

Bond Street Water Main Replacement

Client: Thames Water

Location: London

Value: £6.5m

Duration: 17 Months

In Brief...

To meet London's ever growing transport needs, LUL have carried out a major upgrade of Bond Street Station. More than 155,000 passengers use the station daily. With that number set to increase to 225,000 when Crossrail arrives in 2018.

The upgrade works will reduce congestion and delays at the station, open a new station entrance, provide step-free access and integrate access to Crossrail services.

To enable LUL to deliver the full programme of works safely, several critical water mains needed to be protected from potential settlement, which could arise from the Crossrail tunnelling operations and the associated station upgrade.

Collaboration in Design...

To ensure the project was delivered successfully, Barhale collaborated with several parties throughout the works including; LUL, COLOR and Thames Water. We proposed that slip lining should be used, where possible, to replace the mains instead of traditional open cut techniques. This would reduce the impact on pedestrians as well as the amount of excavation required.

Thames Water had designed for rider mains to run the entire length of site, which would take flows from the existing mains while the team worked on them, ensuring a constant supply of water in this critical section of the network.

Barhale highlighted the impact this would have on pedestrians and requested a re-design to allow for the installation of cross connections between the three mains. This would allow one main to be switched off at a time, while the other two carried the additional flow. Following successful model tests, Thames Water agreed to the re-design.

Technical Features...

The station upgrade necessitated significant tunnelling works at several underground levels; covering a large area beneath Oxford Street and the surrounding areas.

As a result the following asset protection works were required:

- Installation of line stops on three Victorian Cast Iron water mains, some of which were over 150 years old
- Replacing the three cast iron trunk mains along Oxford Street with a combination of HDPE and Ductile Iron Pipe:
 - 30 inch diameter; 120m through open cut and 52m through slip lining
 - 24-inch diameter; 60m through open cut and 110m through slip lining
 - 21-inch diameter, entire 172m replacement delivered through slip lining in 1 pull

It was hoped that slip lining could be used for the entire replacement, however due to bends on the old main, mainly due to station box locations, open cut on-line replacement was also incorporated.

- The replacement of 4, 5 and 12 inch diameter distribution mains in nearby Davies Street



Existing Cast Iron Mains were lined with new HDPE Pipe



Works were completed in a tight compound in the middle of Oxford Street

Customer Benefits...

Through collaborating closely on the permit to dig controls with LUL, COLOR and Thames Water the Barhale team were able to record over 126,000 man hours without a major utility strike or a lost time incident.

The use of slip lining and cross connection's also benefitted LUL as it reduced the risk of underground utility strikes and improved the carbon footprint of the project by reducing the amount of spoil produced and therefore the number of vehicles required to move it.

One of the key features of the project was the large volumes of concrete encountered during excavation. Machine breakers could not be used as they risked damaging the station structure and buried water-mains. Hand held breakers also held the risk of service strikes and brought associated HAVS health risks.

Following consultation between all members of the project Hydro Demolition was chosen as the most effective method of excavation. To mitigate the risk of excessive noise caused through the demolition, a large acoustic enclosure was erected around the works to dampen the sound; with regular sound monitoring undertaken. Over 60m³ of concrete was safely excavated using hydro demolition.

Barhale's collaboration on site was rewarded by winning the "Thames Water Best Practice in Health and Safety Collaboration Award" along with a "Safe and Sustainable" award.

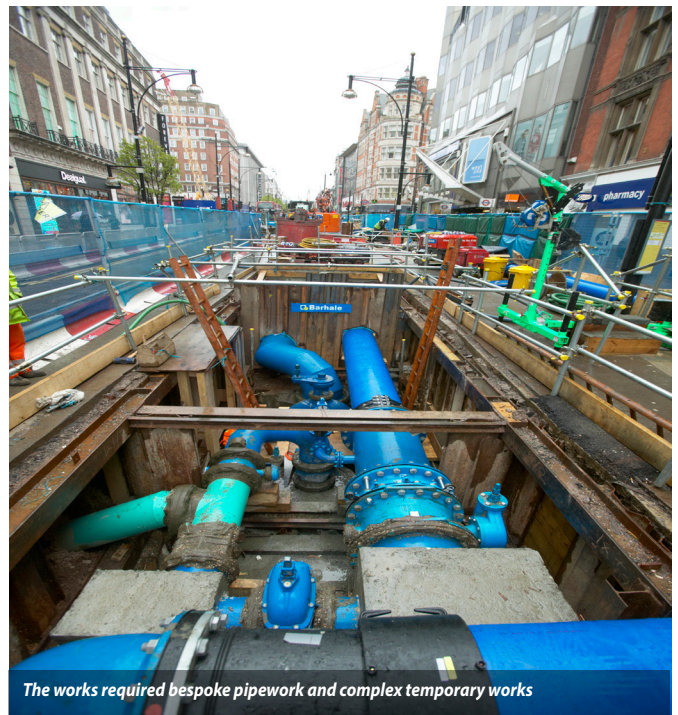


Bond Street Team being awarded

Public Interface...

Barhale interfaced positively with members of the public throughout the project. This was best demonstrated when the project held Very Important Pedestrian (VIP) Days; where Oxford Street was completely handed over to pedestrians for the whole weekend. This event required Barhale to completely demobilise from site to ensure Oxford Street was safe for pedestrians.

All members of the project team, along with external third parties, including Westminster Council, collaborated closely to clear the programme to ensure the deadline was met. It involved instigating a 24/7 working programme; split into two 12 hour shifts, each with approximately 20 men on each. The management of this number of operatives on a confined site was vital to ensure that the programme could be met in a safe way. The weekend was a resounding success, with Barhale's efforts recognised by both LUL and the New West End Company.



The works required bespoke pipework and complex temporary works