



## Temburong Bridge, Brunei CC4 Swamp Crossing in Temburong District

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### Abstract

The new 30 km Cadangan Projek Jambatan Temburong (Temburong Bridge Project) in Brunei will connect the relatively isolated district of Temburong with the more developed Brunei-Muara district. The project includes approximately 12 km of low level piled slab viaduct structure crossing a peat swamp forest in the Temburong District (CC4 Contract).

The peat swamp forest has unique and endangered flora and fauna. The soil conditions consist of soft peat overlying soft marine clay with depths exceeding 70m. In order to permit a fast track construction method with minimal disturbance to the environment, the design required a simple yet innovative solution.

This paper describes the design of the viaducts, focusing on the development, decisions and details adopted to aid the construction method.

**Keywords:** Viaduct, Precast, Reinforced Concrete, Swamp Crossing

### 1 Introduction

Following completion of the Feasibility Study [1] for the 30 km long Brunei Temburong Link, the project was divided into several construction packages [2]. The design and construction of the 12 km of low level piled slab viaduct crossing a peat swamp forest in the Temburong District, which will be delivered under the CC4 Construction Contract, are highly constrained by the environmental requirements [3].

The peat swamp forest has unique and endangered flora and fauna. The soil conditions consist of soft peat overlying soft marine clay with depths exceeding 70m. Due to these challenging ground conditions and in order to safeguard the flora and fauna of the swamp forest, a top-down construction method has been developed, with all construction undertaken from deck level.

The deck consists of almost 200 no. 120m long piled slab modules. Each module consists of 10 no. 12m spans. The design maximises the use of precast concrete elements and repetition, enabling construction to be undertaken in a fast track manner, a necessity to meet the forecast completion date.

Each foundation consists of 4 no. 0.9m diameter concrete spun piles, with a precast pile cap landed above. The piles and precast cap are connected via a cast in-situ pile plug at each pile.

The superstructure is comprised of five precast double T beams per deck, which are landed onto the precast pile caps.

Four deck slab stitch pours connect the double T beams together to form the deck slab, whilst an in-situ diaphragm pour connects the double T beams to the precast pile cap, completing the structure.