

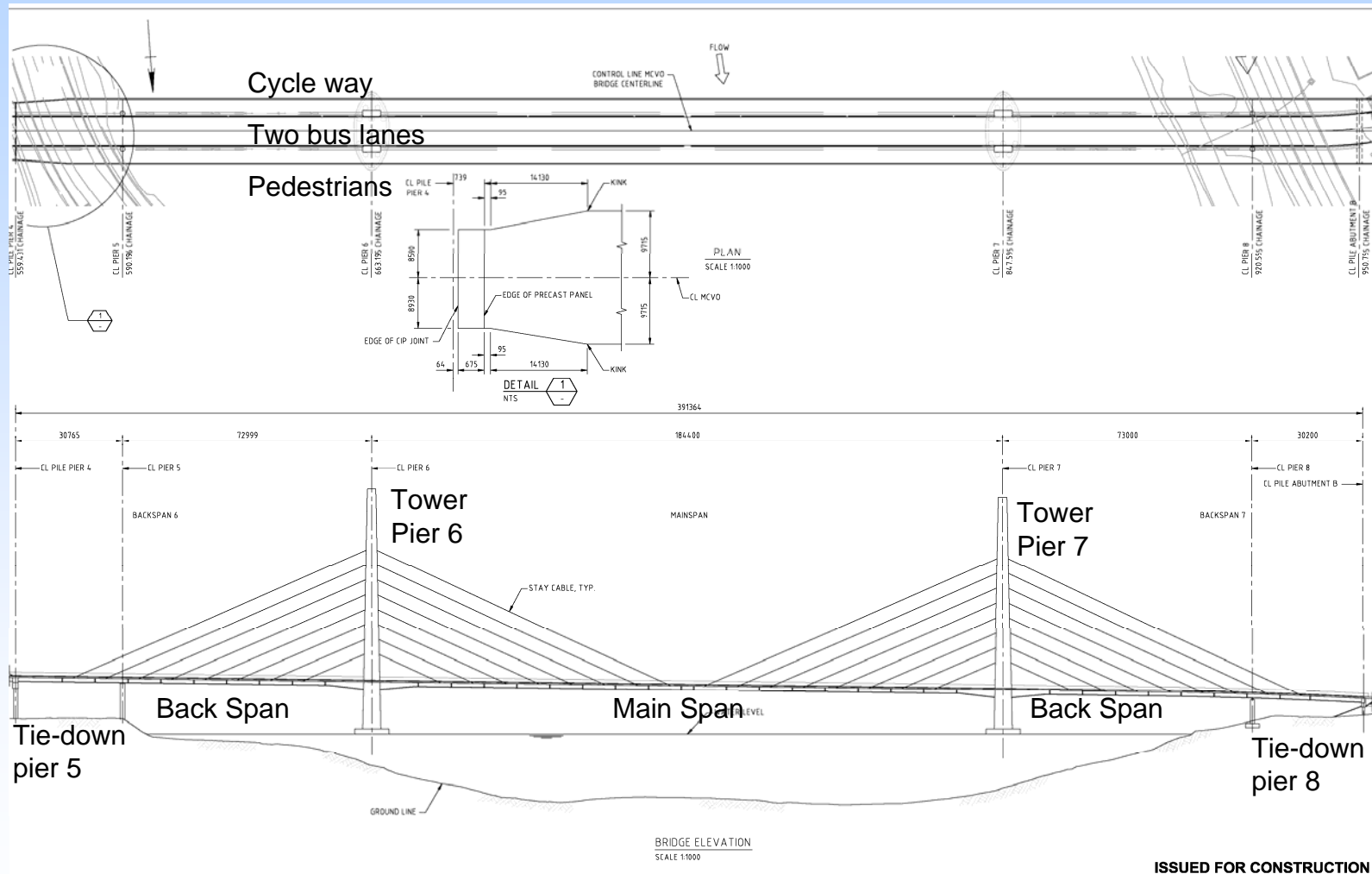
Cable Stays

Eleanor Schonell Bridge (also known as Green Bridge)

Topics:

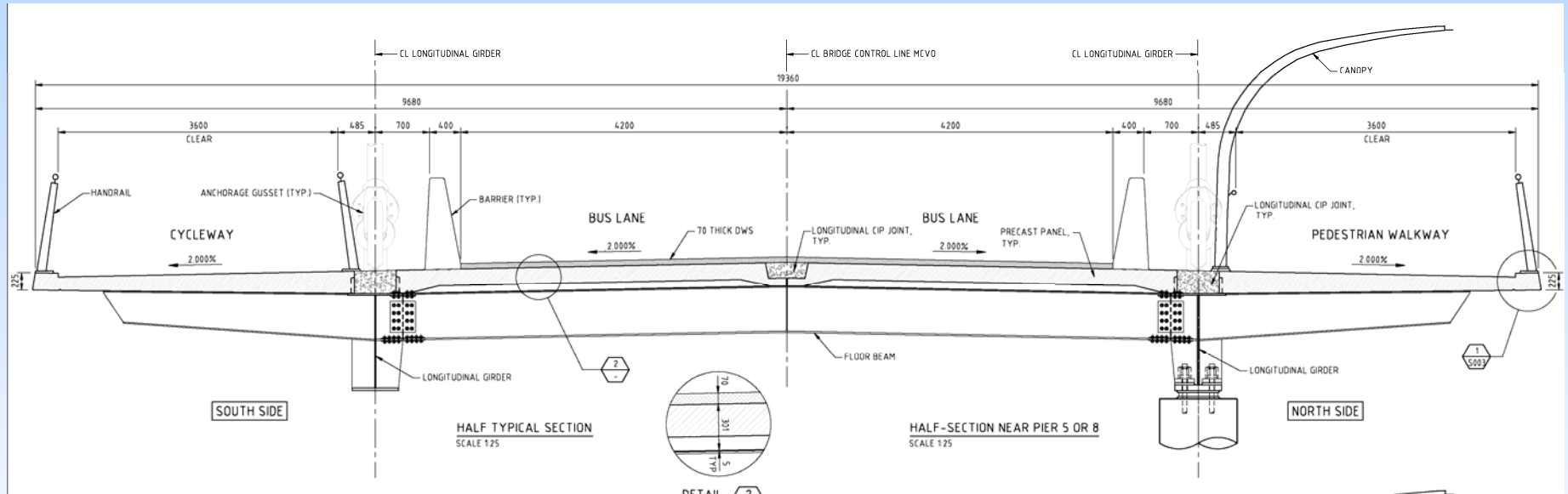
1. Overall bridge form, major elements.
2. Main elements of cable stays.
3. Outline of construction sequence.
4. Governing Codes adopted.

Plan & Side Elevation



ISSUED FOR CONSTRUCTION

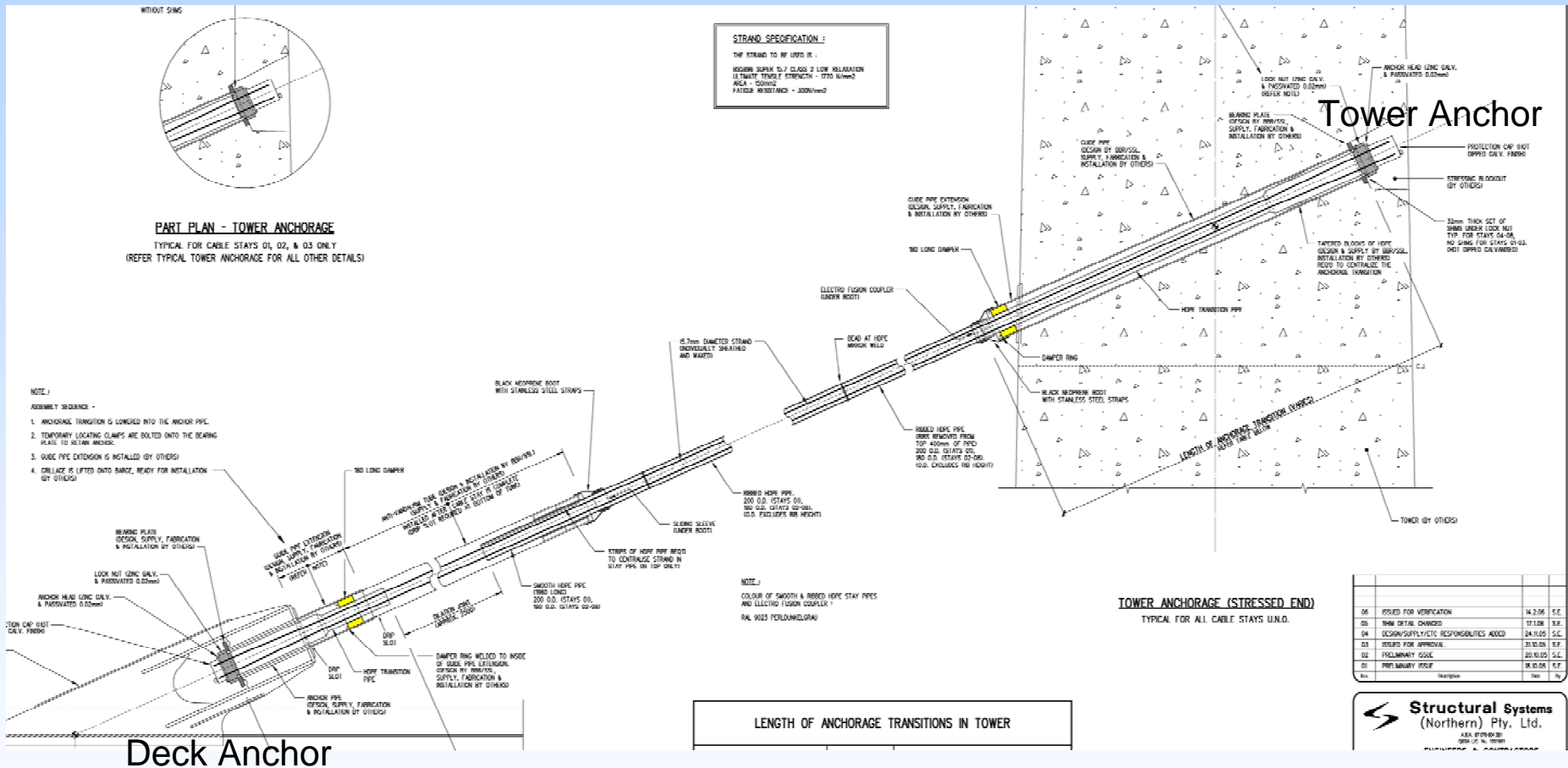
Deck X-Section



Near Completion



Cable Stays General Arrangement



Eleanor Schonell Cable Stays – Main Features

State of the art BBR CONA stay cable technology.

31 and 37 strand parallel seven wire 15.7 mm strands enclosed in a UV-resistant HDPE stay pipe with co-extruded architectural dark grey colour.

Two exterior spiral ribs on the stay pipe help aerodynamically stabilize the stays and prevent wind and rain-induced cable vibrations.

Strands are galvanized, waxed and individually sheathed with a continuous and wear-resistant HDPE coating, providing each strand a triple protection system.

In the anchorages, the strand bundle passes through a deviator and spreads out towards the high fatigue resistant anchorages, where each strand is individually guided and locked with high fatigue resistant wedges.

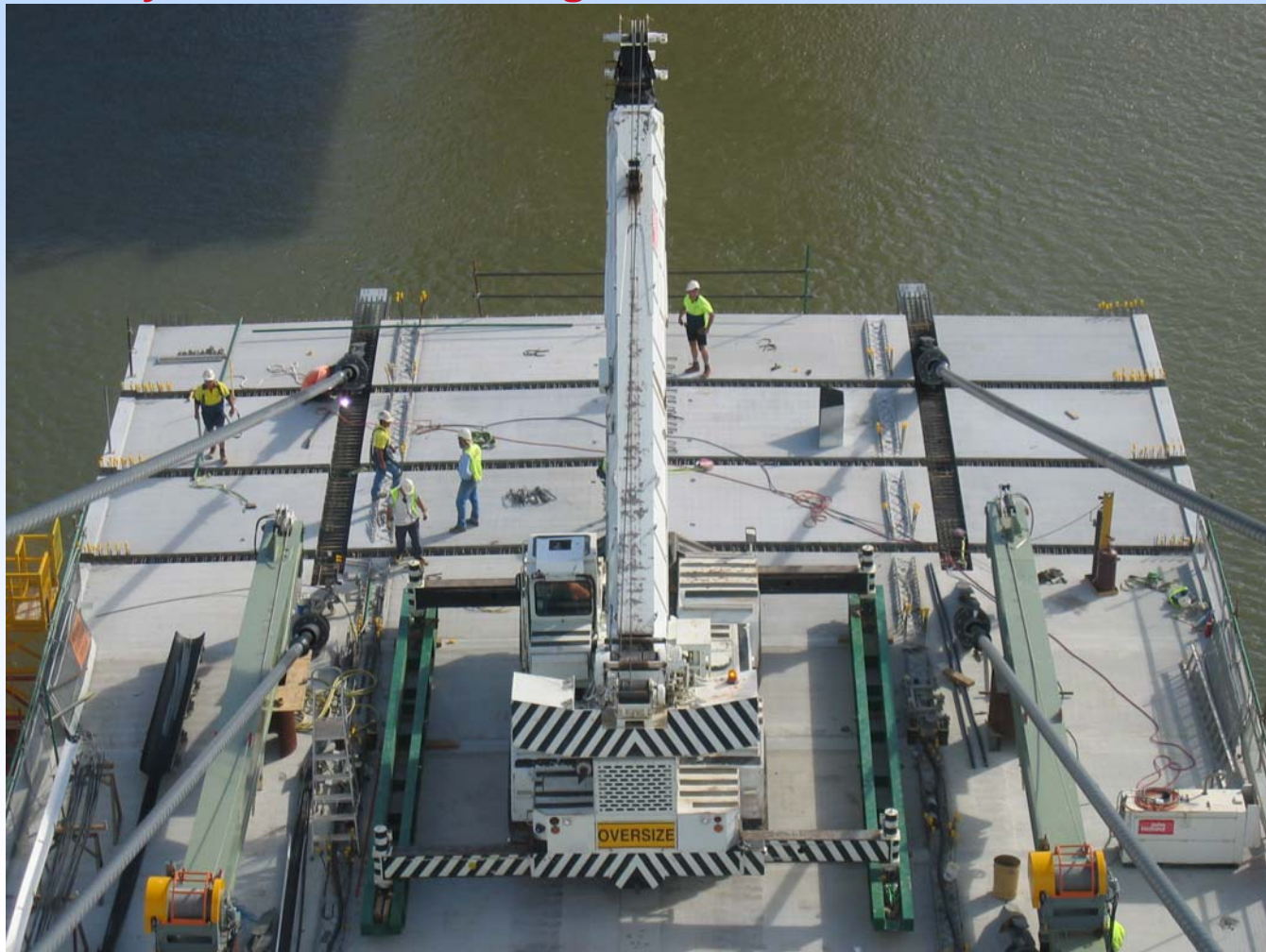
Lock nuts screwed onto the anchor heads transfer the stay loads by contact pressure to the supporting bearing plates. The individual strands inside the anchorage are protected by a corrosion-inhibiting compound.

With this system, the anchorage is fully encapsulated with a multi-barrier system.

Construction of Cable Stayed Deck

Built akin to balanced cantilever construction.

One pair of stays for each deck segment.



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Built from Piers 6 & 7 simultaneously.

At each pier, deck segments erected on alternate ends (main & back spans).

Cable stays provided critical, staged support to each deck segment.

After steel deck grillage erected, eight strands reeved & stressed.

After precast deck installed, joints poured & reached a minimum strength, remainder of strands reeved & stressed.

After survey, all strands re-stressed to achieve intended deck level.

After deck, part of bitumen & most barriers complete, final stressing of stays to achieve final deck level.

During construction feedback on required stay extensions & target forces was essential to achieve intended deck levels & even distribution of load amongst stays.

Survey of deck levels → designer rerun deck model → Structural Systems applied required extensions to stays.

Governing Codes

“Recommendations for Stay Cable Design, Testing and Installation”, Post-Tensioning Institute, Phoenix, Arizona, USA, 4th edition, February 2001. Included in the head contract tender, this publication is the earlier of the two widely used codes for cable stays.

FIB “Recommendations for the Acceptance of Stay Cable Systems, Using Prestressing Steels”, Federation Internationale du Beton, Lausanne, Switzerland.

This publication is slightly more up to date. It was published after the award of this project, but was used a guide to best practice.

Both of these publications are essential references for clients, head contractors, stays cable system suppliers & contractors, structural engineers & architects involved with cable stays.

Acknowledgements:

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The views expressed and any errors are those of the presenter.