



**UNDERGROUND RAILWAY STATIONS  
AT MACQUARIE UNIVERSITY,  
MACQUARIE PARK AND DELHI ROAD,  
SYDNEY**

A new underground railway line is being driven by twin TBM's beneath the northern suburbs of Sydney. This Thiess Hochtief JV project includes three new underground stations, each comprising twin caverns with individual spans up to 16 m. These are excavated by 300 tonne Roadheaders.

PSM personnel are responsible for all monitoring of the caverns, geological mapping, and advice in regard to temporary support.

Monitoring includes an extensive array of inclinometers, extensometers and convergence measurements, the data from which is used to assess support requirements, particularly in regard to shear movements on major bedding horizons.

PSM was also responsible for a programme of Rock Slotter in-situ stress measurements, undertaken to clarify unusually high horizontal stresses measured by hydrofracture techniques. The Rock Slotter results were consistent with previous data in the Hawkesbury Sandstone from which it was concluded that very high stresses interpreted from hydrofracturing were incorrect.



Photo 1 Macquarie Park Station – Platform Cavern, top heading



Photo 2 Macquarie Park Station – Concourse Cavern