

### Channel Tunnel Rail Link 250

Ripple Road Flyover, Barking, LONDON - UK

#### Measurement of Network Rail Tracks and Highway structure during Compensation Grouting and the passage of the T.B.M

The Channel Tunnel Rail Link is being built by London and Continental Railways Ltd. It will be Britain's first major new railway for over a century – a high speed line running for 109Km between St Pancras Station in Central London and the Channel tunnel. For its route through urban London, the line runs in tunnels, passing adjacent to sensitive existing structures and services. The Ripple Road Bridge Structure in the Borough of Barking and Dagenham is one such structure.

As part of the settlement mitigation works prior to the passage of the tunnel boring machine it was necessary to strengthen the ground using injection grouting techniques.

SolData were appointed to design a monitoring system that would measure the track movement, the pH levels of the ground and the stability of the bridge during the grouting works and passage of the TBM. It was necessary that the system would be able to work in real-time and that the data be available for the engineer on-site, as the grouting and TBM works progressed.

The final design consisted of two CYCLOPS theodolites positioned on opposite sides of the tracks, 8 automated pH sensors and 3 multipoint borehole extensometers (MPBX) all linked to the Geoscope management and visualization software that was situated in the engineer's site office and checked remotely via modem.

In addition to the remote checking, SolData engineers were on call 24hours a day during the passage of the TBM under the flyover and tracks to ensure everything was functioning properly, and that no erroneous readings affected the progress of the TBM during this critical phase of works.



Above: The view from Theodolite B to the monitoring targets.  
Monitoring targets: Yellow for bridge monitoring, Green for track monitoring, Purple for rod extensometer

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| <b>CONTRACTOR :</b>   | NUTTALL/WAYSS & FREYTAG/KIER JV |
| <b>PROJECT DURATION :</b>   | MAY 2003 – OCTOBER 2003         |
| <b>SCOPE OF WORK :</b>  |                                 |
| <ul style="list-style-type: none"><li>• Real time monitoring with automated sensors and alarms</li><li>• 2 CYCLOPS theodolites with mini prisms</li><li>• 3 multi point rod extensometers (automated)</li><li>• 8 In-place pH sensors (Automated)</li><li>• 24hr call out during critical phases.</li><li>• Reporting</li></ul> |                                 |