



## K2B Fornebubanen (NO) Water & Frost Protection (Vann- og Frostsikring)

<b>Country</b>	Norway
<b>Type</b>	Metro
<b>Client</b>	Oslo kommune - FOB
<b>Main Contractor</b>	Veidekke
<b>Execution of the work</b>	Renesco GmbH
<b>Designer</b>	Cowi, Multiconsult
<b>Construction Period</b>	2024-2025

## Project Description

The Fornebu Line is a new metro extension in a continuous tunnel system, between Majorstuen and Fornebu. The metro line is approximately 7,7 kilometres long, and has six new underground stations: Skøyen, Vækerø, Lysaker, Fornebuporten, Flytårnet, Fornebu. The Fornebu Line will provide better public transport services to an area under development into housing and commercial areas adjacent to the city centre. At Majorstuen, the track will connect into the existing metro network in Oslo.

## Scope of Service

Supply and install of the water & frost protection system using a 1.2 mm thick reinforced LLDPE membrane. The lining is fastened to bolts and bolts are fastened to rock according to Norwegian Handbook. All membrane is jointed together by hot air welding to guarantee a waterproof. Layer of spacers and steel mesh is installed and fastened by octopuses and nuts.

- Data transfer from BIM to Gemini and from Gemini to Bever control to create drilling – bolting data.
- Drilling by fully automatized rig (AMV 236T) via Trimble navigation, Bever Control System to allow a precise anchoring/ navigation with an accuracy less than 10 mm. All controlled by a surveyor team
- Installation of membrane bolts M16, M20, M25.
- Installation of technical bolts M25, M32
- LLDPE membrane installation with back and front plates fastened with nuts
- Welding of LLDPE membrane joints
- Installation of dilatation joints (crack lines)
- Installation of connection to fire walls
- Installation of spacers
- Installation of steel mesh fastened with octopuses and nuts.



1. Drilling operations with the AMV 236T for the bolting
2. Welding of LLDPE membrane
3. Installation of steel mesh