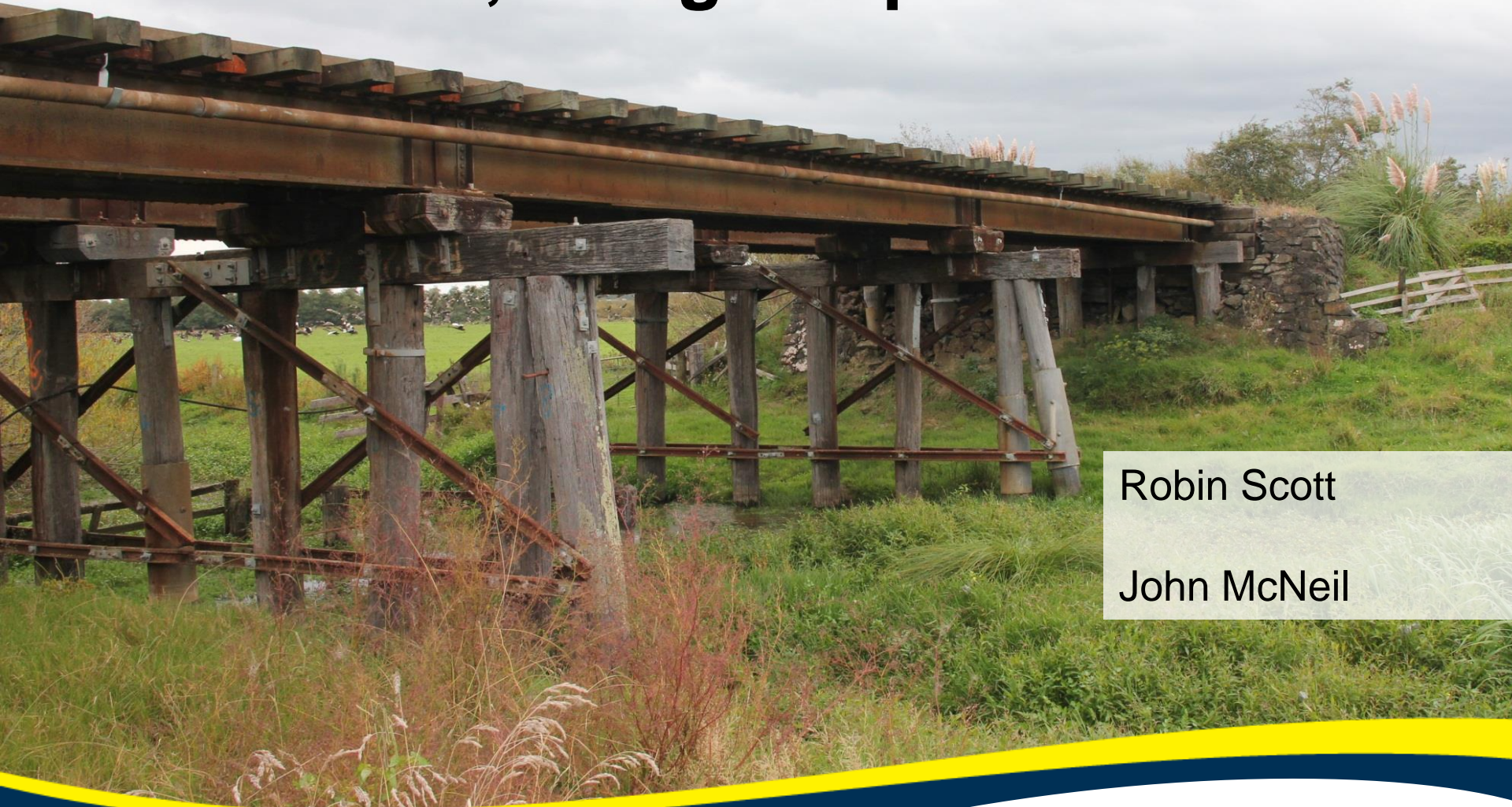


# ECI on the NIMT, Waikato, Bridge Replacements



Robin Scott

John McNeil



**HEB Construction**

**KiwiRail**



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# Reasons for The Project

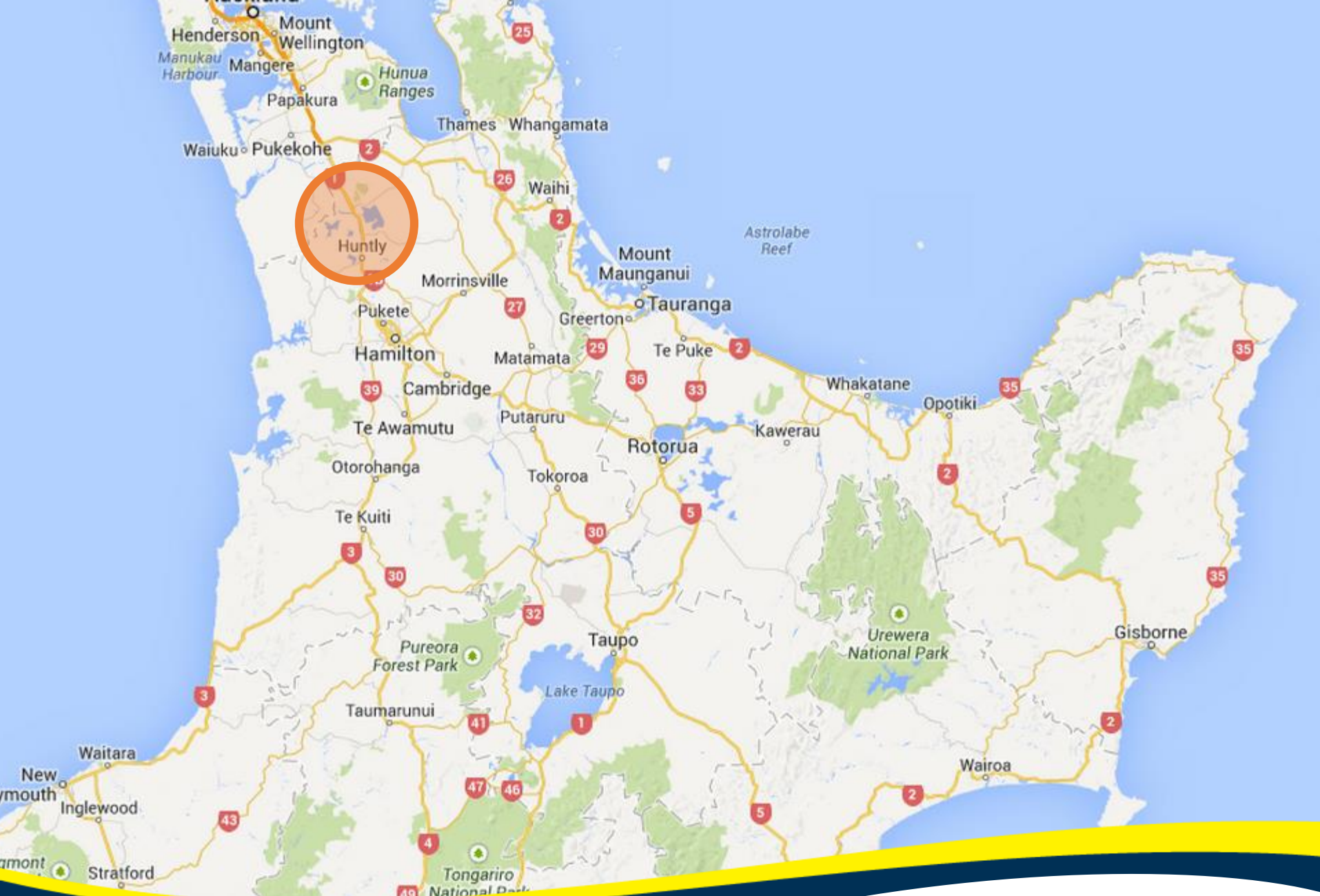
- **Background to Project**

- KiwiRail bought by NZ Government 2008
- Turnaround Plan 2010- Golden Triangle & NIMT
  - "Step change" on the Auckland – Wellington – Christchurch NIMT route
  - Improve reliability and capacity

- **The Project Objectives**

- Replacement of 4 Timber Piered Bridges on the NIMT
- 100 year design life ballast deck
- Tight Design and Construction Timeframe:
  - Project Commenced November 2011
  - Block of Line programmed for December 2012
- Contract to be completed under NZS 3910:2003





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BR 280



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BR 281



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BR 282



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# ECI - Procurement



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# Procurement Strategy Analysis

- Engaged Specialist Help

## Procurement Selection

- Procurement Strategy. Considered:
  - Design and construct Construct only
  - Alliance Early Contractor Involvement

## Key Requirements

- Scope of work Schedule
- Flexibility Cost certainty
- Resources Competitiveness
- Third party influence

## Recommendation

- Early Contractor Involvement (ECI)
- Unknown scope Tight programme
- Unknown Risks Flexibility with Stakeholders





# Procurement Process

## Process

- GETS
- 1- Marketing Briefing
- 2- Expression of Interest
- 3- Request for Proposal (3 Tenderers)
- 4- Award

## Request for Proposal

- ECI divided into two distinct stages:
  - Stage 1: Development (executed under a cost reimbursable basis under short form agreement)
  - Stage 2: Delivery (executed under negotiated lump sum based on tendered contractors margin and risk cap)

# Tender Evaluation and Award

1. Tender documents including Principal's Requirements released to Tenderers
2. Interactive process with site walkovers and individual meetings with Tenderers. KiwiRail provided a panel of experts
3. Evaluation undertaken by experienced KiwiRail team.
4. Weighted attribute evaluation:
  - Resources 10%
  - Proposed methodology and approach 35%
  - Design 25%
  - Commercial 30%
5. Interactive sessions held with Tenderers post tender opening
6. Recommendation





# Design Process



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# Key Design Constraints and Criteria

**Construction around operating trains**

**Flood levels**

**Foundation and Seismic design**

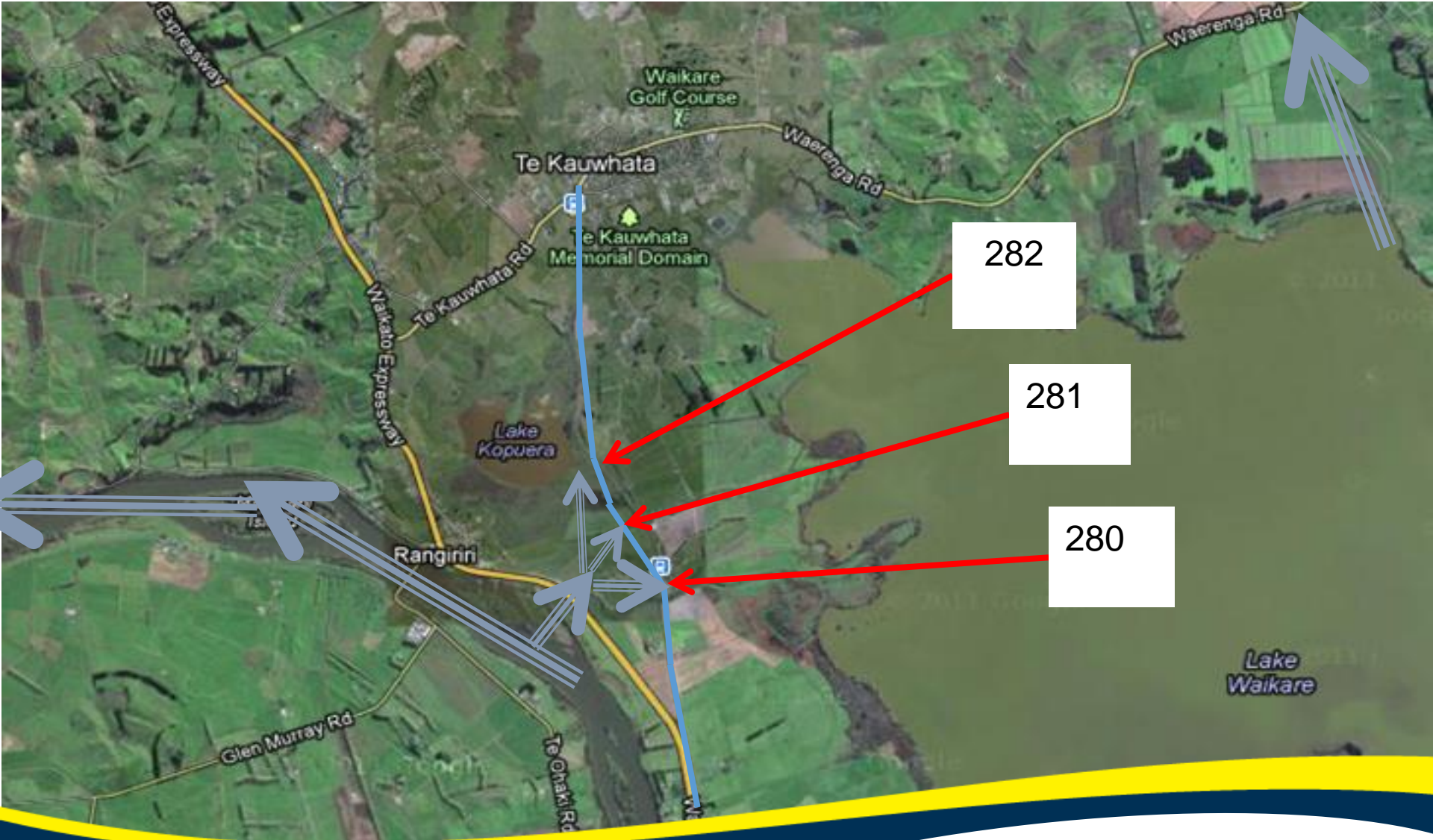
**Modular design**

**Alignment options and future proofing**





# Extreme Flood Flows



# Design Process

**Design office with HEB, KR and design team**

**Collaboratively with KR and Stakeholders**

**Independent design review team. Shearing of knowledge**

**Iwi attendance at design workshops.**

**Enabling works**

**Value engineering**

Track works & Approaches

Enabling works

Walkways

Services





# Programme

## 16 Week design programme April – July

Preliminary design	2 weeks	
40% complete submission	4 weeks	Stage 1 Development T&E
KR approval	1 week	
80% complete submission	4 weeks	Stage 2 Delivery LS.
KR approval	1 week	
independent peer review	2 weeks	
IFC drawings submission	2 weeks	

## Aug – Dec – 5 Months Construction Programme



# Our solution

**Use of standard PSC girders adapted for Rail.**

**Modular design for cost and programme.**

**Substructure and girders delivered before Block of Line**

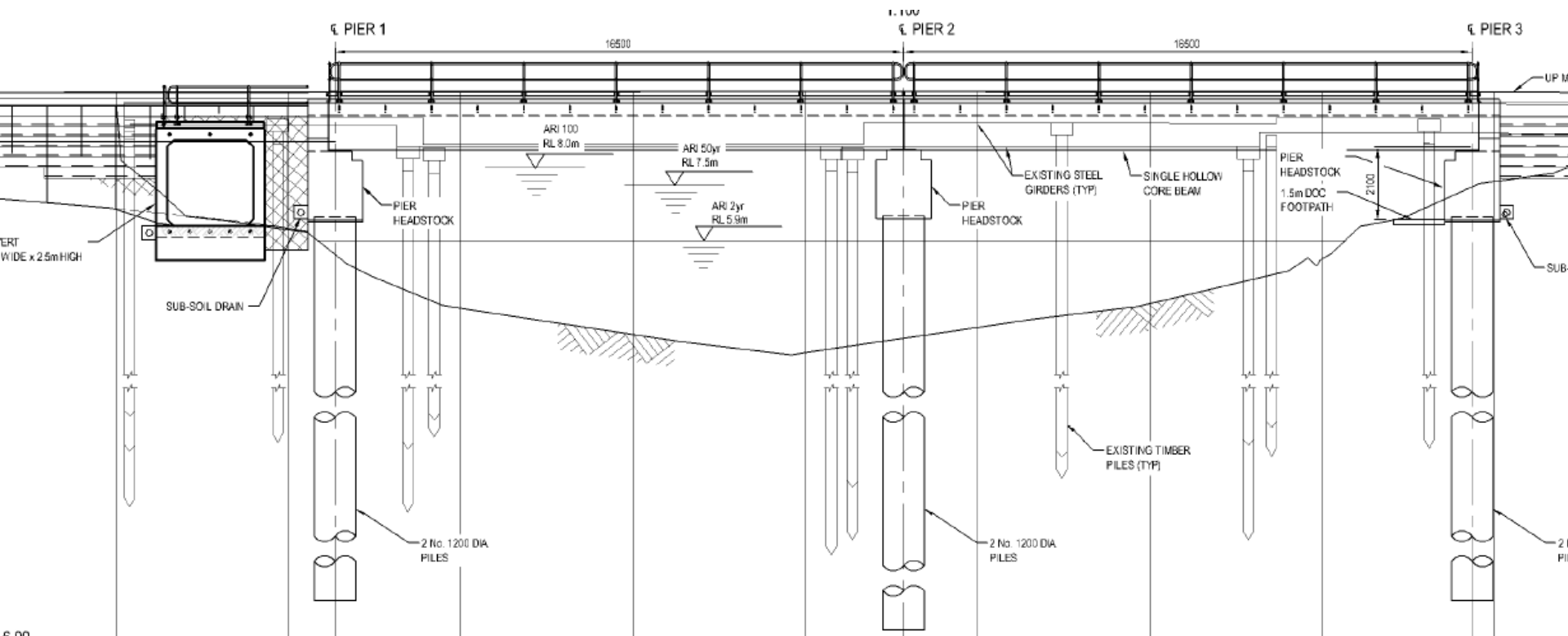
**Back walls and approaches over 72hr block of line**

**Deck Slide over 72hr block of line**

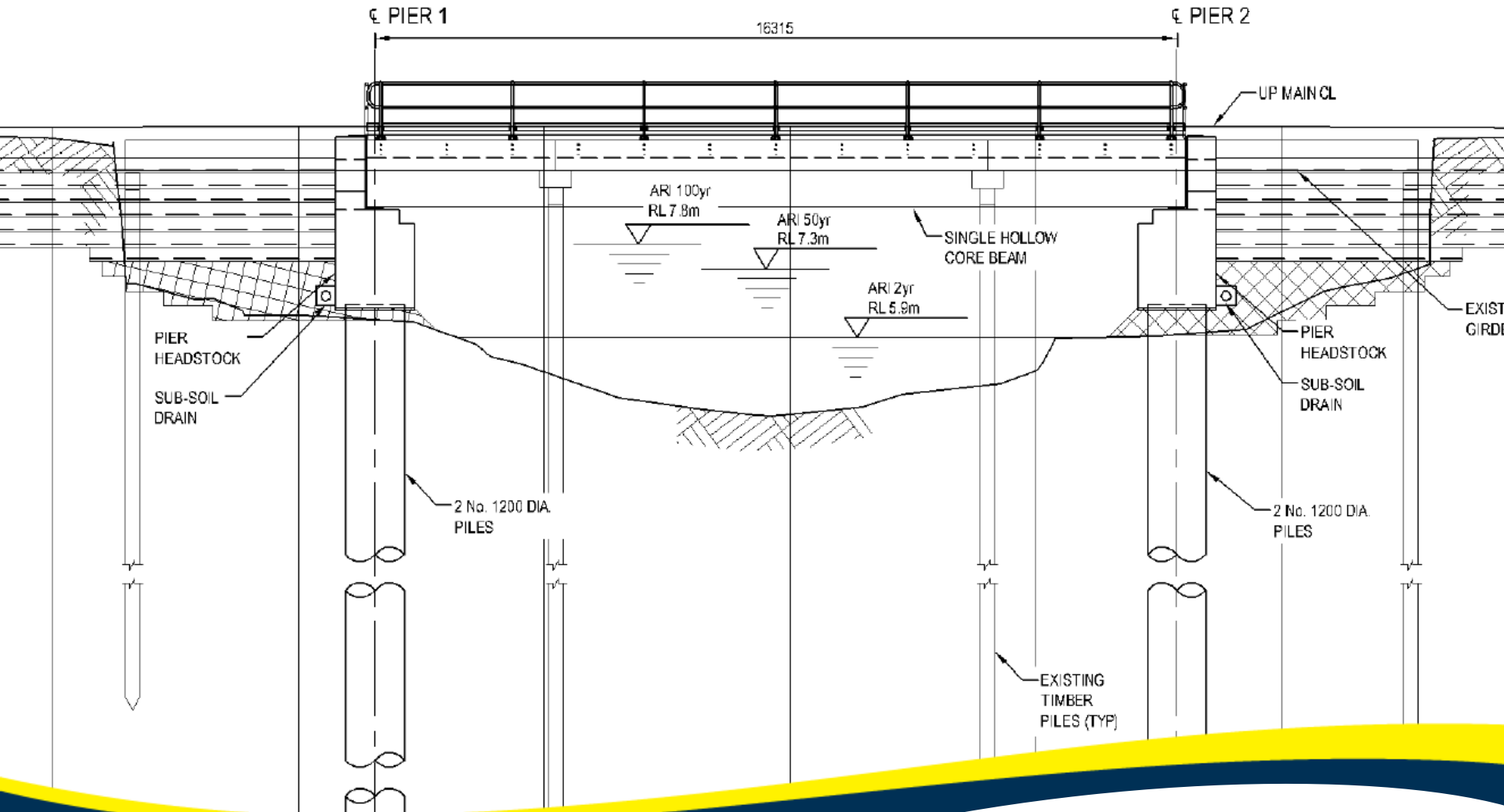




# Bridge Elevation 280

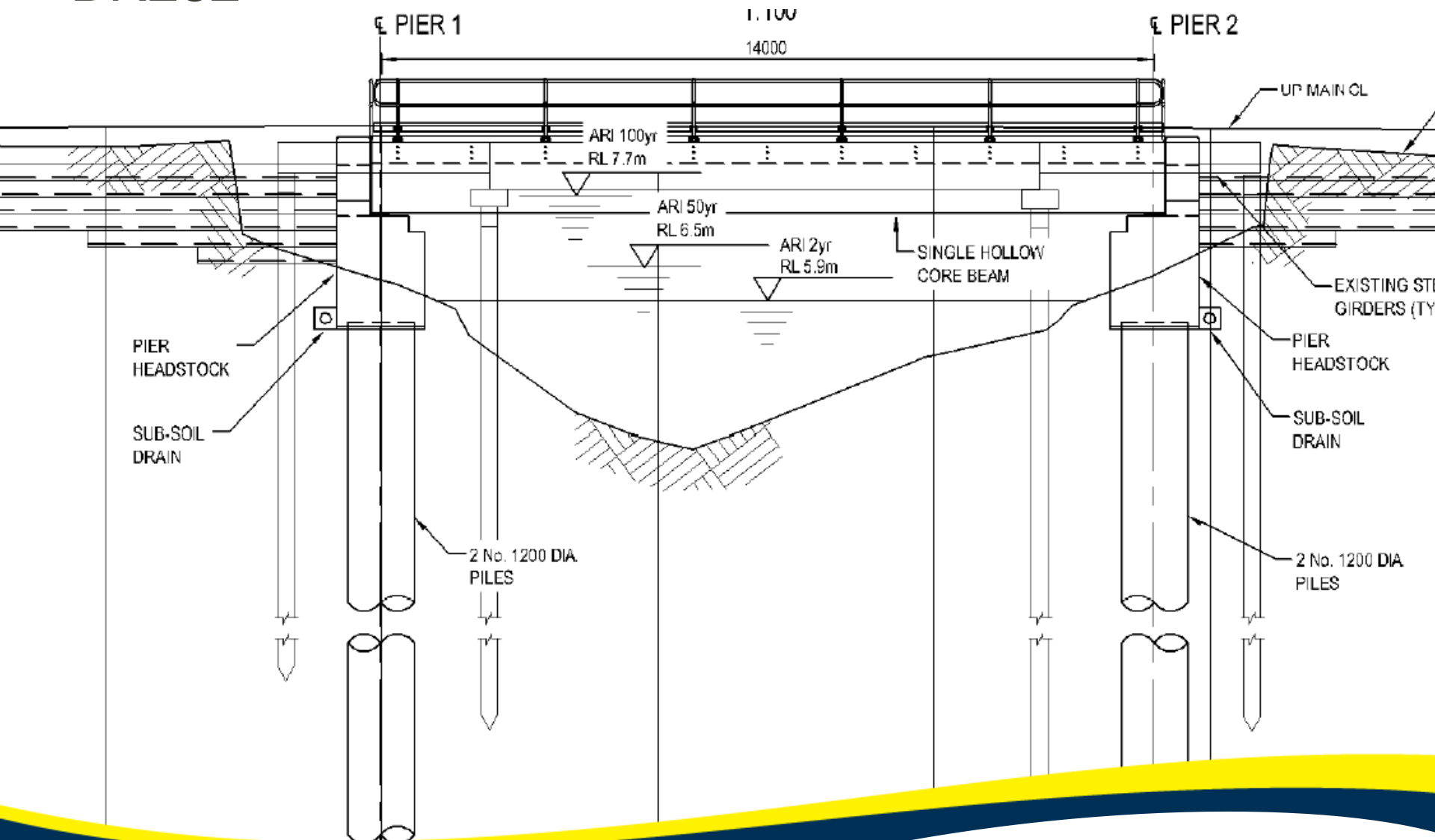


# BR281





# BR282

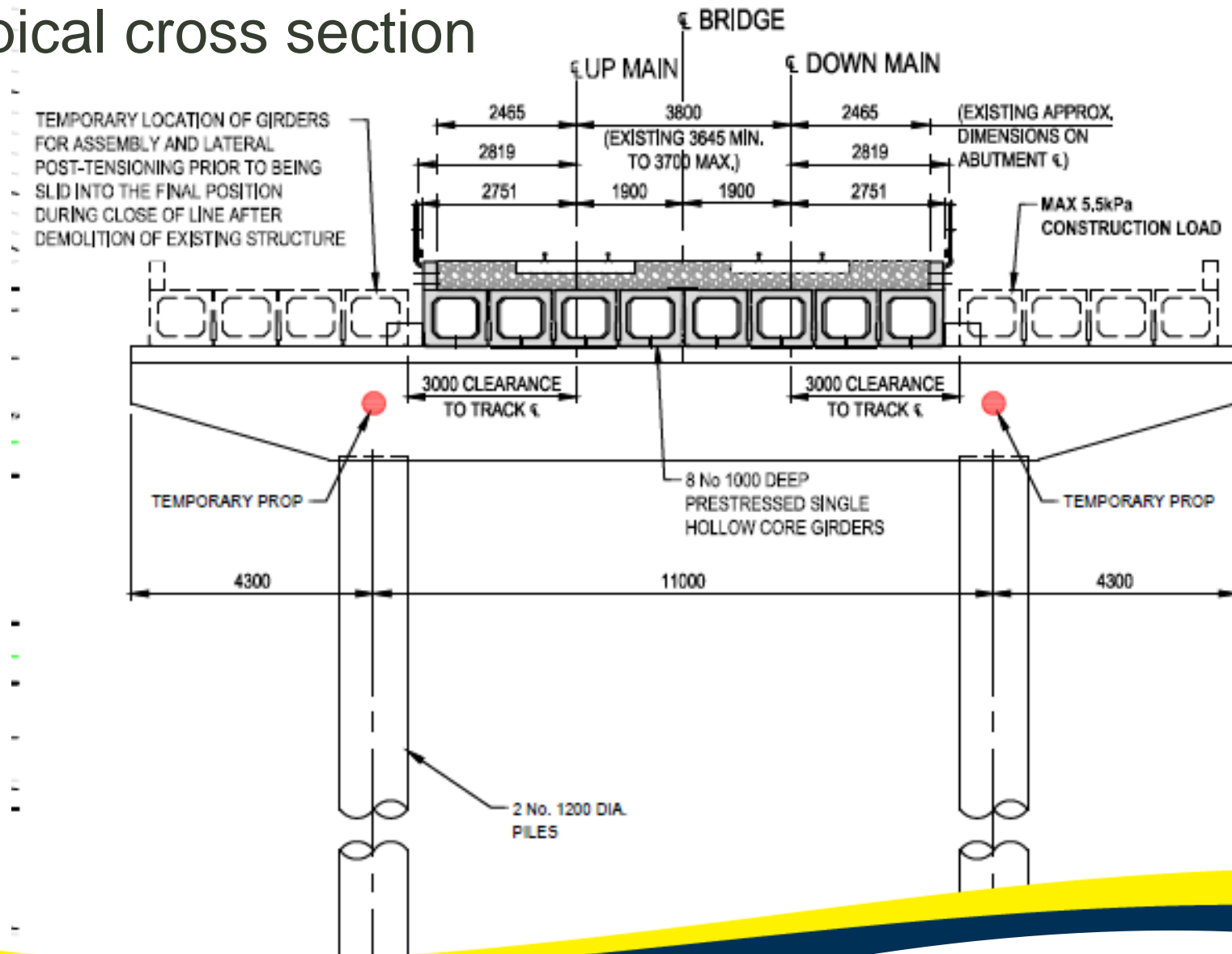


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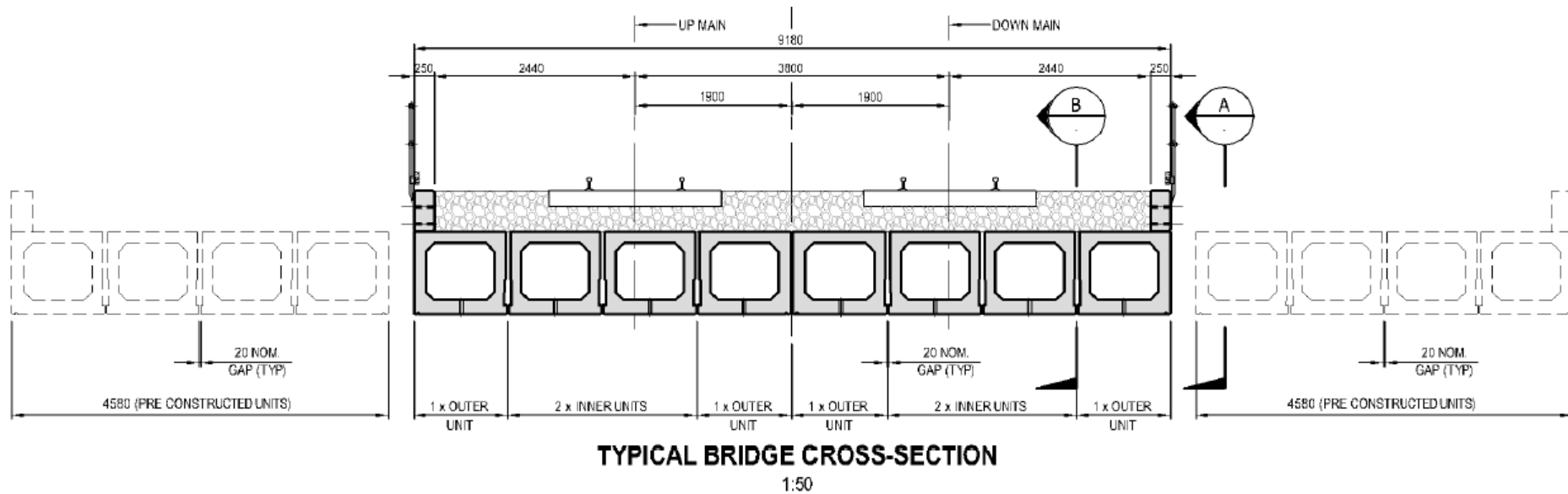
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# Typical cross section



# Girders





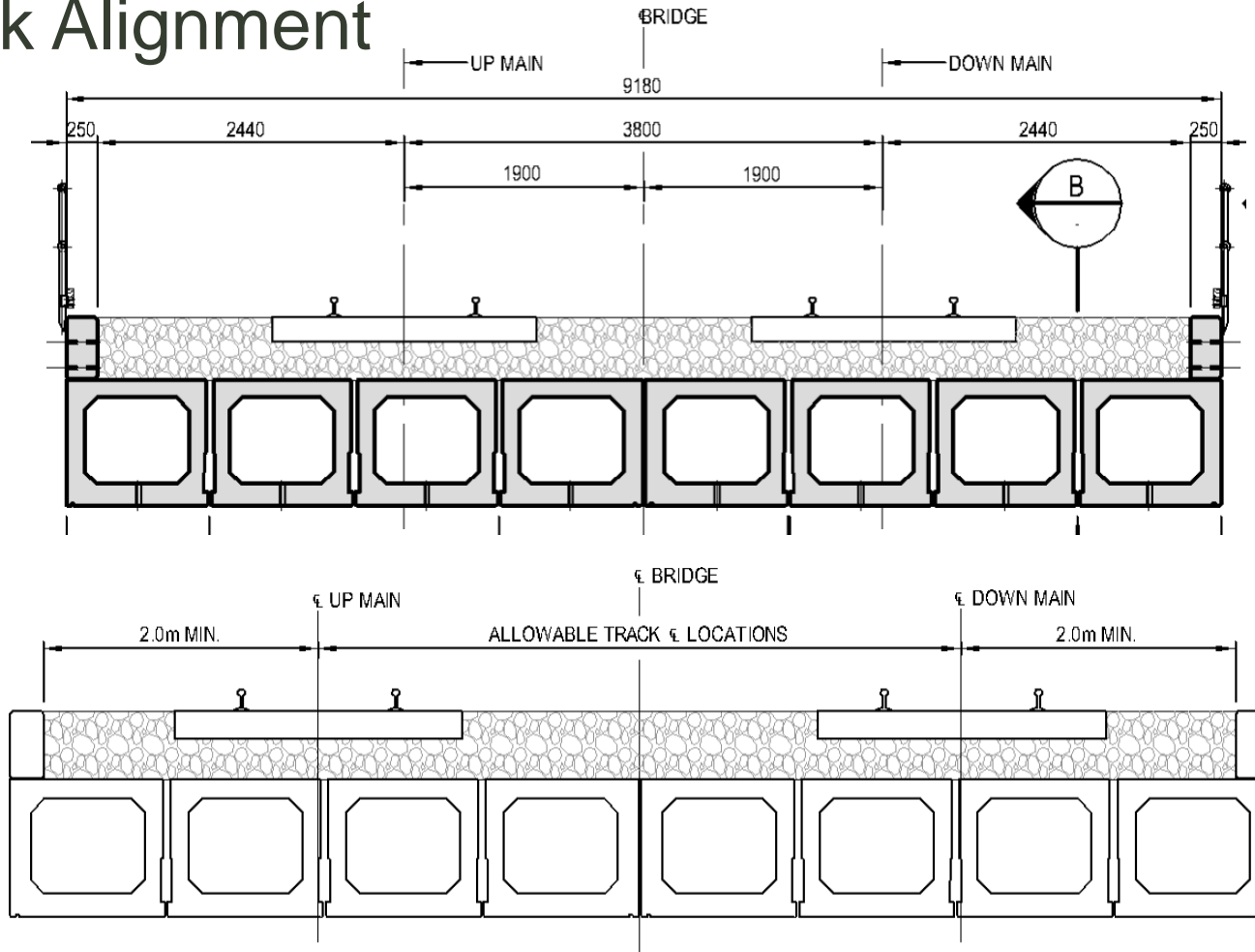


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# Track Alignment



TRACK TO TRACK  $\phi$  ASSUMED TO BE A MINIMUM OF 3.8m (WITH EXCEPTION OF EXISTING TRACK ARRANGEMENT).



# Construction



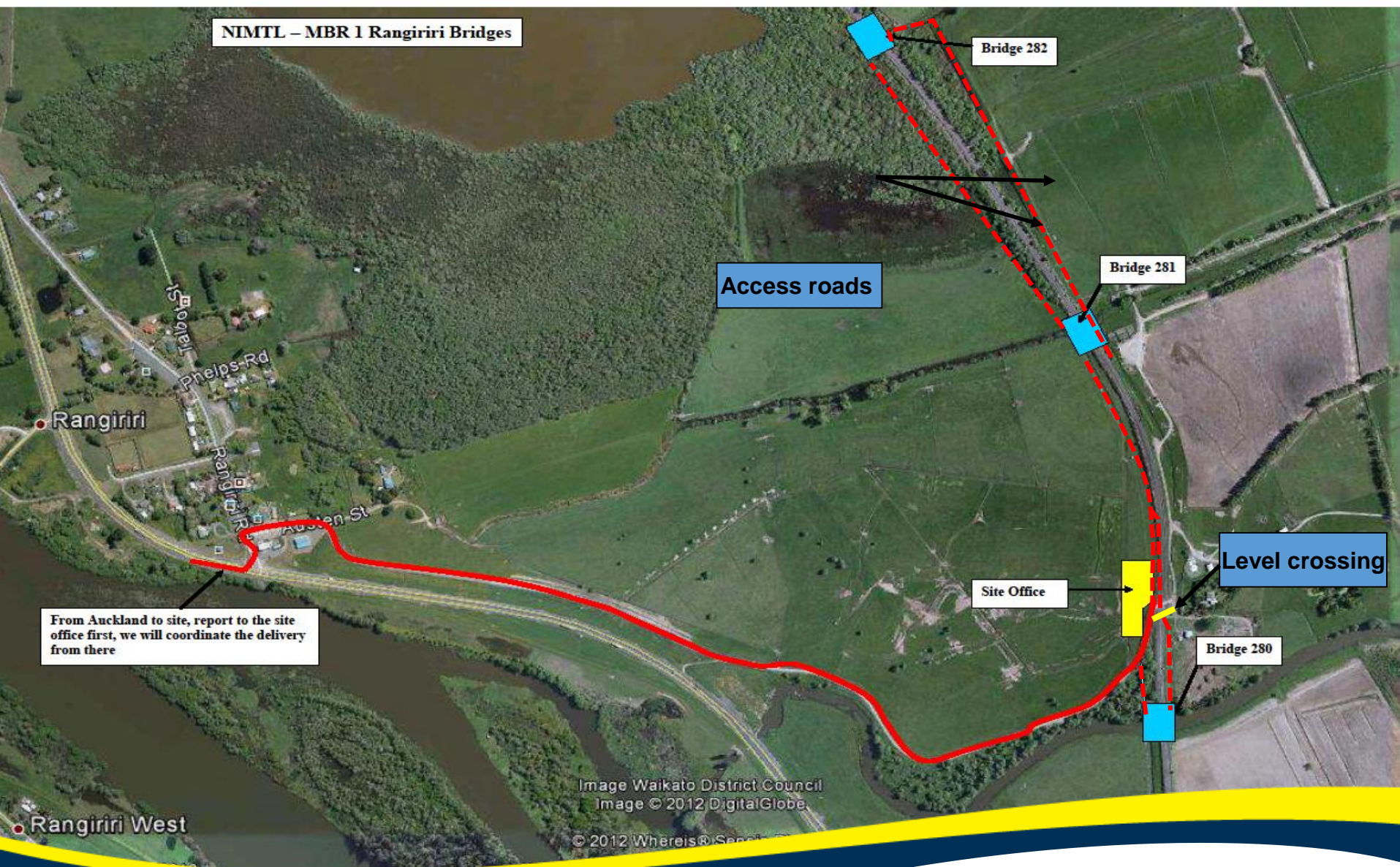
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# Location



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**BOL Works**

# BOL Design

**100 people on site over 72 hours**

**2 crews for 12hr shifts each**

**2 separate teams for structure and civil works**

**Separate teams for each of 3 bridge sites**

**Separate KiwiRail Crew integrated with HEB team**



# Horizontal Jacking System

- ♠ 22t jacks with 11t pulling capacity, 700mm stroke.
- ♠ The jack could operate all together or individually through a series of valves and manifold.
- ♠ Two jacks per pump
- ♠ Two 30t vertical jack per beam
- ♠ One 30t load skate per beam
- ♠ The load skates inside a 200 x 75 channel



# Key Areas of Success From ECI

**Planning, train control and track work combined effort from HEB & KR.**

**Accelerated Programme, with little up front design from KR.**

**Council allowed building consent waiver.**

**Health and safety was aligned with KR.**

**Collaborative approach to agreeing access with adjacent land owners.**

**People key issue with right culture respect from both sides.**



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# Thank you



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