



## Steam Tunnel and Storm Water Improvement Shaft University of Virginia

**Location:** Charlottesville, Virginia

**Date:** 2002 – 2003

**Structure:** TBM Receiving Shaft

**Depth:** 24 feet (7.3 meters)

**Cross-Section:** 507 square feet (46 square meters)

**Geology:** Fill, Fine to Coarse Silty Sand, Sand,  
and Mica Rock Fragments  
(Residual Soil)

**Cost:** Approximately \$8 Million

**Client:** Bradshaw Construction Corporation

**Owner:** University of Virginia

### Shaft Design and Construction Support Services:

Gall Zeidler Consultants (GZ) provided an alternative shaft arrangement study, detailed design, specifications, structural design calculations, instrumentation, monitoring, and construction phase services for a shotcrete lined, 26 foot (8 meter) diameter shaft with underpinning of an existing steam tunnel. The shaft provided access for the removal of an 8 foot (2.4 meter) diameter soft ground Tunnel Boring Machine (TBM). Shaft excavation and support were based on New Austrian Tunneling Method (NATM) principles.



**Figure 1.** Soft ground TBM for the construction of steam conveyance tunnels.



**Figure 2.** Shotcrete lined shaft and underpinning.