



## Structural Description

The existing structure to the east is a two-lane, double-span rail-bridge over the M2 motorway constructed circa 1996. Each span is approximately 35m with a supporting abutment located between lanes on the M2. The structure consists of approximately 3m deep concrete box girders. A lightweight steel handrail is fixed to both sides of the bridge.

This bridge has been designed for M270 loading plus impact class 1XC in accordance with the 1992 Austroads bridge design code. It has also been designed for a minimum ballast depth of 300mm under the concrete sleepers which equates to approximately 5kPa.

The existing structure to the west is a single-lane, double-span rail-bridge constructed circa 2016. It spans approximately 38m with a supporting abutment located between lanes on the M2. The structure consists of three, 1.8m deep pre-stressed concrete super-T girders. Precast concrete fascia panels are fixed to both edges of the bridge with steel posts supporting safety screens fixed to these panels.

This bridge has been designed for 300LA railway traffic loading in accordance with AS5100.2-2004. It has also been designed for a minimum 300mm depth of ballast below sleepers which equates to approximately 5kPa.

## Feasibility of Additional Loading

Dead loads imposed by the signage are expected to be significantly less than the original design load of each structure. The proposed additional dead loading represents an increase of approximately 3% of the current design dead load for the western bridge and less than 2% for the eastern bridge. Northrop have not undertaken detailed analysis of the bridge structure, however in our professional opinion we anticipate this load increase will be allowable considering the capacity of the existing structure.

Assuming the new signage elements can be aligned with the depth of the existing bridges, the new signage is not expected to attract significant additional wind loads to either structure.

Given that the western bridge was constructed in 2016, it is expected that the structure will be in good condition, maintaining the original structural capacity. The condition of the older, eastern bridge should also be reasonable considering it was constructed in 1996.

Multiple service ducts are located in the edges of the deck of the eastern bridge. Signage fixings to the existing structure will need to be coordinated to avoid damaging these services.

## Recommendations

Based on our understanding of the proposed signage and the existing structure, we see no reason why the existing structure could not support the additional loads imposed by a sign fixed parallel and within 500mm of the edge of the bridge, subject to further engineering design and the following recommendations:

- This letter is intended to provide structural feasibility advice only and does not constitute a structural engineering approval. Signage details are yet to be determined, and further work is required to provide structural analysis and approval for construction.



ON BEHALF OF NORTHROP CONSULTING ENGINEERS