

NEWater Infrastructure Plan Extension Public Utilities Board

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| Location: | Singapore, Singapore |
| Date: | 2010 – Present |
| Structure: | Water Supply Tunnel |
| Length: | 10,800 feet (3,300 meters) |
| Cross-Section: | 19 feet (6 meters) Diameter |
| Geology: | Jurong Formation (Residual Soils, Siltstone, Mudstone, and Sandstone) |
| Cost: | -- |
| Client: | CPG Corporation |
| Owner: | Public Utilities Board (PUB) |

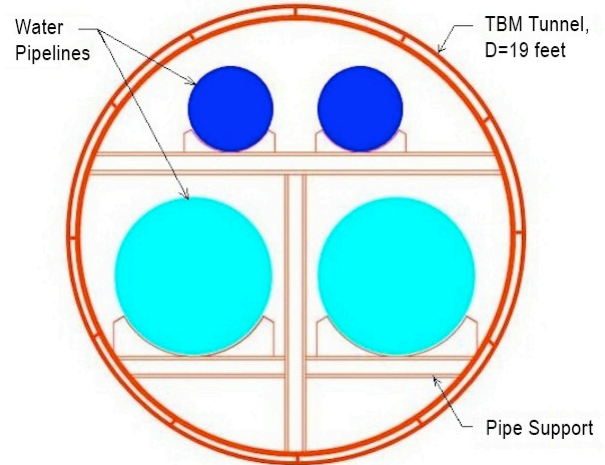


Figure 1. Typical cross-section view for pipelines within TBM tunnel. (Courtesy of PUB)

Design Services for TBM Lining:

The NEWater Infrastructure Plan Extension (NIPE) will extend the PUB services to Jurong Island, and increase the water supply to the country's large industrial area.

The NIPEC4 design-build contract consists of a 10,800 foot (3,300 meter) long, 19.7 foot (6 meter) diameter Tunnel Boring Machine (TBM) tunnel, which will carry twin 3.9 foot (1.2 meter) diameter potable water pipelines and twin 7.2 foot (2.2 meter) diameter pipelines (Figure 1). Tunneling will be accomplished by closed face TBM beneath a busy industrial corridor as well as the West Jurong Channel.

Gall Zeidler Consultants (GZ) provided the bidding contractors with the design for the TBM tunnels and shaft connections in addition to the geotechnical monitoring program and advice on the TBM selection.

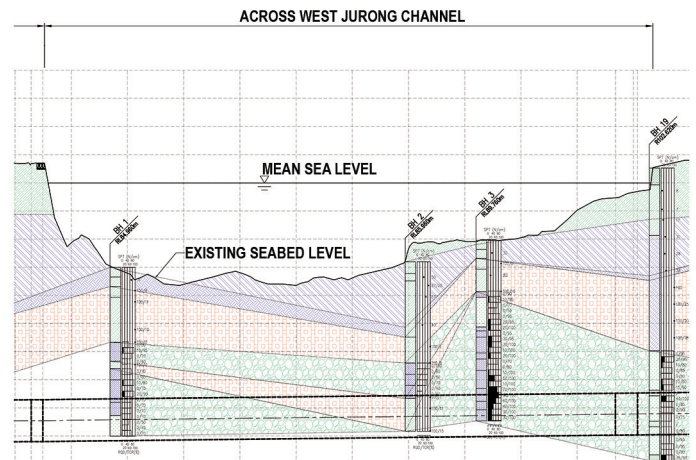


Figure 2. Geologic profile across the West Jurong Channel.