

# **Interactive approach for the design of Governor Road bridge abutment foundations**

**Alex Ting** <sup>\* & 1</sup>, Daiquan Yang <sup>2</sup>, Trevor Cruden <sup>3</sup>, Peter Kerian <sup>4</sup>

<sup>\* & 1</sup> Principal Geotechnical Engineer - Tonkin & Taylor Pty Ltd; <sup>2</sup> Senior Principal Geotechnical Engineer / Technical Director - Tonkin & Taylor Pty Ltd; <sup>3</sup> Project Director – McConnell Dowell; <sup>4</sup> Project Director – Decmil

## **Abstract**

This paper presents a comprehensive case study of the geotechnical design and construction challenges in the development of a road bridge over the existing Governor Road as part of the completed Mordialloc Freeway Project in Victoria. The bridge over Governor Road comprises a two-span structure with a spill-through abutment on both sides. The bridge abutments are supported on a combination of vertical and raked ‘floating’ piles driven into compressible Quaternary Swamp Deposits, Brighton Group and Fyansford Formation.

The paper details the interactive approach and considerations implemented in the bridge abutment pile design. It elaborates on the complex interaction between the piles and the abutment fill placed on thick, compressible soils. The paper further highlights the subsequent adjustments made to the pile design during construction. This was in response to a revised earthwork staging and updated lateral soil movements induced by the abutment fill and temporary surcharge based on settlement monitoring data. The interactive design and risk mitigation approaches have proven effective in enabling the bridge structure and abutment fill construction to continue without delay. The paper also underscores the critical role of close collaboration among the project owner, contractor, and designers in overcoming the project challenges.

**Keywords:** driven precast pile, raked, negative skin friction, lateral soils movement, wick drain, surcharging, observational, rate of settlement, back analysis, primary and creep settlements,