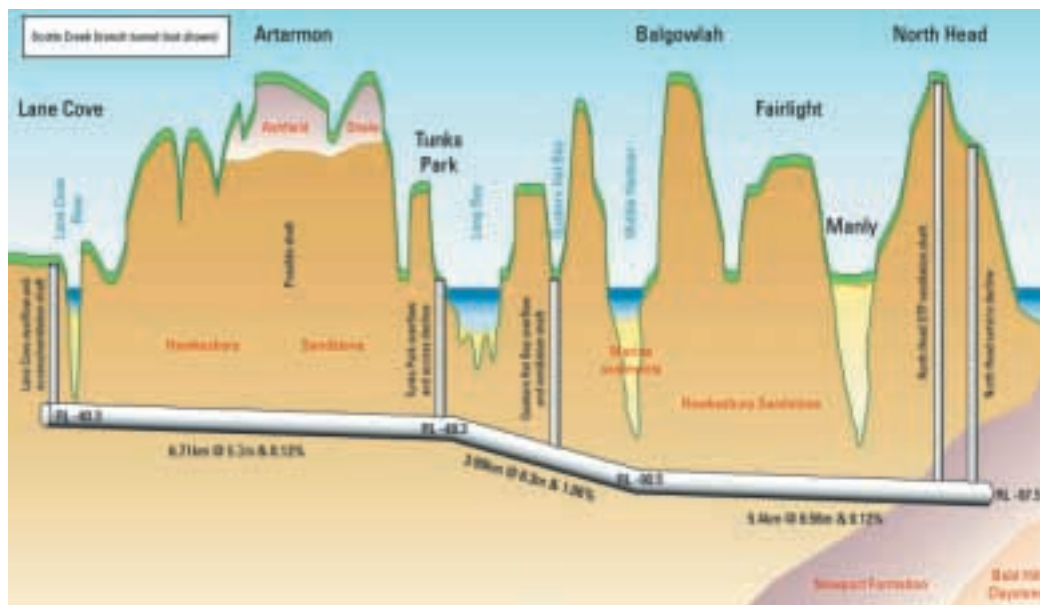


Leica survey instruments in Sydney also used underground on major environmental protection projects

From marking out of the entire Olympic Park in Homebush Bay through to completion of building work on Stadium Australia, Australian surveyors used the same Leica laser survey instruments (type TCA) as SwatchTiming is now using in the stadium to measure distances during athletics events. Australian surveyors from Hard+Forester supervised the surveying activities involved in creating Sydney's Olympic Park on behalf of the Olympic Coordination Authority. Surveyors from Hard+Forester have previously assisted construction engineers with positioning and orienting concrete immersed tube units for the Sydney Harbour Tunnel using instruments from Leica Geosystems. They also surveyed the vast underground Opera House car park adjacent to the harbour.

Right: The Northside Storage Tunnel collects rainwater from the northern Sydney district, with a population of over one million. The entire tunnel complex is around twenty kilometres long.

Below: 28-year-old surveying engineer Cameron Mills (left) is responsible for all the survey work involved in the project. Bruce Forester (right): "These young lads have certainly got what it takes!". When it comes to instrumentation, Bruce Forester has trusted Leica Geosystems for decades.



Left: For control and monitoring, targets are set up in the tunnels at precise, known coordinates. Working in dust, wet and darkness stretches both men and machines.

Centre: Various tunnel construction techniques were used, including four large tunnel boring machines with 6.3 m / 6.57 m diameter.

Bottom: Cameron Mills with his LEICA TCA1800 equipment in the cavern at Scotts Creek, where site access and tunnels from four directions converge. Excavated material is transported above ground in barges – the work is virtually inaudible to residents of nearby Tunks Park.



16-kilometre Northside Storage Tunnel

For the past two years, 28 year-old Hard+Forester employee Cameron Mills and more than a dozen survey specialists have been guiding four giant tunnel boring machines on a route that follows the northern foreshore of Sydney Harbour and passes below Middle Harbour to the coast at Manly. The machines are excavating through sandstone to create a wastewater retention tunnel 16.1 kilometres long and 6.30/6.56 metres in diameter. The project is important for environmental protection in the Sydney Harbour area.

Bruce Forester says, "I am happy for the athletes that these laser devices will be used to take the measurements at the Olympic Games in Stadium Australia. As the best athletes in the world, they deserve that the best measuring instruments should be used. Only in this way can their accomplishments be determined accurately, quickly and fairly". Bruce Forester knows what he is talking about: just a few months before the Summer Olympics get underway, a team led by Cameron Mills used exactly the same instruments to steer four giant tunnel boring machines from various directions over kilometre-long curved paths at precisely defined inclinations up to 80 metres underground, with centimetre precision. Now, the water in Sydney Harbour remains clean even after a cloudburst. **Stf**

