



Innovative Design and Construction of Special Guideway Structures for Vancouver's New Evergreen Line SkyTrain Extension

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Abstract

The new Evergreen Line is an 11 kilometre extension to the existing SkyTrain advanced light rail transit system in Metro Vancouver, British Columbia, Canada. The project scope includes design and construction of six new stations, expansion of one existing station, nine kilometres of elevated and at-grade guideway, and a two-kilometre bored tunnel.

This paper focuses on innovative design of the elevated guideway "Special Structures" where the standard precast segmental construction was not suitable. The necessity of constructing Special Structures is primarily driven by the complexity of the guideway and station geometry, and constraints imposed by properties, municipal infrastructure, railway tracks, and by connecting to an existing station. Construction challenges included working in constrained linear corridors, through multiple municipal jurisdictions, and over private properties and active railway lines.

Keywords: elevated guideway structures, light rail transit, performance-based seismic design

1 Introduction

The new Evergreen Line is an 11-kilometre extension to the existing SkyTrain advanced light rail transit (ALRT) system in Metro Vancouver, connecting the neighbourhoods of Burnaby, Coquitlam, and Port Moody to the existing Millennium Line at Lougheed Town Centre Station. Total project cost is estimated at \$1.43 billion. It was delivered as a design-build project and opened to the public for revenue service on December 2, 2016. The project scope includes design and construction of six new stations,

expansion of one existing station, nine kilometres of elevated and at-grade guideway, and a two-kilometre bored tunnel. The Design-Build Contractors formed three joint ventures (JVs) to deliver various components of the project. The Special Structures were included in the scope of two of these JVs.

The following figure shows the overall guideway alignment of the new Evergreen Line as well as the locations of various Special Structures: