



## Background

The project Doorstroom (Thoroughfare) Station Utrecht (DSSU) includes optimising the current railway infrastructure on the site of Utrecht Central Station. Part of this plan is a service tunnel, which connects the public road with the southern rail yard. This underpass crosses four tracks and is built with minimum disturbance to normal train traffic.

On behalf of ProRail, the DSSU project is designed by Movares and will be executed by the contractors combination U-Central (BAM Rail and Volker Rail). The design phase includes the preliminary design, the final design and the implementation design.

## Implementation

The service tunnel is made up of 8 segments. The tunnel ramps consist of 6 open tunnel segments parallel to the tracks. The junction with the train tracks consists of 2 partially closed segments. The partially closed segments include a section in which the road turns the corner at 90 degrees. Under segment 4 there is a pump basin for rainwater.

Due to the high water table a sheet pile pit is needed since lowering of the groundwater level is not permitted. After unearthing of the pit and the pouring of the underwater concrete the pit is drained. For driving the sheet pile along the tracks there is 1 train-free period of 52 hours available. To build segment 5 in its final location there will be approximately 7 months when 2 of the 4 tracks will be out of service. This segment can be built relatively simply without disturbing the rail traffic. On the other hand, segment 4 must be built during a train-free period. To that end, the deck west of the railway tracks will be built on top of the sheet piles and during a 52-hour train-free-period slid on to its final place. The deck is located temporarily on the sheet pile walls, which are part of the building pit. Afterwards, the pit under the deck is unearthed. Then underwater concrete is poured and drained after the concrete has been sufficiently cured and the finishing work can begin. This phase consists of building the pump basin, building the concrete walls and floor underneath the deck, when once again a train-free period is needed.

Finally, the sheet piling is disconnected from the newly built segment to ensure that all external forces will be distributed to the new segment.

## Design

During the entire design phase engineering programs such as Allplan (drafting) and Scia (design) were used. The final design consists of a model where fabrication and reinforcement drawings can be generated. It is intended that this data can be transferred completely to the contractors combination U-Central so that information loss in the digital chain is reduced to a minimum.

The tunnel floor has both a longitudinal and transverse slope and goes through a bend in the tunnel. The floor reinforcement is orthogonal and follows the upper surface of the floor.

The project is designed in accordance with the latest European standards (EC2) and, where possible, the use of standard lengths of rebar.

Contact Gerrit van Kekem  
Address Postbus 2855  
3500 GW Utrecht, The Netherlands  
Phone +31 6 2278 2213  
Email gerrit.van.kekem@movares.nl  
Website www.movares.nl



### From concept to completion

Movares is an engineering consultancy providing solutions in the fields of mobility, infrastructure, building and spatial planning. Usability, future value and sustainability play a major role in the designs we produce and the advice we give. We contribute to accessibility through our unique combination of expertise. With some 1,400 members of professional staff, Movares operates throughout Europe and has offices in the Netherlands, Germany and Poland.

### Giving shape to mobility

Infrastructure is the backbone of development, both for society and the economy. From the initial studies and the earliest planning phases to the design and execution of projects through to management and maintenance, Movares plays an active role throughout the entire consulting and engineering process. Our combination of knowledge, expertise and innovativeness is summed up in our motto: 'Giving shape to mobility'.

### Project information

Owner	ProRail
General Contractor	Movares Nederland
Engineering Office	Movares Nederland
Location	Utrecht, The Netherlands
Construction Period	09/2013 to 10/2014

### Short description | Service Tunnel Station

A part of the "DoorStroom Station Utrecht" (DSSU) project concerns a new free crossing between the railway and the area to the south of "Centraal Station Utrecht" and the public road. During the design process of "Diensttunnel", the BIM concept was applied to attain savings in costs and time in the building phase. This implementation consisted of the engineer, contractor and rebar company coming together and reaching agreement on what information was needed and how that information can be exchanged. In practice, this resulted in reusing design information and speeding up the process.

