UKAEA
Restoring our Environment

# Cross Site Sewer construction project

A typical shaft compound pictured during construction in September 2002

## Background

The Cross Site Sewer was needed to improve the infrastructure for the disposal of effluent on the Harwell site. The Cross Site Sewer was funded through a Public Private Partnership (PPP) with Thames Water, and was the first PPP at UKAEA.

As an operational nuclear licensed site, UKAEA manages the collection and treatment of all Harwell's active and trade wastes at the Liquid Effluent Treatment Plant (LETP). All foul effluent is transported via the existing sewerage network to the Thames Water pumping station located at the LETP. However, the existing network crossed beneath buildings on the site, making maintenance difficult, and had an inadequate capacity for both current usage and future development.

The Cross Site Sewer spans Harwell from Fermi Avenue in the south to the LETP in the north. The project also included the construction of a new satellite pumping station at Chilton Field, complete with rising main and gravity sewer, which connects into the new works to cater for the future development of this area.

One of the two innovative microtunnelling machines used on the project

## Objective

For the local utility provider, Thames Water, to adopt the principal foul drainage network on the Harwell site, increasing capacity for foul waste and reducing UKAEA's future liabilities in terms of the old sewer network.


Children from Harwell and Chilton primary schools named the tunnelling machines

## Key challenges

- Provision of a new sewer under a PPP framework agreement.
- First installation of a new sewer using a microtunnelling technique on a licensed site.
- Obtaining adoption of the new and existing principal foul sewers on site.
- Ensuring the new sewer catered for development needs.

## Solution

The Cross Site Sewer was constructed using the no-dig technique microtunnelling - the first time this method was employed on a nuclear licensed site. This reduced the risks and safety implications of excavating open cut trenches across the centre of the site, avoided collision with essential underground services such as gas, water, electricity and telecoms and also minimised disruption to site users.

Eighteen shafts were sunk at approximately 80m intervals along the 1.2km sewer line at depths of up to 7m. The shafts were lined with concrete rings and form the manholes for the sewer system allowing access for maintenance by Thames Water.

Each shaft was used for both the thrust and reception of the microtunnelling machine. The microtunnelling machine was guided on its course between shafts by a system of lasers and cameras, which could be controlled, to +/- 25mm tolerance, in line and level by the machine operator. The machine bored through the underlying chalk at a rate of up to two metres per hour.

The 'Chameleon' machine is lowered into the shaft for the first time

The machine installed and ready to go

## Outcome

- The principal sewers of the existing system have been upgraded to a suitable standard for adoption by Thames Water.
- Sewers not required for future development are being decommissioned.
- Final connection of the Chilton Field pumping station to the new Cross Site Sewer is underway.
- Using microtunnelling techniques reduced potential waste volumes from 20,000m$^3$ to 1,500m$^3$.
- Following additional works on the trade effluent system this new sewer will permit the eventual decommissioning of the trade effluent treatment facility at the LETP.

## Key facts

Existing foul system

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| • Length of sewer surveyed/upgraded: | 3.3km |

Cross Site Sewer

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| • Start date: | Summer 2002 |
| • End date: | Summer 2003 |
| • Length of sewer: | 1.2km |
| • Depth of sewer: | 6.5m |
| • Number of shafts: | 18 |
| • Material excavated: | 1500m$^3$ |
| • Material to be reused: | 800m$^3$ |

Chilton Field

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| • Length of rising main: | 900m |
| • Depth of rising main: | 1.5m |
| • Pumping stations: | 1 |
| • Depth of pumping station: | 5.2m |
| • Number of chambers: | 6 |

Further Information:

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