



Rehabilitation of 140m of 20" cast iron water main pipe within an urbanised areas, whilst minimising disruption to the community and adjacent buried utilities.

## Thames Water *Whitechapel, London.*

### CLIENT

Optimise LLP.

### LOCATION

Whitechapel, London, UK.

### YEAR

2015

### CHALLENGE

Rehabilitate an unstable cast iron water mains in an urban area.

### SOLUTION

Insertion of 120m PE liner from a single access point using sliplining technique.

### BENEFITS

Reduction in disruption.  
Insertion completed in one day.

# CAST IRON WATER MAIN

The construction of the Crossrail link through London has required tunnelling under some of the capital's most densely populated areas and prestigious commercial and historic districts. These works have required dewatering in locations where the tunnelling works were carried out below groundwater level, putting the overlying ground and structures, including buried utility pipelines, at risk of settlement.

Following precautionary surveying before the works, one 20" cast iron main, which forms a part of Thames Water's strategic network, was deemed to exceed thresholds of failure risk and required preventative maintenance works.

## CHALLENGE.

Thames Water took the decision to replace the 140m of pipeline. However, whilst the maximum flow capacity of the pipeline needed to be maintained, the pipe was located in Vallance Road, a heavily urbanised area in the Whitechapel district of East London. Thus excavation needed to be kept at a minimum to avoid disruption to the community and minimise the risk of damage to the high density of other buried utilities and associated plant in the vicinity.

## SOLUTION.

With the above considerations in mind, Thames Water discounted traditional replacement methods in favour of Radius Subterra's Subline close-fit polyethylene (PE) lining technique.

A fully structural lining for the renovation of weakened and aging pipes, this concentric reduction (reducing diameter by approximately 10%) pipe lining system is thick walled and fully pressure rated with approval for both drinking water and mains gas applications.



Pipe being concentrically reduced

As its insertion into the host pipeline uses conventional slipling techniques, only small access trenches are required and once inserted, the pipe is pressurised with cold water to revert it to its original diameter, retaining its capacity and forming a close fit within the host pipe.

## IMPLEMENTATION.

Due to site constraints, the affected main was split into two sections, with an insertion pit in the centre approximately 8m long and two smaller excavations at each end to allow winching operations and re-termination of the liner pipe to take place.

Once the 20" cast iron main had been decommissioned and cut at the centre pit, a CCTV survey was carried out. On one of the sections an uncharted tee and a bend was identified. These, and a client requirement to fit a new tee branch on the section, led to an adjustment of the volume of lining works originally planned and the incorporation of two tee branches.

Supplied by Radius Systems in 12m sticks, the DN500 SDR 17 PE100 liner pipe was fused into two string of 72m and 48m using an automatic PE butt fusion welding machine.

The decommissioned 20" cast iron main was then cleaned using the drag scrape and plunge technique.

The insertions were undertaken by drawing the processed PE liner pipes into the main from the central insertion pit to the reception pits at each extremity using a 10t winch. Once the insertion was complete, the liner was pressurised hydraulically and reverted to a close-fit with the cast iron host pipe.

Due to a relatively small site area, the liner processing operation was carried out in a single visit lasting one day to minimise site disruption.

## RESULT.

**The lining works, including the extra excavation required for the additional tees, were completed within a three week period.**

**Optimise's Project Manager, Brendan Melody said: "Radius Subterra were able to use the operational flexibility of Subline to great advantage in the severely restricted site. It has enabled us to ensure the security and capacity of Thames Water's asset with much less disturbance to the public and to other utilities' buried plant than would have occurred with conventional open cut trenching or other slipling solutions".**



Diameter reduction rollers