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Port of Mackay
Wharf 5 – Western Approach

EA and PIANC ANZ Northern Chapter Event

14 March 2022

ENGINEERS AUSTRALIA

PIANC A.D. 1885 AIPCN NAVIGARE NECESSE

Agenda

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

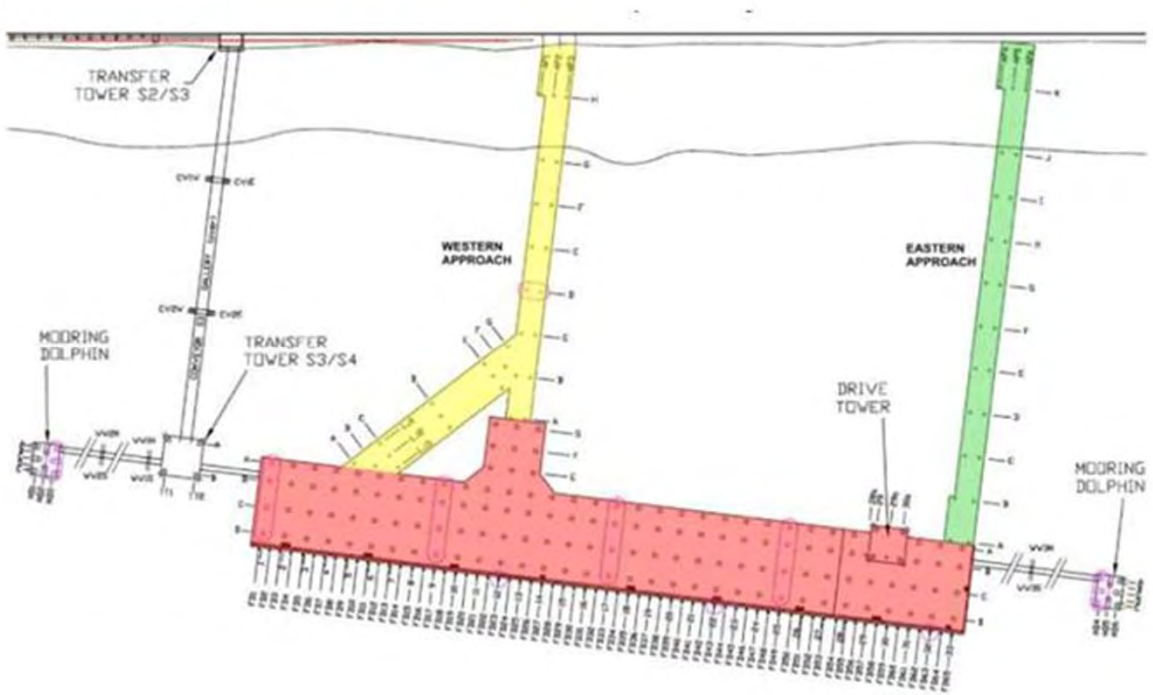
Project Background

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

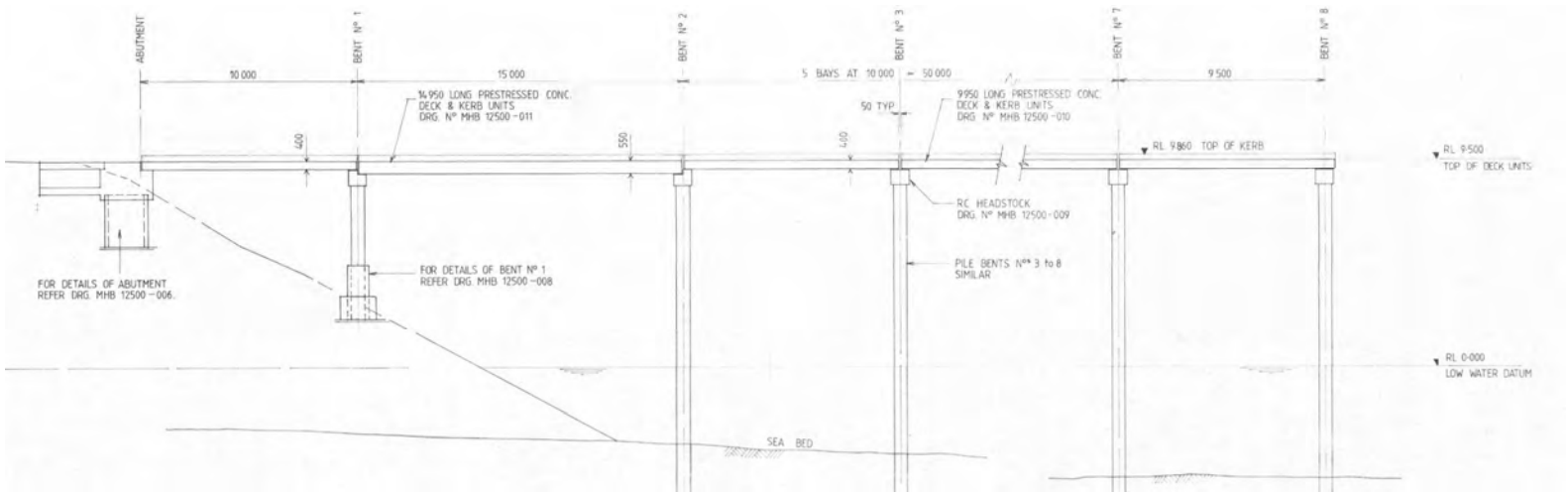
Project Drivers

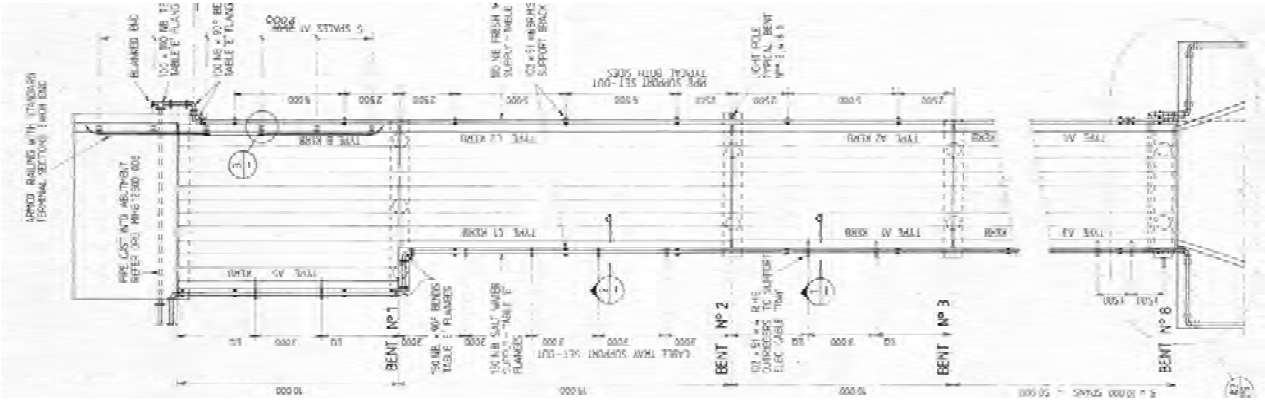
- Need to Replace. NQBP Asset Management systems have identified the need to replace the structures in the near term;
- Minimise impact on existing operations. The existing wharf approach structures support key port trades, therefore solutions are sought that limit any impacts on operations;
- Infrastructure 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.

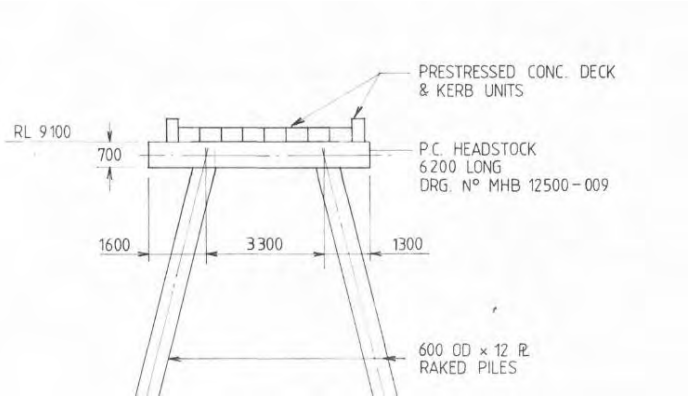
Evaluation of Existing Structure

Evaluation of Existing Structure

- General Layout, Elevation and Cross Section

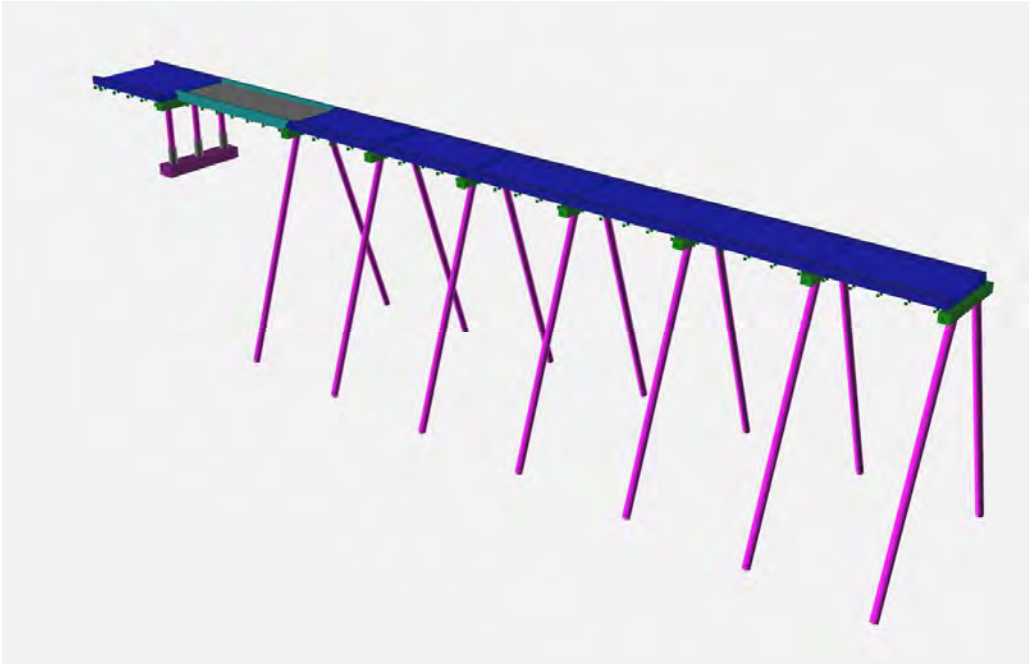






Evaluation of Existing Structure

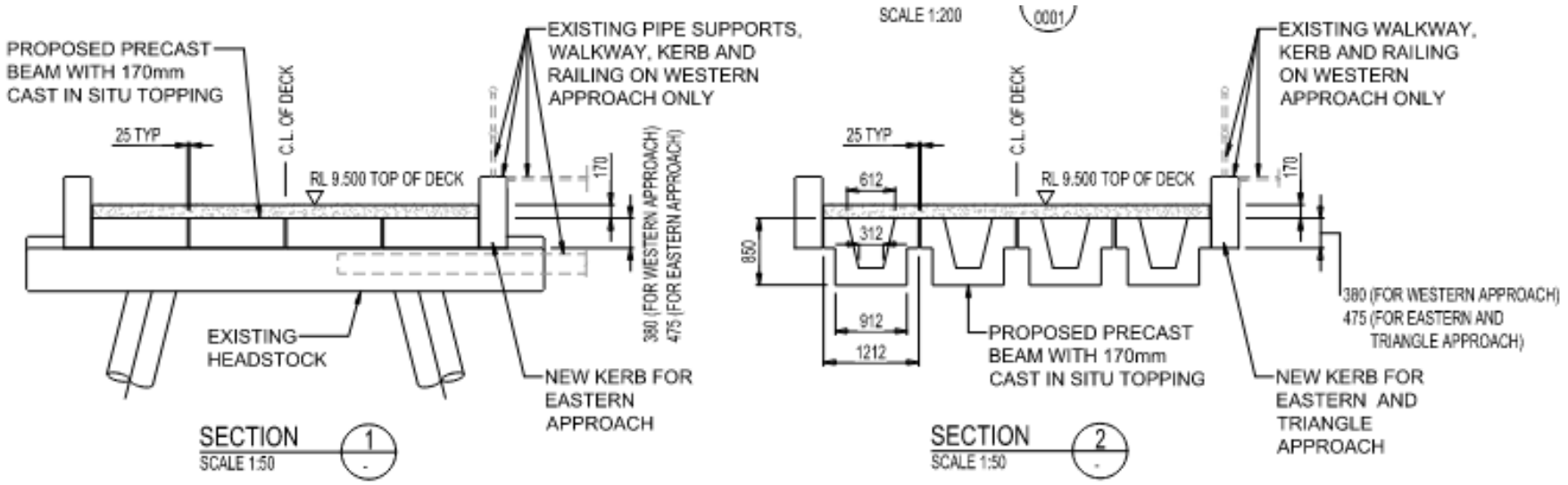
- Piles
  - Piles was inspected in 2019 which indicated an average level of protective coating remaining; well maintained.
  - In conclusion, none of the Wharf 5 piles were considered to require strengthening repair works, with no notable corrosion being identified.
- Headstocks
  - Appeared to be in 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)



Design Development

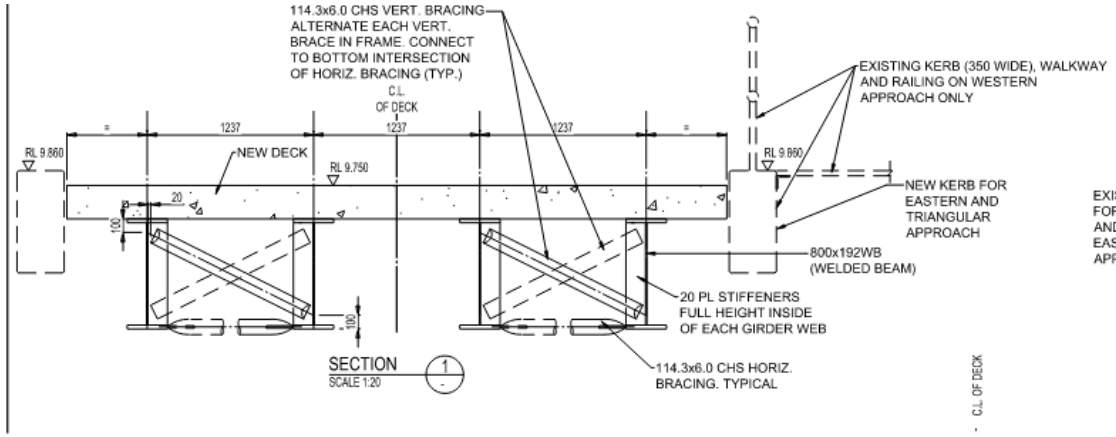
Design Development

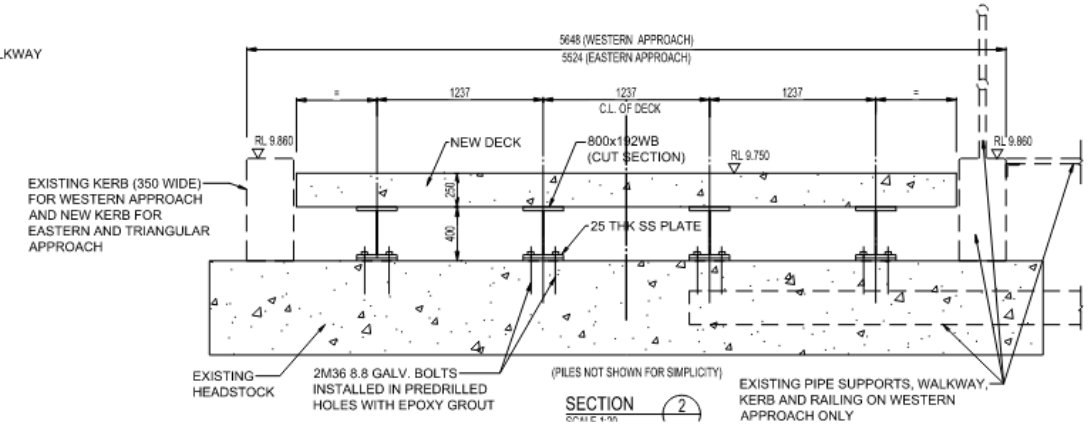
- Option 1 - 100% Concrete:
  - Combination of Precast and cast insitu concrete



Design Development

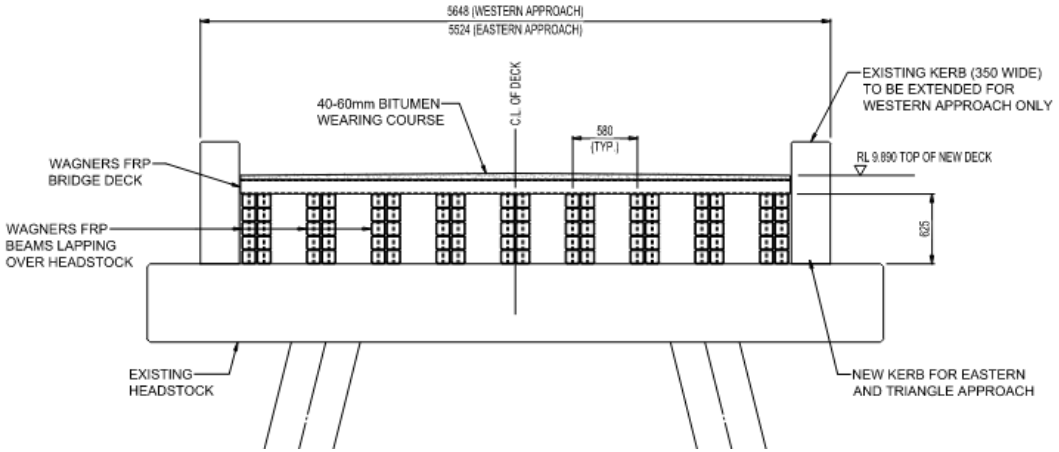
- Option 2 - Modularised Steel Girders with Precast Concrete deck

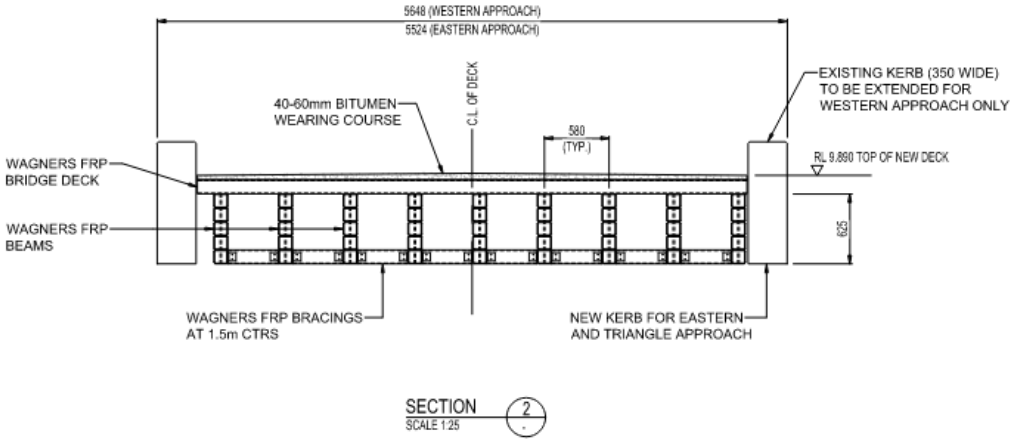




Design Development

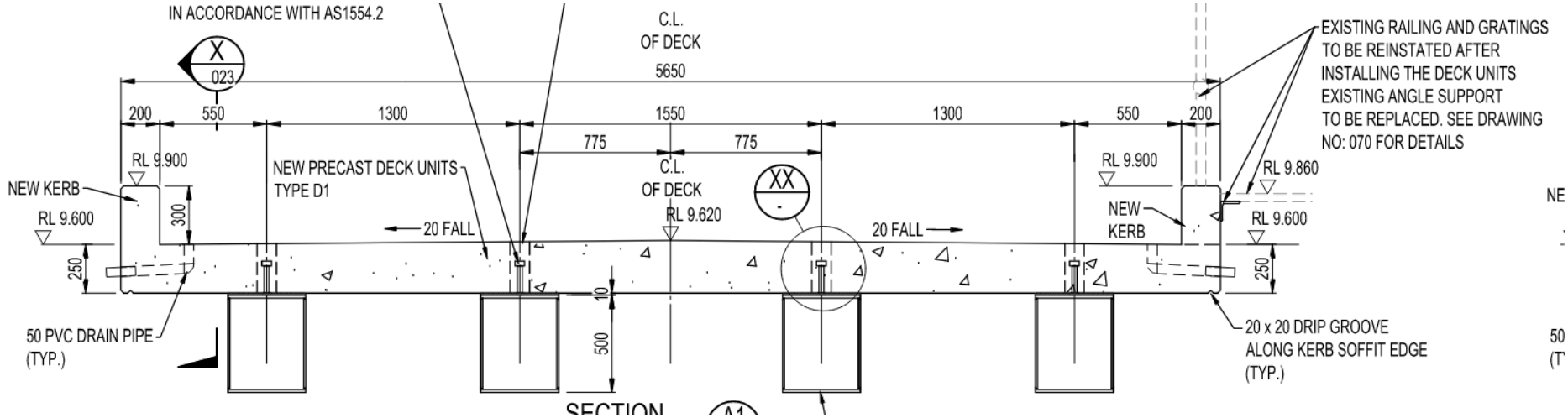
- Option 2 – FRP Deck Structure Option





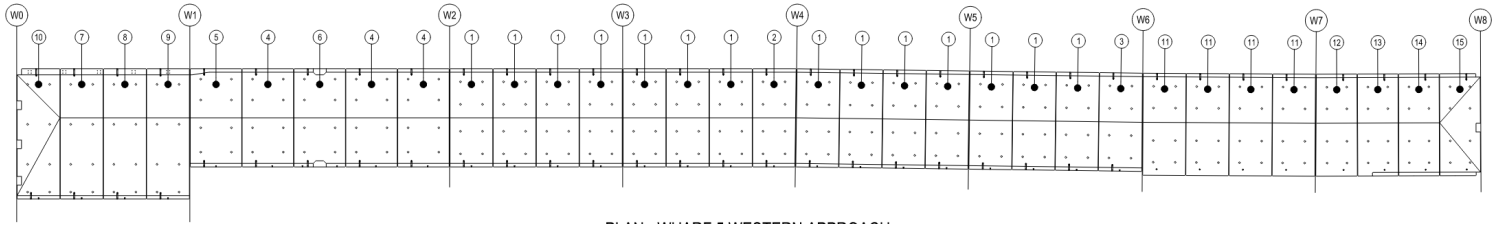
Design Development

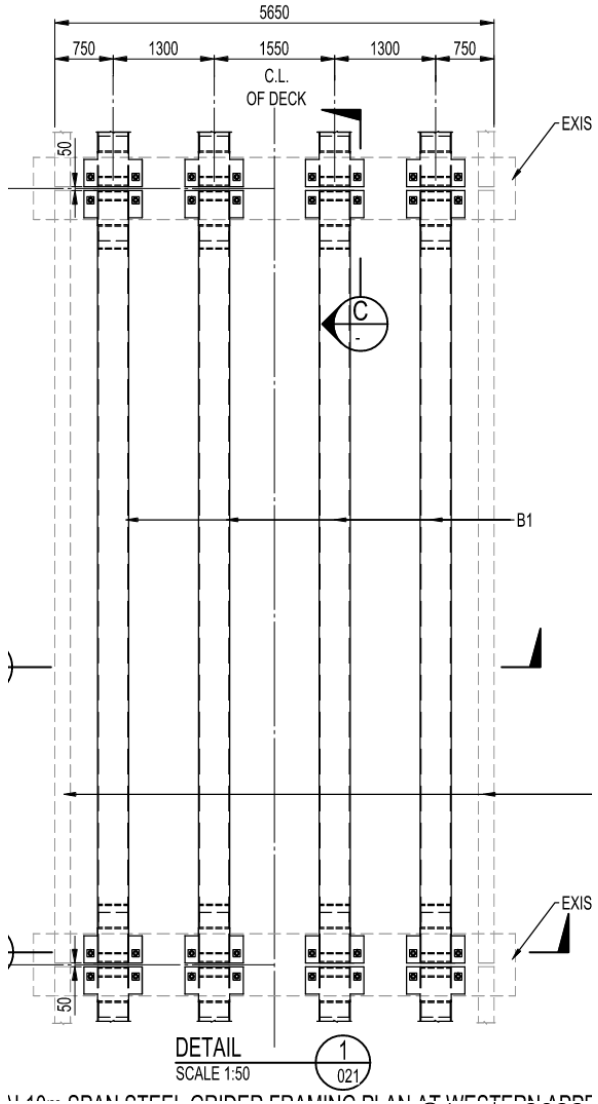
- Selected Option - Modularised Steel Girders with Precast Concrete deck with the following change:
  - all steel sections cleanly boxed out due to maintenance requirements associated with birds nesting within the bottom flanges of the girders.
  - cross-bracing removed between the girders within the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



Design Development

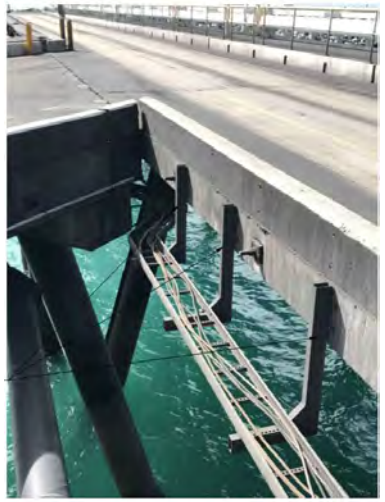
- Advantage for the steel Girders option:
  - Ability to maintain or improve the load carrying capacity of the deck.
  - Shorter construction schedule than concrete deck.
  - At end of life, steel and concrete materials are largely recyclable.

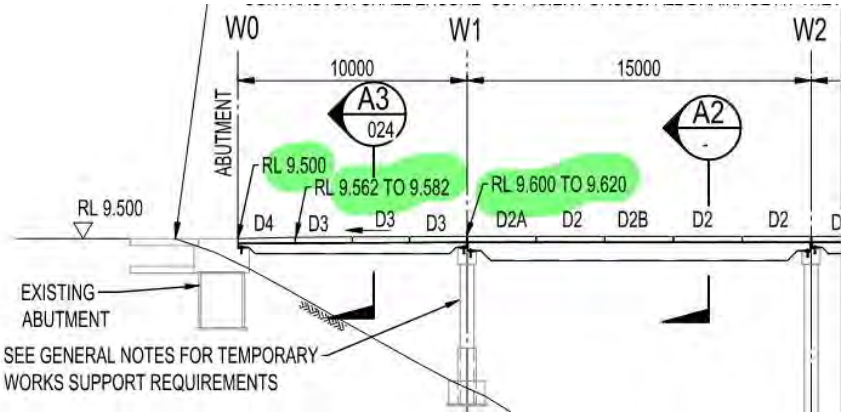




Design Development

- 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.





Current Progress

Current Progress

Current Progress

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Presented by

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