) project which is also responsible for rebuilding jetties at Clump Point and Dunk Island.

Cardwell sustained significant damage when Tropical Cyclone Yasi crossed the Queensland coast in February 2011. Tropical Cyclone Yasi eroded significant areas of the beach and foreshore, devastated the dunal vegetation, severely damaged council park infrastructure, and destroyed a section of the eastern side of the Bruce Highway known as Victoria Street.

The Reconstructing Cardwell project will:

- reconstruct a 1.4 km section of the Bruce Highway (Victoria Street)
- construct a buried erosion protection structure (rock wall) to protect the road and natural environment from future natural disasters
- reconstruct the foreshore along the Cardwell esplanade.

This project aims to provide:

- a safe, reliable and more efficient road for motorists, pedestrians, cyclists and transport operators
- a road and natural environment that is more resilient to future natural disasters
- infrastructure that aligns with the future vision for the Cardwell community.

This work is being delivered under the Natural Disaster Relief and Recovery Arrangements (NDARRA), a joint federal and state initiative. Under NDARRA, the Australian Government provides 75% of the funding, with 25% from the Queensland Government.

Why do we need an erosion protection structure?

There are certain fixed elements that must be delivered with the NDARRA funding as part of the Reconstructing Cardwell project and as part of the guidelines set by the Queensland Reconstruction Authority.

These guidelines specify that:

- existing infrastructure must be reconstructed to meet current minimum design standards
- infrastructure (transport and marine) must be protected from further damage that could be sustained during a similar future weather event.

An erosion protection structure (rock wall) will ensure the road and natural environment will be more resilient to future natural disasters.

What happens to the beach and the road without an erosion protection structure?

Provision of an erosion protection structure is a fixed element of the Reconstructing Cardwell project that must be delivered with the NDARRA funding.

If an erosion protection structure is not provided, the highway and natural environment will be at risk from future major storms. This means there would be no “last line of defence” to protect the highway and natural environment. Damage, similar to what occurred during Cyclone Yasi, could occur again.

Beach nourishment alone will provide protection to the highway in normal weather conditions and in less severe storms. However, over time beach erosion will occur and without ongoing maintenance will provide progressively less protection for the highway. The highway will also be at risk in severe storm events like tropical cyclones.

The diagram on the inside of this document shows what can happen to the beach and highway if there is only beach nourishment and no erosion protection structure.
Why do we need a beach nourishment program (replacing sand) to protect the foreshore, if sand will be lost when the next storm occurs?

Replacing sand is a fixed element of the Reconstructing Cardwell project that must be delivered with the NDRRA funding. Coastal erosion is a natural part of coastal processes and sand replenishment is one of the most efficient and effective ways to manage this long-term, while retaining beach amenity.

Replacing the beach sand along the foreshore will increase the width of land available for normal erosion to occur while allowing the beach to continue its natural processes. To maximise the success of sand replacement, the following needs to occur:

- the source of sand needs to be from outside the active beach zone
- the grain size of the imported sand needs to be similar to the existing sand
- the entire beach profile needs to be nourished.

Some erosion of the renourished beach will still occur as the beach profile adjusts to the new conditions. Any sand ‘lost’ through erosion on the visible beach remains in the active beach system and is available to be moved onshore through natural coastal processes. This process can be seen in the series of Natural Beach Evolution diagrams below.

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Cardwell Beach Shoreline Erosion Management Plan (SEMP)

The Cardwell Beach Shoreline Erosion Management Plan 2008 (SEMP) identified a deficit of approximately 100,000 cubic metres of sand along the Cardwell foreshore as a result of ongoing coastal processes that, for this location, has resulted in coastline erosion.

The SEMP recommends the replacement of sand to build beach and foreshore resilience and provide for greater beach amenity. This will result in the erosion protection structure along the highway being buried, increasing the amenity of the foreshore and allowing the development of amenities along the foreshore area.

The Cardwell foreshore is a low energy environment with low annual rate of sand loss meaning sand replenishment is a viable option for managing coastal erosion. As a result of natural coastal processes, ongoing annual sand replenishment will be required, but on a much smaller scale than that required for the initial nourishment (approximately 1000 cubic metres per year). The existing catch-groyne at Tskalisiris Street will provide a source for some of the sand, with the remainder needing to be sourced from elsewhere.

A study to determine where the sand will be sourced from has commenced as part of the Reconstructing Cardwell project.