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## **Port of Mackay Wharf 5 – Western Approach** EA and PIANC ANZ Northern Chapter Event 14 March 2022





#### Agenda

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- Project Background
- Project Drivers
- Evaluation of Existing Structure
- Design Development
- Current Progress

## **Project Background**

### **Project Background - Site Location**



## **Project Background - Site Location**



#### **Project Background – Original Construction**

- Western Approach originally constructed in 1986 as part of the original Breakwater Wharf (now Wharf 5)
- The Western Triangle Approach and Eastern Approach, both constructed in 1998 as part of the extension to the wharf head



# **Project Drivers**

#### **Project Drivers**

- Need to Replace. NQBP Asset Management systems have identified the need to replace the structures in the near term;
- Minimise impact on existing operations. The existing wharf approach structures support key port trades, therefore solutions are sought that limit any impacts on operations;
- Infrastructure Resilience. The criticality of the structures to key port trades means that the replacement infrastructure needs to be durable and resilient;
- Minimise impact on 3rd party services/infrastructure;
- A balance between capital and operational costs and project benefits, both in the short term and over the whole life of the infrastructure.



## **Evaluation of Existing Structure**

#### **Evaluation of Existing Structure**

 General Layout, **Elevation and Cross** 15 000 5 BAYS AT 10 000 - 50 000 10 000 14 950 LONS PRESTRESSED CONC. DECK & KERB UNITS DRG. Nº MHB 12500 - 011 9950 LONG PRESTRESSED CONC DECK & KERB UNITS DRG Nº MHB 12500 -010 50 TYP Section RL 9860 TOP OF KERB RL 9500 TOP OF DECK LINITS RC HEADSTOCK DRG. Nº MHB 12500-009 PILE BENTS Nos 3 to 8 FOR DETAILS OF BENT Nº 1 REFER DRG. MHB 12500-008 FOR DETAILS OF ABUTMENT REFER DRG. MHB 12500-006. RL 0-000 LOW WATER DATUM SEA CO w 51 wei SPARS - NELE C SHUTE VI STINGS 2 AND A THOMAS ICHT POLE 00 NB 4 90 0 SUPPLY SUPPLY PRESTRESSED CONC. DECK LEND RALING WITH ITAKONAN FERMINA, SECTORI, ENDI RAD SELS HUG TYTER & KERB UNITS 3005 0052 555.5 10.0 205 5522 T RL 9100 2,25 BATH 2V THAT P.C. HEADSTOCK 6200 LONG DRG. Nº MHB 12500-009 700 HIRE COST MTD MBUTPHAIT 1 4833 13 344.F 11M W 8388 10.03 EV \$0.1 1600 3300 1300 RUMBER <0) Net Star BENT Nº 2 L.N 000 F 000 - 000 - 000F BENT 02.75 000 005 5 600 OD × 12 R 190 NB 90.0E 2MB BENG RAKED PILES de. (aler) 2 \* 10000 EVYLS - 20000 000.01 1000 57 000.05

## **Evaluation of Existing Structure**

- Piles
  - Piles was inspected in 2019 which indicated an average level of protective coating remaining; well maintained.
  - In conclusion, none of the Wharf 5 piles were considered to require strengthening repair works, with no notable corrosion being identified.
- Headstocks
  - Appeared to be in a reasonably good condition with minor signs of fine shrinkage cracks radiating form the piles.
  - Existing headstocks is highly utilised but found to be within design capacities. (with the existing deck system)



- Option 1 100% Concrete:
  - Combination of Precast and cast insitu concrete



Option 2 - Modularised Steel Girders with Precast Concrete deck



Option 2 – FRP Deck Structure Option



- Selected Option Modularised Steel Girders with Precast Concrete deck with the following change:
  - all steel sections cleanly boxed out due to maintenance requirements associated with birds nesting within the bottom flanges of the girders.
  - cross-bracing removed between the girders within the modules



- Advantage for the steel Girders option:
  - Ability to maintain or improve the load carrying capacity of the deck.
  - Shorter construction schedule than concrete deck.
  - At end of life, steel and concrete materials are largely recyclable.





- Challenges encountered during the design stage:
  - Working with existing structures design had to be versatile to cater for tolerances and movements.
  - Maintaining existing deck level new deck level is 100mm higher compared to existing level.
  - Removal and reinstatement of existing services walkway and access gate.







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## **Current Progress**



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## **Current Progress**







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## **Thank You**

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