



## Engineering Group of the Geological Society



### Evening Meeting

Date/time: 5.30pm Wednesday 17 June 2009

Venue: The Geological Society Burlington House, London

### AGM followed by a Presentation

## The Excavation of the 34th Street Station for the No.7 Line Extension and Grand Central Terminal Rock Caverns beneath New York

By Paul Heslop, Design Manager Contract CMO19 East Side Access (Grand Central)

**This presentation is a joint event supported by the *ICE New York Local Association* and the *British Tunnelling Society***

The presentation following the AGM is the first held jointly by the EGGGS with the ICE New York Local Association and the BTS on a significant underground engineering project. It will also be the first presentation in the UK on the challenges of the Grand Central Terminal Rock Caverns following on from the successful presentations on the 7-Line project running tunnels by Seth Pollak in winning the Engineering Group's Glossop Award and the previous Second Avenue joint BGA/BTS presentation.

The presentation will describe the ground investigation and detailed design work that has been undertaken for the design of the initial rock support at the 34th St. Station Cavern for the No.7 Line extension and the Grand Central Station Caverns for the East Side Access Project, both are currently under construction in New York. The caverns are upto 70 feet in height and in some locations with as little as 20 feet of cover.

The importance and value of undertaking a detailed ground investigation to establish baseline ground conditions will be illustrated with discussion on how the results of the ground investigation can be interpreted in order to establish meaningful ground models and rock properties for the design work.

The performance of the initial ground supports will then be discussed and the experience gained from the design and excavation of these large span and shallow rock caverns will be presented. In particular the back analysis of joint properties such as persistence and spacing will be highlighted, both of which have lead to the development of a refined ground model and a better appreciation of the rock mass behaviour in the Manhattan Schist, Granites and Gneissic rocks.

The presentation will describe the value added by sound engineering geological knowledge in characterising the ground and rock properties both during the initial ground investigation work and then during construction when detailed geological mapping can be used to verify design assumptions.

Refreshments will be provided.

#### Convenor:

Patrick Cox

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