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Tight curved microtunnel in Auckland; New Zealand

ABSTRACT

The City Rail Link project in Auckland is the biggest underground infrastructure project ever made in New Zealand. The project consists of the construction of an underground rail tunnel between two existing rail stations. As part of this project, Bessac, associated with the local company March Construction, has successfully carried out the CRL C6 contract. This package consisted in the diversion of an existing stormwater tunnel located in the axis of the future rail tunnel. The scope of works included the construction of a 425 m long microtunnel, 2.0 m ID with a 100 years' design life and the construction of shafts and associated civil works, in a sensitive urban area. The geological conditions were very heterogeneous: the first part of the microtunnel is in soft clogging rocks and soils and the last part is in a mixed face with very hard and abrasive basalt. The project was originally designed to be carried out in two straight drives. Thanks to its expertise and previous experiences, Bessac brought an innovative solution to build the microtunnel in only one curved drive and so save the construction of an intermediate shaft. This alternative route included a very tight "S curve", with a radius of only 150m. Almost 90% of the length was curved. This solution was possible thanks to an adapted MTBM for such curves, the implementation of specific hydraulic joints between each pipe with a real-time monitoring system and experienced operators to ensure an accurate guiding while respecting the high local safety standards.