

## NORRA LÄNKEN TUNNEL

STOCKHOLM - SWEDEN

### Monitoring of railway tracks and buildings during the excavation of several road tunnels in Stockholm

The 300m long Norra Länken tunnel is a small part of the Stockholm road network under construction. Its complexity and its importance are remarkable, in particular because of the geological structure heterogeneity it goes through, the low average depth of the excavation (1m) and the fact that the tunnel goes through a nature reserve extremely important for the region. For all those reasons, Bilfinger Berger must guarantee the site integrity as well as that of the buildings located in the influence area.

Bilfinger Berger called on SolData's expertise to monitor railway tracks, the Wenner Gren Center building and a metallic cage designed to protect the tracks during the construction of 1.2m wide and 24m deep retaining walls. The aim of such supporting infrastructure is to create an access at the entry of the worksite.

In order to guarantee such integrity, SolData's solution consisted in a CYCLOPS based real time monitoring system. For that, we installed 30 targets on the railway tracks, 20 on the metallic cage and 6 on the lower part of the Wenner Gren Center, that is to say a total of 56 monitoring targets. With this system, our engineers were able to obtain settling and tilting measurements with a  $\pm 0.3\text{mm}$  precision.

The system, controlled by our GEOSCOPE software, clearly and easily shows the evolution of the measurements and is able to automatically send alarms by SMS or email. On several occasions, this system allowed Bilfinger Berger to take precautionary measures in order to guarantee the zone safety and the good development of the project.



CLIENT: BILFINGER BERGER

DATE OF WORKS : JULY 2007 – JULY 2011

#### WORKS CARRIED OUT AND MATERIAL INSTALLED :

- 1 Cyclops
- 56 prism targets
- Real time visualisation system
- Alarm system (email, text messages)
- System installation, configuration & maintenance
- Reporting