

VYRNWY LDTM

# Improving water quality



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In autumn 2009 we started work cleaning and refurbishing some of the mains water pipes that supply our customers in parts of Cheshire and Merseyside. As part of this project we are working on the Vyrnwy Large Diameter Trunk Main (LDTM) which supplies up to 210 million litres of water a day to 900,000 people in Cheshire and Merseyside.

Since the pipes were first installed up to 130 years ago, deposits of iron which occur naturally in raw water from our upland reservoirs have built up on the inside of the pipes. Although not harmful to health these deposits can result in discolouration of our drinking water.

It is because of these deposits that we need to carry out work to clean and refurbish the insides of the Vyrnwy LDTM. The work is due to be complete by 2020.

This project is part of a major cleaning and maintenance programme that we are undertaking across the North West.

## **The Vyrnwy Large Diameter Trunk Main**

Large Diameter Trunk Main is the term we give to the giant water pipes that feed the vast majority of our customers in the main conurbations of the North West. The Vyrnwy LDTM system consists of three pipelines which run in parallel from Oswestry Water Treatment Works to Prescot Water Treatment Works near Liverpool.

Lines 1 and 2 of the Vyrnwy LDTM were laid in the 1880's and are made from unlined cast iron, whilst line 3 was laid in the 1930's and is made from bitumen lined steel. The pipelines vary in size between 39" to 42" with a total length of around 240km.



# What we are doing

## Cleaning

In March 2011 we completed cleaning 28.5km of the Vyrnwy line 3 pipeline between Oswestry and Malpas. As this main is constructed from bitumen lined steel it was suitable for cleaning utilising specialised pressure jetting equipment. The section between Norton Tower and Prescott will start in spring 2011 as part of a separate LDTM cleaning project

Pressure jetting involves purpose-built equipment travelling down the inside of the pipeline directing jets of water against the internal surface of the pipe to remove any deposits.

## Refurbishment

Lines 1 and 2 of the Vyrnwy LDTM are made of unlined cast iron and are unsuitable for pressure jetting. These mains will therefore be refurbished. We will refurbish the main utilising a technique known as thin wall lining which involves creating access holes within the main to allow a flexible polyethylene (PE) liner to be inserted.

Trials of two techniques (folded liner and swage lining) have successfully been completed on short sections of both mains between Hindford and Crickett.

## Folded Liner

This involves the insertion of a folded PE liner into the host main. Once in place the water pressure causes the PE liner to open up and securely fit against the internal wall of the mains creating a lined pipe.

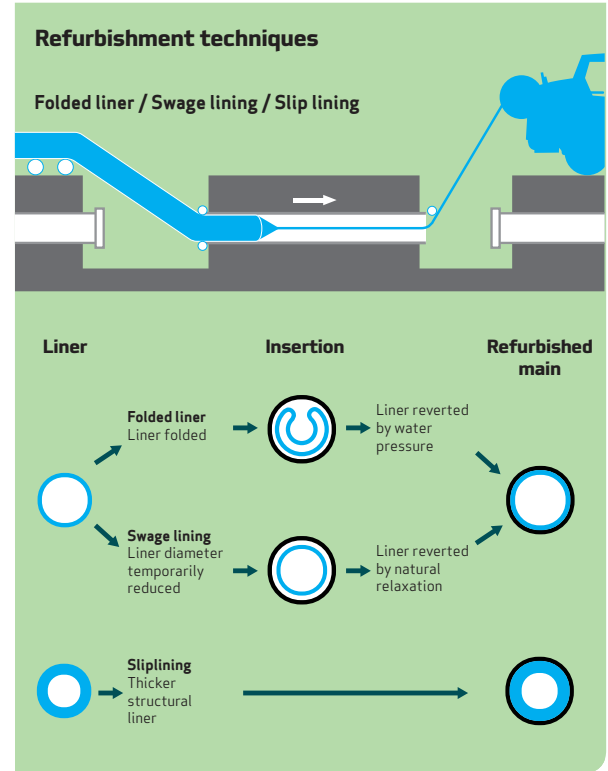
## Swage Lining

The PE liner is drawn through a specialist machine to reduce its diameter and allow insertion into the host main. Over a period of time its elasticity will allow it to revert to its original diameter creating a tight fit.

## Slip lining

Slip lining involves the insertion of a thicker structural liner into the host mains. The thicker liner reduces the volume that the host main can carry more than alternative techniques and therefore will only be utilised on small sections of main.

We will utilise a combination of these methods to refurbish lines one and two of the mains between Oswestry and Malpas. After the cleaning and refurbishment work, we will use CCTV surveys and other tests to make sure we have been successful.



# How will it affect you?

Your water supply will be unaffected by our works. To ensure that we maintain water supply to our customers during the work, demand dictates that we can only work on one of the three mains at a time.

As the work we are doing will be concentrated on the route of the pipelines you should not be affected by the work. However if you do live along the route of the pipelines you may notice an increase in traffic and construction related activities and noise.

Occasionally we may also need to divert traffic. If we need to do this in your area we will let you know in advance.



## Completed work:

### Cleaning

Cleaning (Pressure Jetting ) Line 3  
Oswestry to Malpas

### Trials

Refurbishment (Lining) 1.375km sections of  
Lines 1 & 2 between Hindford and Crickett

## Work undertaken as part of a separate project:

### Cleaning

Cleaning (Pressure Jetting) Line 3  
Norton Tower to Prescott (2011 - 2012)

## Work yet to be completed:

### Phase 1

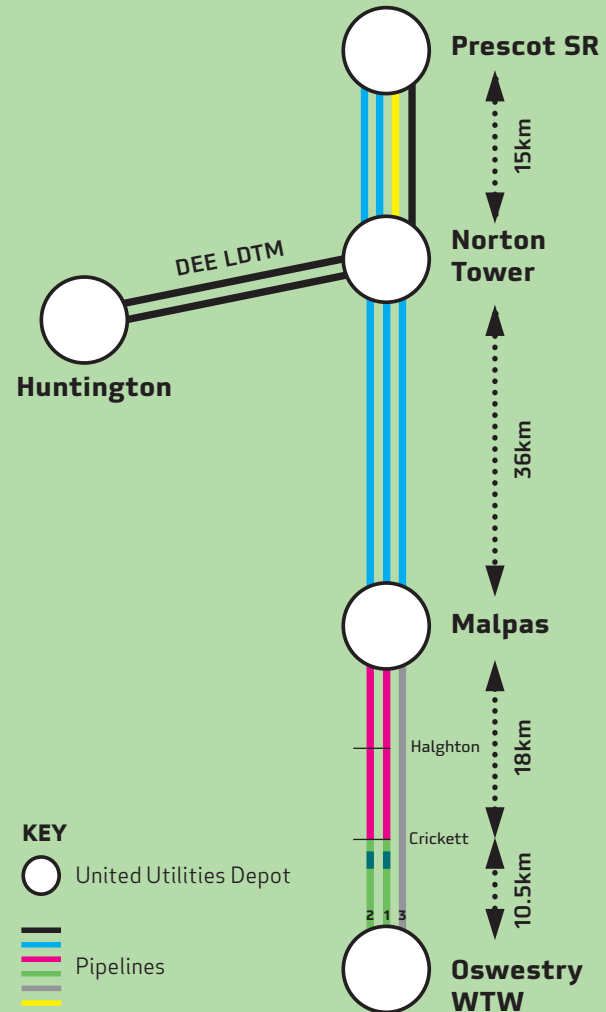
Refurbishment (Lining) of Lines 1 & 2  
Oswestry to Crickett (2011 - 2012)

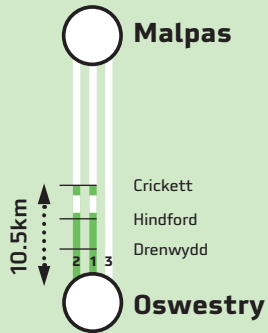
### Phase 2

Refurbishment (Lining) Lines 1 & 2  
Crickett to Halghton (2012 - 2013)  
Halghton to Malpas (2013 -2015)

### Phase 3

Cleaning and refurbishment of lines 1  
and 2 Malpas to Prescott along with Line 3  
between Malpas and Norton Tower  
(2015 - 2020)





### Phase 1:

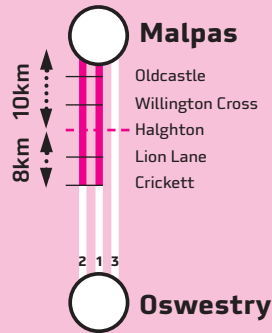
#### Refurbishment (Lining) Lines 1 & 2 Oswestry to Crickett (2011 - 2012)

Phase 1 will focus on the refurbishment of lines 1 & 2 between Oswestry and Crickett.

A total length of 18 km of pipe (9km of line 1 and 9km of line 2) will be refurbished utilising the thin wall lining technique. Access holes will be created to enable a flexible polyethylene (PE) liner to be inserted into the host main.

We will utilise a combination of techniques to refurbish lines 1 & 2 of the mains between Oswestry and Malpas. To minimise disruption, the refurbishment will be carried out in a number of sections and both lines will be refurbished prior to moving onto the next section.

The work in Oswestry is due to start summer 2011.



### Phase 2:

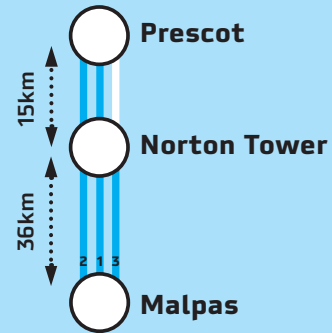
#### Refurbishment (Lining) Lines 1 & 2 Crickett to Malpas (2012 - 2015)

Phase 2 will focus on the refurbishment of lines 1 & 2 between Crickett and Malpas, a total of 36km of pipe (18km of line 1 and 18km of line 2).

Design is currently underway on this phase of the scheme and work will start on site following the completion of phase 1.

Due to the length of pipe to be refurbished this phase will be broken down into two sections. The first section from Crickett to Halghton, a total of 16km of pipe (8km of line 1 and 8 km of line 2) will be completed prior to starting work on the second section Halghton to Malpas, a total of 20km of pipe (10km of line 1 and 10km of line 2).

Again to minimise disruption the refurbishment will be carried out in a number of sections. Both lines will be refurbished prior to moving onto the next sub section.



### In the future:

#### Phase 3:

#### Cleaning and/or refurbishment of Lines 1 & 2 Malpas to Prescott and Line 3 between Malpas to Norton Tower (2015 - 2020)

Phase 3 will focus on the cleaning and/or refurbishment of 138km of lines 1, 2 and 3.

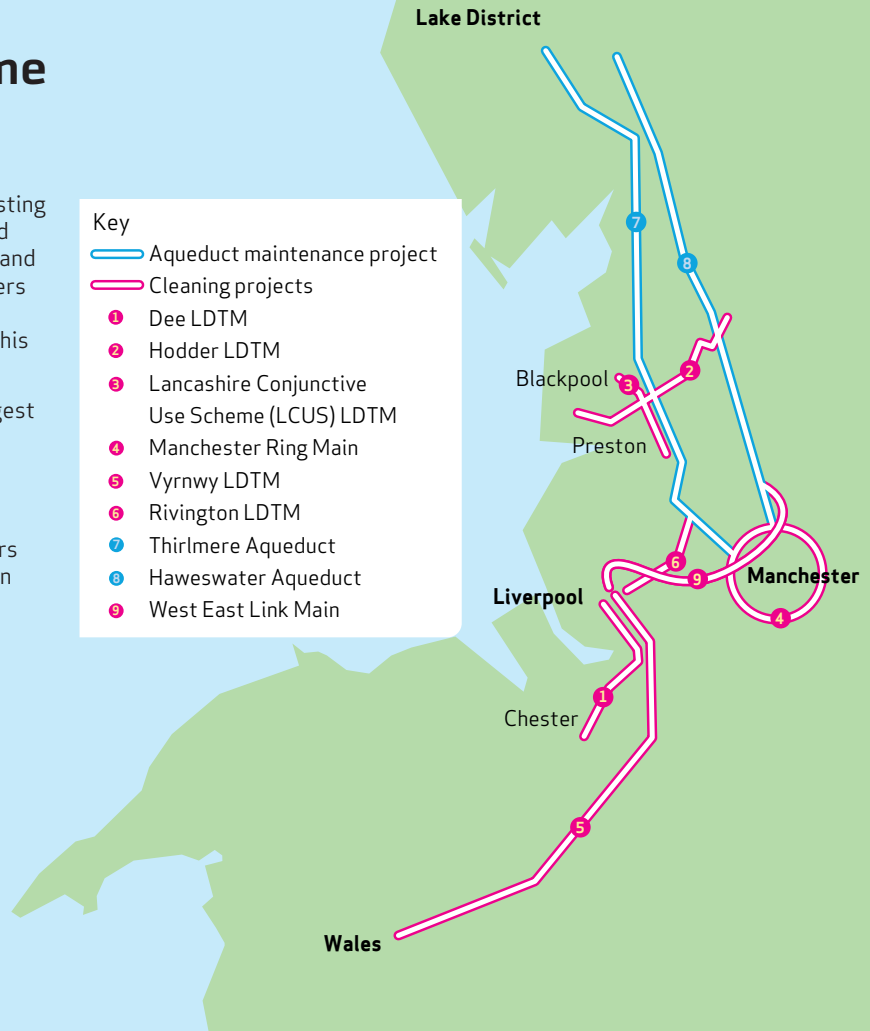
102 km of lines 1 and 2 between Malpas and Prescott (51km of line 1 and 51km of line 2) and 36 km of line 3 between Malpas and Norton Tower.

Cleaning and/or refurbishment methods are still to be decided. We will seek to use state of the art techniques at that time.

# Large diameter trunk main cleaning programme

As part of our on-going investment to improve our existing water network, between 2006 – 2020 we will clean and refurbish our largest and most important water pipes and aqueducts which provide water to five million customers every day. These large pipes or mains have never been cleaned before and this is the first time that work on this scale has ever been undertaken in the water industry.

- We are cleaning and refurbishing 600km of our largest water mains
- We are investing £200 million in the clean-up and maintenance of our large diameter trunk mains
- The programme will benefit over 5 million customers throughout the North West, leading to a reduction in discoloured water and improved water quality



## Q&A

**Q: What are Large Diameter Trunk Mains?**

A: This is the term we give to the giant water pipes that feed the vast majority of our customers in the main conurbations of Manchester and Liverpool. The pipes measure between 30" and 60" in diameter.

**Q: Why are you carrying out this work?**

A: The pipes have been in place since Victorian times. During this time deposits of manganese and iron, which occur naturally in raw water, have built up inside the pipes. Although these deposits are not harmful to health they can cause discolouration of the water supply during changes in flow. We now need to clean or repair these pipes.

**Q: Will my drinking water be affected during the work?**

A: Your water supply will not be affected.

**Q: Where can I get more details?**

A: You can contact us in a variety of ways. Please see the panel opposite.

## Further information

**Website:** Visit [unitedutilities.com/vyrnwy](http://unitedutilities.com/vyrnwy) to access information on the programme.

**Email:** If you have any specific questions please email [cleanandmaintain@uuplc.co.uk](mailto:cleanandmaintain@uuplc.co.uk)

**Telephone:** 0845 746 2035

**Or write to us at:**

Vyrnwy LDTM  
United Utilities Water PLC  
Grasmere House  
Lingley Mere Business Park  
Lingley Green Avenue  
Great Sankey  
Warrington  
WA5 3LP





[unitedutilities.com](http://unitedutilities.com)

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Warrington  
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