



CASE STUDY

**GABUL WAY COASTAL WALKWAY,
MAGNETIC ISLAND**

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PROJECT TYPE: MICROPILED FOUNDATION SUPPORTING CANTILEVERED COASTAL WALKWAY

CLIENT: TOWNSVILLE CITY COUNCIL

MAIN CONTRACTORS: HUTCHINSON BUILDERS

PROJECT ENGINEERS: ARUP (WALKWAY) PCA (MICROPILE FOUNDATION DESIGN)



PROJECT DESCRIPTION AND CHALLENGES

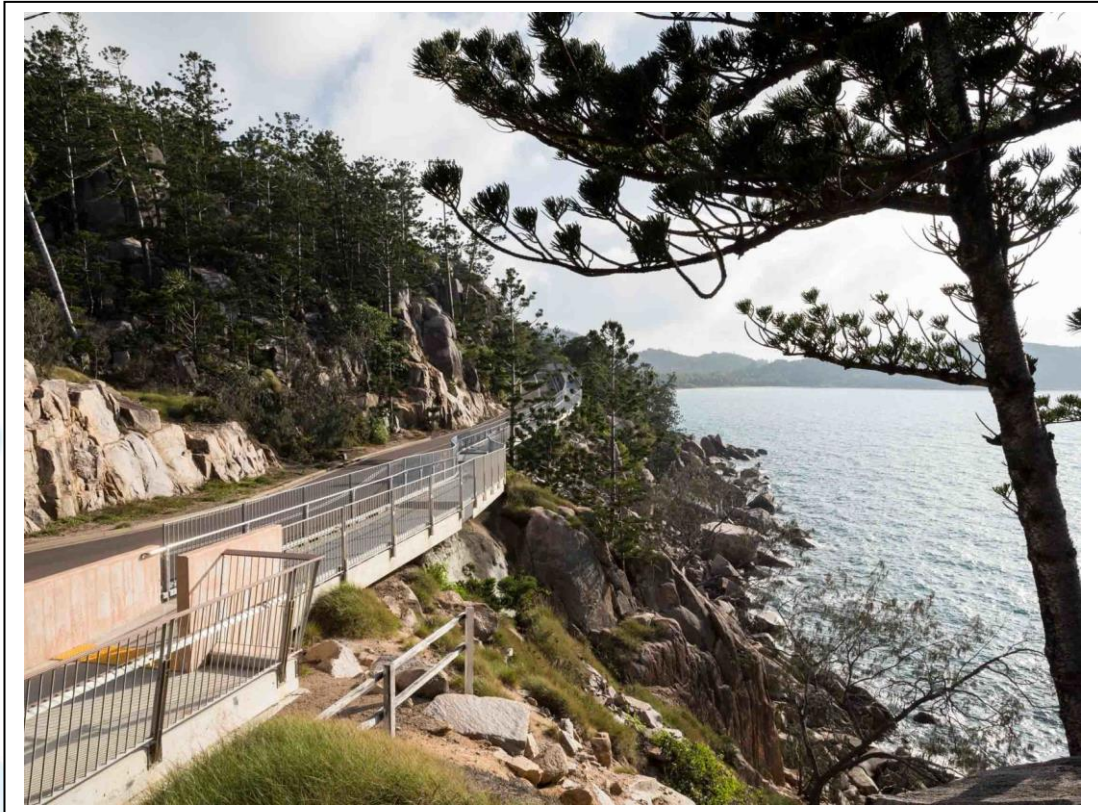
Gabul Way is a 300m long walkway joining Nelly Bay and Acadia on the southern edge of Magnetic Island. Prior to the construction of the walkway, pedestrians who wished to walk from the ferry terminal at Nelly Bay to Acadia would traverse a narrow ledge on the outside of the traffic barrier directly adjacent an almost vertical drop of up to 20m to the ocean below.

The limited space on the outer edge of the road and the granite cliffs and boulders on the inside of the road alignment meant there was no room for a traditional concrete or timber walkway to be constructed leaving the only option to cantilever the walkway out over the embankment.

Geotechnical investigations revealed the new walkway placed it along an alignment consisting of large fresh granite boulders ranging in size from small car sized boulders to some which were the size of a small house. These boulders were interlocked together with large voids intersecting the spaces between them.

The strength of the rock, existence of large voids and the limited working space meant that traditional piling methods would not be applicable as support for the new structure. A different method of support was required.





THE SOLUTION

Prior to releasing the project to tender, Arup Engineers worked with PCA Ground Engineering to determine the feasibility of a series of 38 “nodes” which could act as support for the 11m long cantilevered concrete deck units. Each “node” would be located at the intersection of adjacent sections of deck units and would need to handle the various load cases applied including pedestrian, environmental (cyclones) and impact from vehicles.

The solution was to design a micropile arrangement within each node to resist the design forces specific for each node. PCA was able to generate four different micropile layouts which could be used depending on the applied forces and location of each node. Due to the limited room, the size of the nodes was kept to a minimum at just 1m wide by 1.8m long with between 5 and 7 micropiles in each.

The micropiles were constructed using double corrosion protected hollow bars and installed with zero swing excavator mounted drill rigs that could fit within a single lane of traffic to maintain traffic flow along Magnetic Island Road.

The micropiles were drilled using air and post grouted with neat cement grout to provide the required bonded length. Voids between the bond zone of the micropile and the ground surface were filled with a specially designed grout mix to ensure the micropiles were grouted for their full length.

Rock strengths of over 200mPa were encountered during installation with the drilling technology utilised to install the micropiles taking away any risk of delays and cost due to potential latent conditions.

