

November 13th, 2020

SY201496-SL08-A

# Timothy Chee

## Ethos Urban

173 Sussex St

Sydney NSW 2000

Dear Timothy,

**RE: Rail Signage Site 08**

### Corner of Mona Vale Road and Pacific Highway (Pymble) – Bridge Mounted

## Structural Feasibility Statement

Northrop Engineers have been engaged to undertake a desktop review of the proposed signage at the location above. The existing railway overpass structure above Mona Vale Road and parallel to the Pacific Highway has been assessed in order to determine the structural feasibility of installing new signage on the existing bridge. The investigation was based on aerial and ground photographs of the site. The limited available structural documentation for the existing structure is listed on the following pages. For detailed design, architectural drawings and survey plans will be required.

The assessment was done based on the available site plan & general arrangement drawings provided by Ethos Urban:

- Preliminary Assessment provided by Ethos Urban dated 03/08/2020
- DWG No. A-5.1 (Site Plan & General Arrangement) by Ethos Urban
- 19527detail (Survey Plan) by C.M.S. Surveyors PTY LTD
- Existing drawings – refer to Appendix A on following pages

As per the Preliminary Assessment document, an illuminated static signage was previously fixed to the western side of the rail bridge. This is also visible from available street photography. The new proposed signage is a digital signage on the eastern side, fixed to the noise wall. The screen dead loads have not yet been provided by Ethos Urban but based on our prior experience with LED signage these are typically in the order of 55 kg/m<sup>2</sup>. The bordering region is assumed to weigh approximately 10 kg/m<sup>2</sup>.

The total size of the signage at the above site is 15.5m wide x 3.3m high (including 12.4m x 3.2m digital screen), making the overall weight of the LED signage and border approximately 2.5 tonnes. This weight excludes additional fixings / supporting steelwork, access walkways etc. The total weight of the entire signage element, including structure will be in the order of 3.5 tonnes.

## Structural Description

The existing structure is a railway overpass suspended over a roadway. The rail deck consists of tensioned precast concrete planks spanning between abutments with an intermediate pier. The total span is approximately 50m.

Northrop assumes that the design live loads are approximately equivalent to the design loads in the bridge code AS5100. The available as-built drawings do not confirm the design live loads. For the purposes of our assessment, we have assumed that the design live loads are equivalent to current standard rail loading for passenger trains (type 300LA) which is approximately 22 tonnes per linear metre for each track. Refer to AS5100 clause 9.2 for loading conditions. Note that ultimate state design for rail loading includes relatively high load and dynamic factors, and that the train line has tracks in both directions.

## Feasibility of Additional Loading

Dead loads imposed by the signage are expected to be significantly less than the original design load of the structure. The proposed additional dead loading represents an increase of approximately 1% of the current design dead load of the structure (based off 1 span only). 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.

Given the position and geometry, the new signage is not expected to attract significant additional wind loads to the structure, which should be similar to those experienced by the signage previously located on the western side. It is assumed that signage fixings will connect directly into the primary concrete structure. Connection to the structure will require further analysis for overturning and wind induced moments.

## Recommendations

Based on our understanding of the structure to date and the above discussed loads, we see no reason why the existing bridge could not feasibly support the additional loads imposed by a new sign fixed parallel and close (within ~500mm) to the bridge edge. This assessment is subject to further engineering design and the following recommendations:

- Site investigations will be required prior to detailed design including concrete scanning to determine reinforcement quantity and location.
- Further structural engineering needs to be undertaken for complete engineering analysis of the existing structure and design of the proposed sign framing and connections. A full set of as-built structural drawings will be required for this analysis.

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.

Yours faithfully,



**Brendan Blake**  
Structural Engineer  
BE (Civil), Dip Eng Prac



**Isabel Duffy**  
Associate | Structural Engineer  
BE Civil with Architecture Hons. MIEAust CPEng NER

ON BEHALF OF NORTHPROP CONSULTING ENGINEERS



# APPENDIX A

List of existing structural drawings by State Rail Authority of NSW Way and Works Branch, dated 6<sup>th</sup> July 1983

- 180-374
- 180-375
- 180-379
- 180-380
- 180-381
- 180-382
- 180-383
- 180-384
- 180-387
- 180-388
- 180-389
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