McCONNELL DOWELL
CREATIVE CONSTRUCTION™

# Granite Island Causeway Replacement

WGA

David McKay and
Christopher Hochwald

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## Company Overview McConnell Dowell

**McConnell Dowell is Creative Construction. We successfully deliver complex infrastructure with our customers and the community.**

- Average annual revenue of +$1.5 billion
- Over 3000 office and project staff
- Four business units with operations across Australia, Asia, New Zealand and Pacific Islands
- Current work portfolio includes projects valued between $20m to +$1b
- Experienced in all contract delivery models, including Alliance, Early Contractor Involvements (ECI), Design and Construct and Construct Only
- In-house design and design management capability
- 60 uninterrupted years of Creative Construction

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# Company Overview
# WGA

**Sectors**

- Ports & Marine
- Resources
- Defence & Space
- Energy
- Buildings
- Sports & Recreation
- Traffic & Transport
- Urban Development
- Water


JULY 2022

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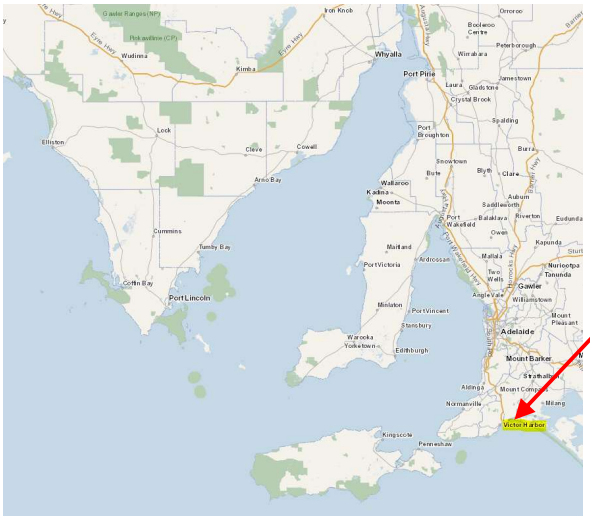
# Project Overview – Location





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## Project Overview – Need for replacement

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## Project Overview – Need for replacement


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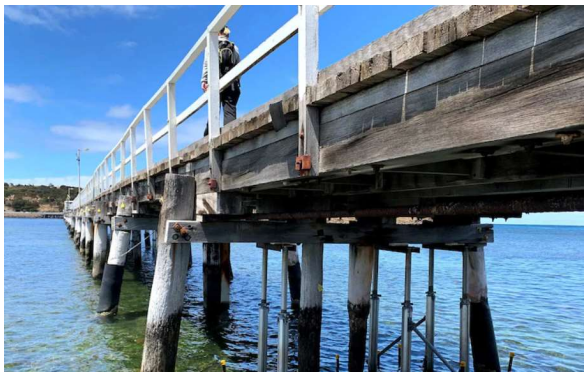
## Project Overview – Need for replacement



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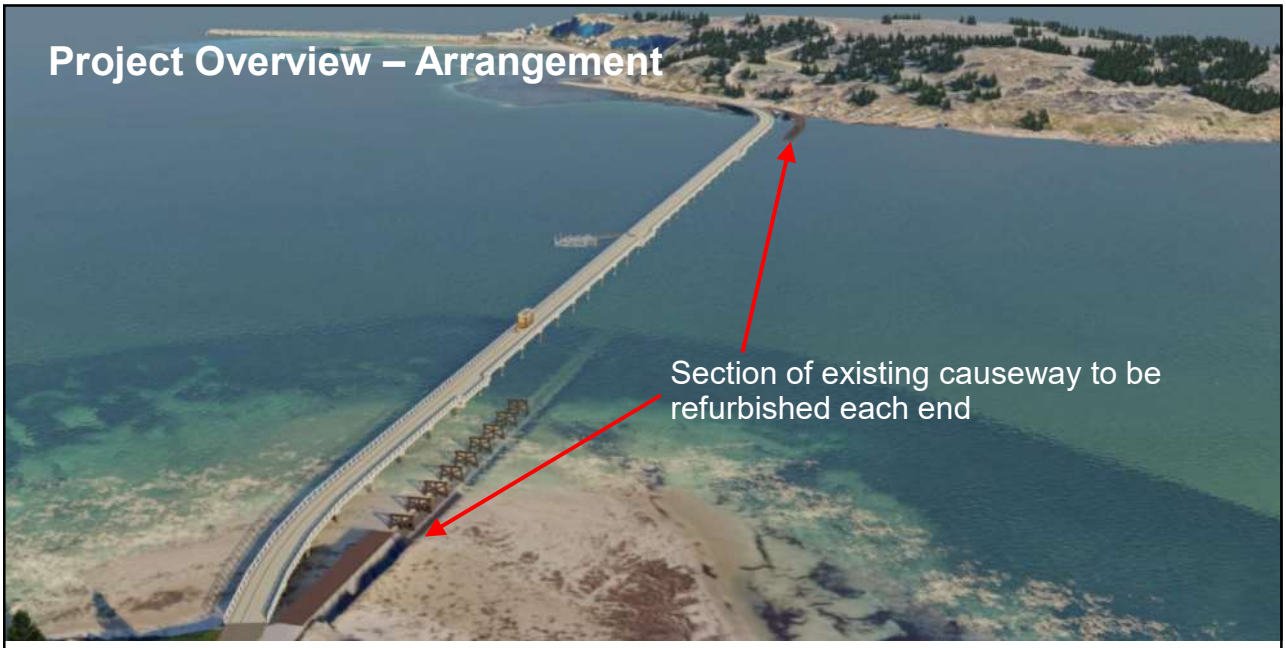
## Project Overview – Arrangement

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## Project Overview – Arrangement

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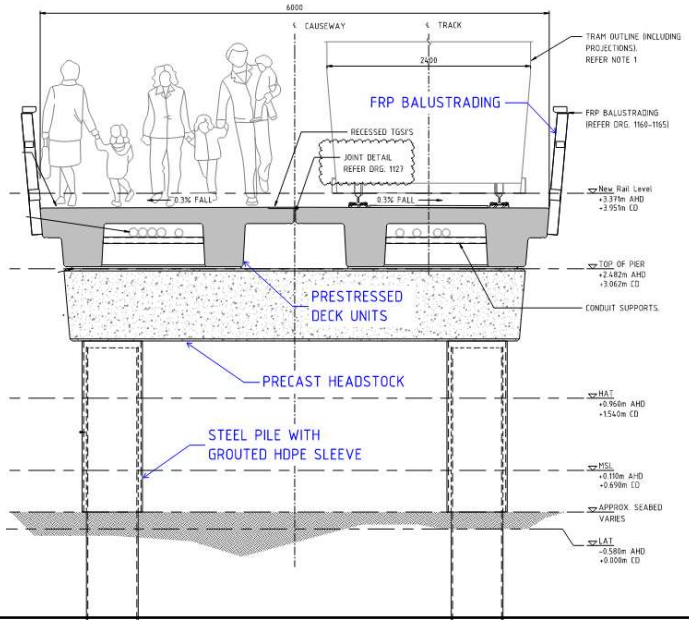
## Design and Functional Requirements

**Key Requirements**

- Separate zones for tram and pedestrians
- T44 Truck and Coach load rating
- Main structure design life of 100 years
- Existing causeway to remain operational during works
- Relatively short design and construction timeframe
- Design to be respectful of heritage and place

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## Deck - Concept Arrangements Considered

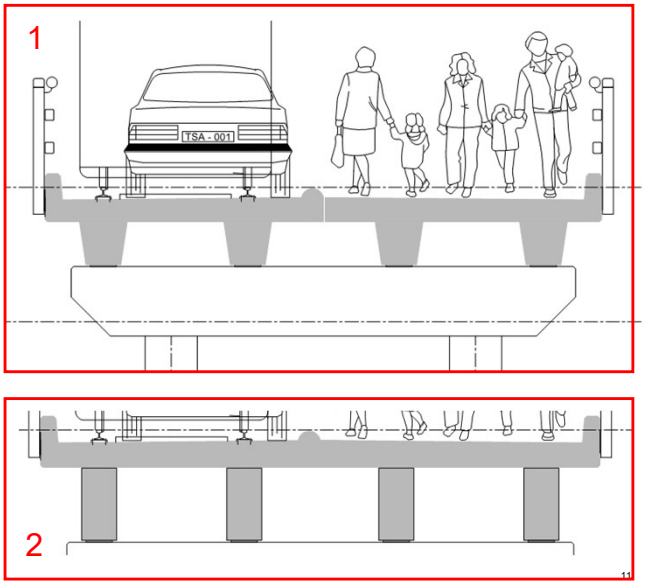
**Option 1 – Integral Beam and Deck**

1a – Passive reinforcement
- 12m span for 750deep

1b – Prestressed / PT
- Span of 15m for 750deep (~42t)
- Span to suit economical crane size

**Option 2 – Independent Beam and Deck**

2a – Prestressed beams, passive deck
- 9m span

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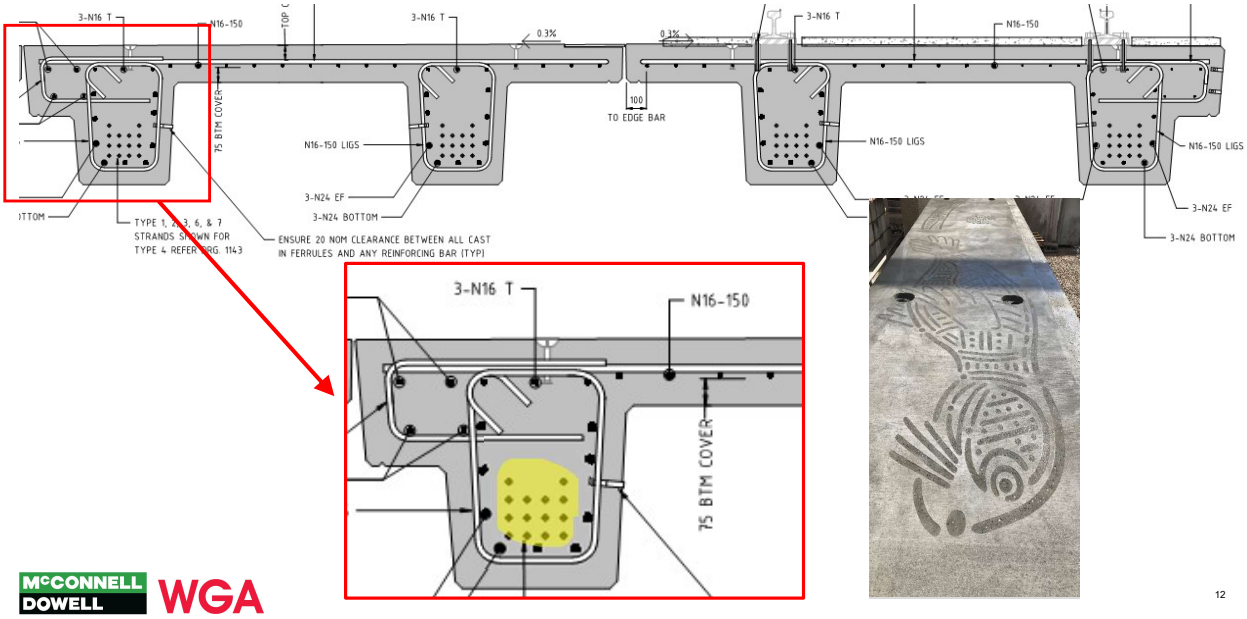
## Deck - Prestressed Concrete









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## Piles - Concept Arrangements Considered

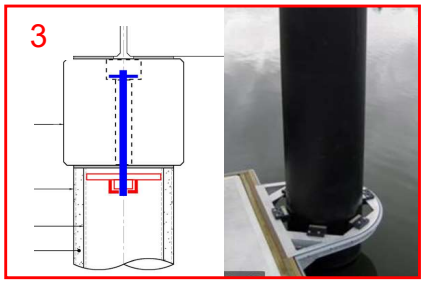
**Option 1 – Exposed unpainted steel**
(corrosion allowance)

**Option 2 – Paint and maintain**
(repaint or wrap)

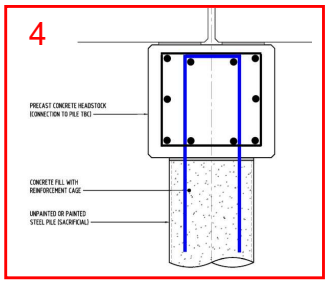
**Option 3 – Grouted HDPE sleeve**
(with unpainted pile)

**Option 4 – Concrete filling**
(unpainted steel sacrificial pile)

**Option 5 – Pile wrapping**
(corrosion allowance at seabed)



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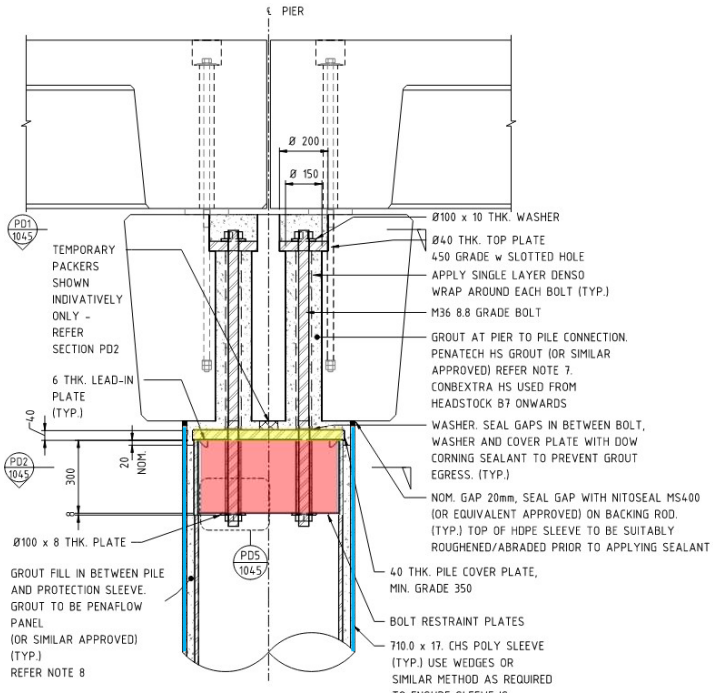
## Piles - Design

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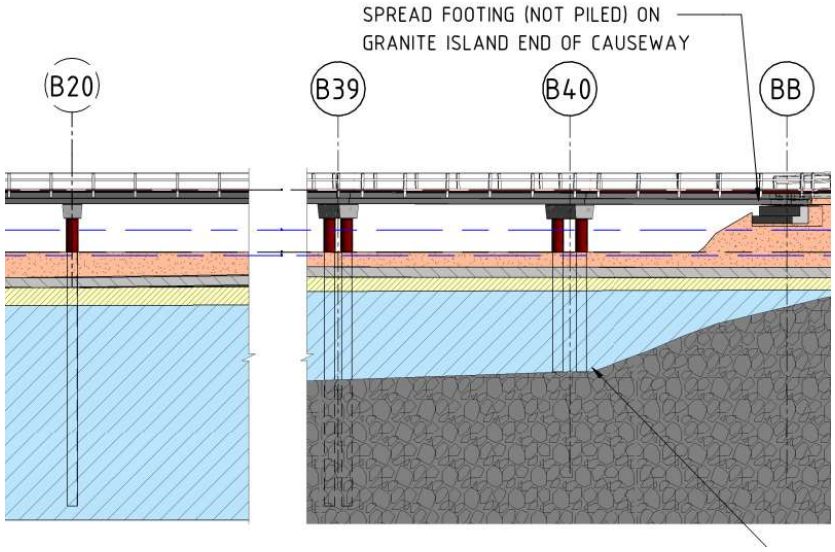
## Design Considerations – High Level Granite

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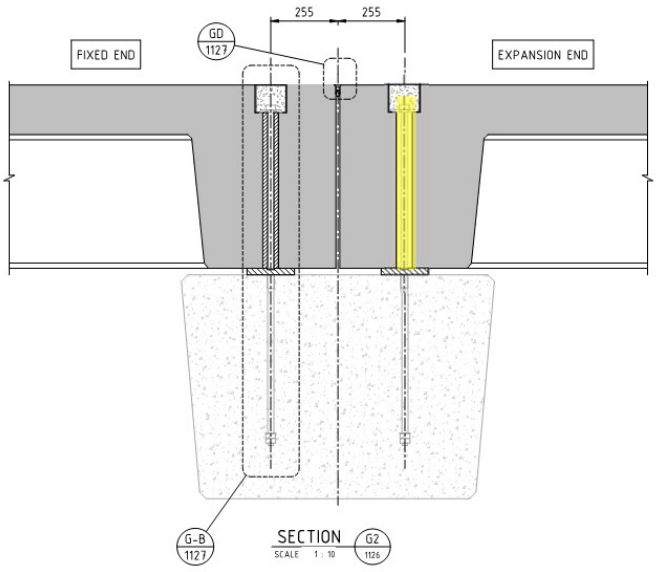
## Design Considerations – Thermal Expansion

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## Construction Method – Key Drivers

- Short 8 month construction program
- Minimal Environmental Impact
- Minimisation of exposure to sea state and high winds
- Allowing continual public and stakeholder access

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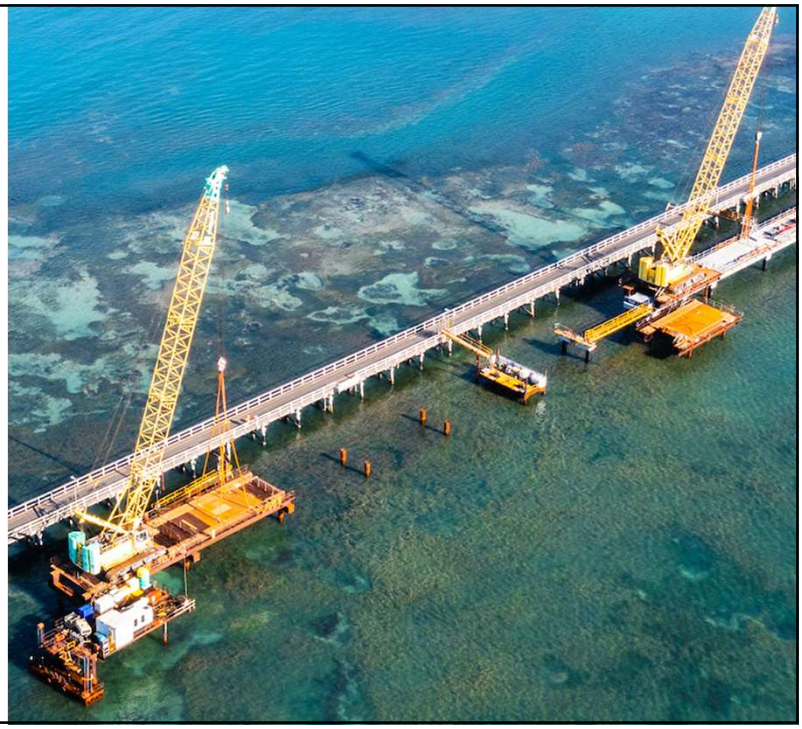
## Construction Method

- Hand over hand construction
- 2 x 200 tonne crawler cranes
- 3 work fronts operating concurrently
- All deliveries direct to work fronts



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## Construction Method – Crane #1

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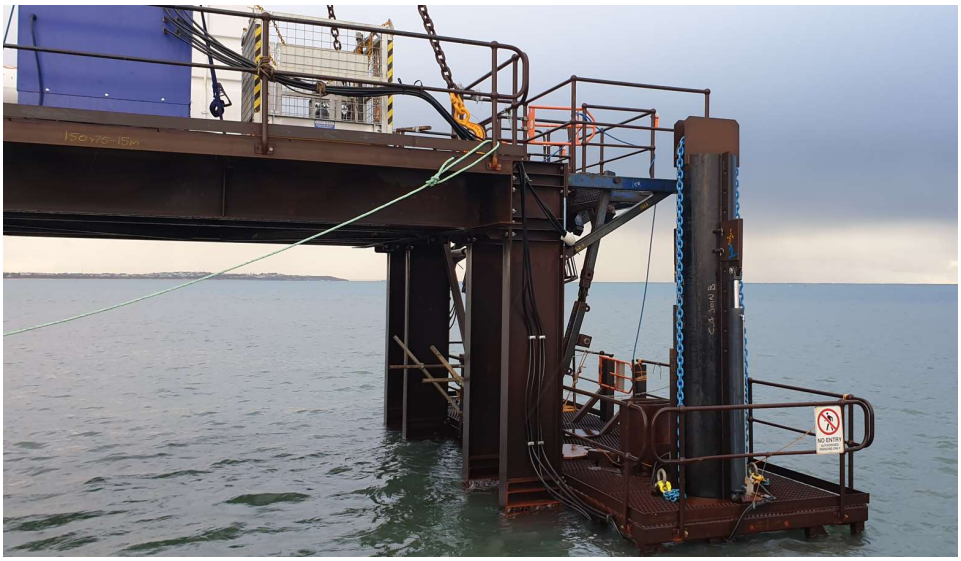
## Construction Method – Crane #1



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## Construction Method – Crane #2

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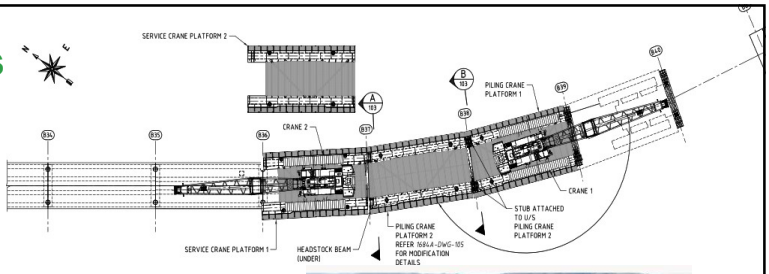
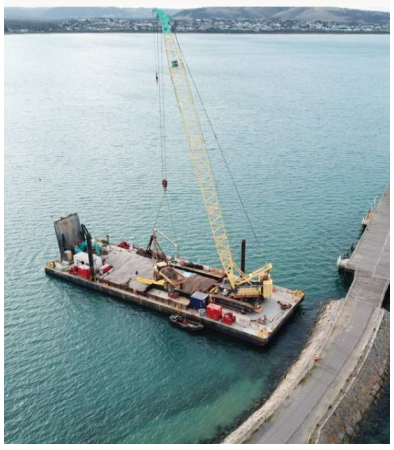
## Construction Challenges

- Constructing around a curve
- Crane demobilization
- Logistical movements to Granite Island



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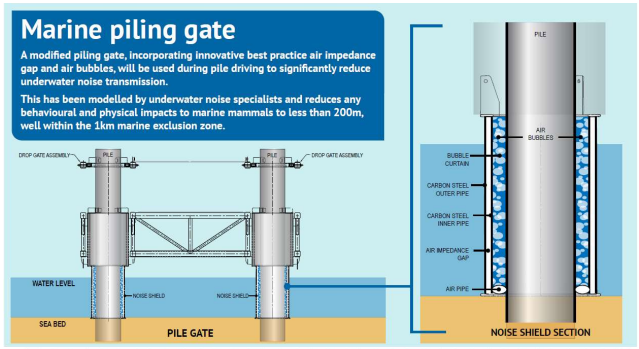
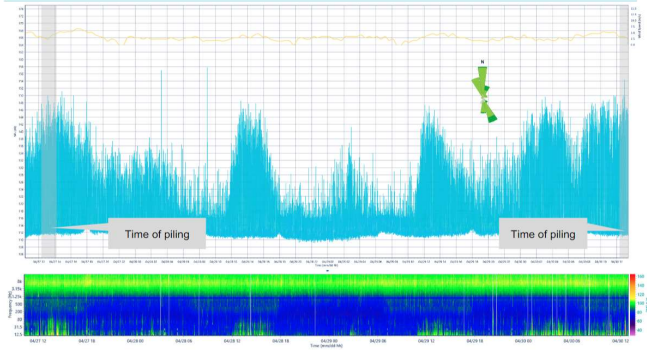
## Construction Method – Underwater Noise Mitigation

**Integrated Bubble Curtain & Air Impedance gap**

- No Discernible increase in underwater noise over background at 1km
- Monitoring during piling demonstrated noise levels 10 dB lower than modelled

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## Completed Causeway

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## Completed Causeway

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## Completed Causeway

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## Completed Causeway

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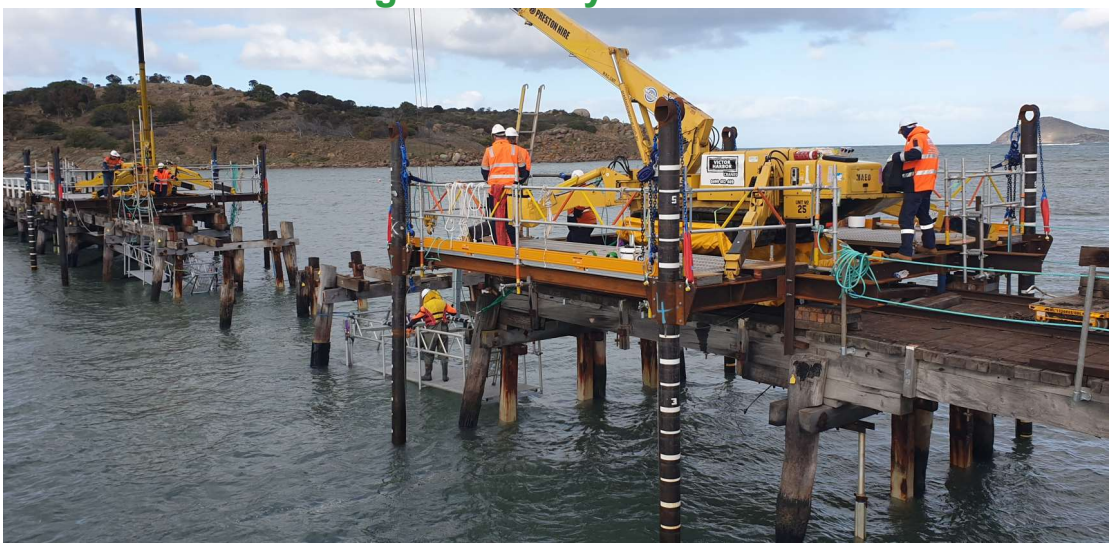
## Demolition of Existing Causeway



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## Demolition of Existing Causeway

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## Foreshore Areas

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## Completion on Time

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## Thankyou!

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