References

Weholite limits overflows and pollution in London

Uponor involvement

- 5 km Weholite pipes in dimension 400–3000 mm, 12 large Weholite Modular boxes

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Uponor's Weholite technology was the key solution in a unique project in London, where the Lee Tunnel and Thames Tideway tunnel have the task of capturing an average of 39 million tonnes of sewage a year from the 35 most polluting combined sewer overflows (CSOs). An upgraded pipeline system was designed to reduce the number of overflows – and their environmental impact – from the sewers and treatment systems serving London. A particular aim is to limit pollution from the sewers and treatment systems connected to the Beckton and Crossness sewage treatment works.
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Project Facts:

Location	Completion
London, United Kingdom	2015
Building Type	Product systems
Municipal	Sewer Municipal, Storm water
Project Type	
Renovation	

Partners

MVB

Uponor Infra Project Services

London’s globally admired sewage system was created in the Victorian era. This system now faces the challenges of ongoing urbanisation and ever-growing sewer discharges.

Construction work on the Lee Tunnel began in 2010 and was completed by the end of 2015. In this 4.2 billion pound project, a Weholite culvert served as the final discharge point of the tunnel, transferring the sewer overflow to the extended Beckton Sewage Treatment Works. The Beckton Sewage Treatment Works was upgraded in 2013, with over 5 km of Weholite high density polyethylene (PE-HD) pipe being supplied in different sizes ranging from 400 mm to 3,000 mm. The idea was to install the pipe for all of the associated chamber fabrications of this extensive, inter-process pipework project.

A trustworthy partner providing the best technology

The project included not only London’s deepest ever tunnel, but also one of the most complex subterranean networks in the world, characterised by multiple navigational and engineering challenges. This required an experienced partner with the best possible technology. MVB, a joint venture between Morgan-Sindall, Vinci Construction Grand Projects and Bachy-Soletanche, contacted
Uponor Project Services which, together with the licensee Asset International Limited, used its design expertise in land and marine applications to re-engineer the project. This involved the creation of a landmark design – the largest plastic outfall ever installed in the UK and one of the largest in the world in terms of diameter.

Uponor was able to bring deep expertise and enormous versatility to this ambitious project, which included 880m of 3,000mm diameter Weholite pipes laid as a twin culvert, alongside twelve large-scale Weholite modular PE-HD boxes. The project also involved the provision of installation, supervision and site services, and health and safety management.

The pipe-laying process consisted of a land section comprising 105m of twin culvert laid at 10m depths, in order to break through the tidal protection wall that prevents the Thames from flooding Europe’s largest treatment works at Beckton. A giant 7m x 11m x 5m Weholite modular box was used to house a 3,000mm spool section in order to complete the installation.

The operation to install the remaining 335 metres of twin culvert section in the River Thames was carried out by marine contractor CMP, alongside the Asset and Uponor PS partnership. This ambitious marine project was further complicated by the fact that the pipes had to be submerged under an existing jetty structure and sections of the project were often isolated by the tide (which rises and falls by up to 7 metres in the Thames), with no access by land.

The innovative grouting process saved time and money

Thanks to Uponor’s patented grouting process there was no need for risky, heavy concrete collars when ballasting the strings. Using Uponor’s innovative technology, the hollow Weholite profile was filled with an inexpensive and pumpable grout, which is a much safer and faster methodology. Since concrete collars were not used, a smaller trench was needed, the dredging operation was minimised and excavation volumes were drastically reduced. Since submarine excavations are much more expensive than dry land excavations, the ad-vantages of Weholite are clear.
Once the pipe strings were ready, they were towed individually upriver by tugboat and submerged. Specialist divers were used to bolt the innovatively designed quick-connect flanges joining each pipe string.

Additionally, steel sheet piling of over 11,000m2 was installed to allow the riverbed to be dredged so that the pipes could be laid free of obstruction. Over 28,000m3 of riverbed materials were dredged, with much of the dredged material being reused to backfill the

pipes once installed. This provided an environmental advantage based on vastly reducing the amount of materials taken off site and thereby reducing the carbon footprint.

The results speak for themselves

This successful project received positive comments from all sides. Emmanuel Costes, Construction Manager at MVB, declared: "We were very happy with the Weholite technolo-gy employed in the implementation of the Lee Tunnel Outfall pipeline. The specifications of the project were highly detailed, but the solutions provided by the Asset International/Uponor collaboration were impressive, ticking all of the boxes that this complex, and in many cases unique, project required."

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> Christian Vestman from Uponor Project Services says: "The Uponor/Asset Partnership demonstrated the full depth of knowledge and versatility available within our organisations. This unique project really allowed us to show-case the impressive capabilities of Weholite – the results speak for themselves."

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