

Directional Core Drilling for the MetroWest Water Supply Tunnel

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Abstract:

The Massachusetts Water Resources Authority (MWRA) used directional core drilling technology from the mining industry and Norwegian tunneling practice to determine geologic conditions along a proposed rock tunnel alignment. The directional core drilling system was used on the most geologically complex section of the MWRA's 28.3 km (17.6 mile) long MetroWest Water Supply Tunnel (MWWST) in Weston, Massachusetts. A 533 m (1750 ft) long boring was drilled from the ground surface at a 30 degree angle from the horizontal. Specially designed coring tools were used to "kick", or bend the boring to the horizontal and parallel to the crown of the future tunnel at a depth of 63 m (207 ft).

Continuous rock core was recovered along the entire length of a portion of the MWWST alignment where faulted ground and soft rock alteration are known to occur. Evaluation of the core will aid in the refinement of a grouting program and the decision of whether a tunnel boring machine may be used, resulting in possible cost savings. Reduced contingency in the tunnel bids and potentially fewer differing site condition claims are also anticipated as a result of obtaining the core.

Keywords: alluvial and glacial soils; vertical borings, seismic refraction surveys, and outcrop mapping; Devico system; previous uses of the Devico system; Directional core drilling – Wye to shaft 5A; fault zone with gouge and breccia.