VITAL ENERGi

CASE STUDY

The University of Warwick

DISTRICT HEATING EXTENSION & FUTUREPROOFING

OVERVIEW

The University of Warwick planned a £1m district heating expansion which would connect their Social Services building as well as "future proofing" the network to facilitate further expansion.

As part of the University's commitment to providing an optimum studying environment, and minimising disruption, the district heating extension was scheduled to be delivered in phases, during the 2017, 2018 and 2019 summer holidays, with the network going live in 2020, although Vital were able to deliver an accelerated programme to complete this in 2 years. This method of delivery ensured that noisy and disruptive works were delivered outside of study and exam periods, when the student and staff population are at a minimum.

THE SOLUTION

The overall project involves the installation of approximately 1.25km of Logstor Series 2, fusion welded steel pipework and saw the Social Sciences Building connected as well as five termination points which will allow further buildings to be connected in the future. This "Future Proofed" approach was created in response to the University's future development plans and will ensure ease of expansion.

Our design needed to ensure both optimal sizing of the pipework, and to identify a route which would avoid clashes with existing services and buildings. Our solution was a heating network which combined above and below ground pipework, creating a hybrid system which navigated the already developed campus and avoided all clashes and obstructions.

Whilst the delivery of the project was scheduled to take place over a three year period to take advantage of the summer holidays our team were able to successfully install the network in just two of these years, significantly reducing the disruption for the University. This was partially achieved by our on-site team working some weekend periods which had a significantly positive affect on the programme.

Over the two phases the project team delivered a combination of above and below ground pipework. The majority was made up of buried Logstor pipework which ranged from between 350mm and 200mm in diameter and the above ground pipework was stainless steel and ranged from 200mm to 125mm and was then insulated to avoid

PROJECT SUMMARY:

CLIENT
The University of Warwick

PROJECT
District Heating Extension & Futureproofing

TIMESCALE:
Summer 2018-Summer 2019

CONTRACT VALUE:

£1 Million

THE BENEFITS:

> Delivered ahead of programme with completion over a 2 year period, rather than 3 years

> Above and below ground pipework solution avoided clashes

> Multi-Utility solution including water mains and district heating

Whilst the original programme called for the project to be delivered over three years, during the quieter summer period, our on-site team were able to complete works a year ahead of schedule.

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heat losses. In addition to the district heating, our team also took responsibility for installing 400m of mains cold water and installing 400m of ductwork through which High Voltage Cable could be installed at a later date.

Our team had to ensure that the highest standards of health and safety were adhered to, whilst not disrupting the day to day operation of the University. Despite taking place during the quieter summer periods there were several pedestrian thoroughfares which needed to be open for the delivery of food to the student union building. Our engineers were able to create a safe, temporary 3mx1m pedestrian bridge allowing food carts to be pushed across.

Creating Structural Solutions to Simplify the Pipework Route

One of the most common problems to retrofitting district heating pipework on an existing campus can be choosing the ideal route and overcoming technical issues along that route. This can often see the need to avoid clashes with existing services.

On the University of Warwick scheme the route called for our engineers to design a solution to running pipework through a box culvert. The original proposal suggested by the client involved drilling through the concrete jointing seams of the culvert, but this would create the need to introduce additional bends to bring the pipework back to its original route. Our engineers proposed a simpler solution of core drilling holes in a different location which allowed the pipe to run through in a straight line.

We worked with the client and their structural engineer to create a new proposal which strengthened the box culvert by reinforcing it with a steel mesh and concrete solution. This allowed us to drill the 400mm holes necessary without weakening the structure.

Adding Isolation Valves to the Existing Pipework to enable expansion.

One unusual aspect of the University's system was that the de-commissioned steam mains which were installed in the early 1990's are now being used as a Low Temperature Hot Water (LTHW) community heating network. This system, however, did not provide a way to isolate sections of the network, so our team installed pre-insulated double isolation valves on the pipework. This allows the University a level of control and also makes future expansion less disruptive.

The installation of this was made more complicated as the culvert the steam main sat in did not have space to house two series 2 valves side by side. Our engineers therefore created a solution which saw one installed traditionally, with the other one being offset. The new pipework connecting these valves was then painted in a red oxide primer as an anti-corrosion barrier and then insulated with 35mm penolic foam and aluminium cladding. The team then created valve access chambers, making it simple to access and use the new valves.

Utilising Above-Ground Pipework to Create the optimum network.

200 metres of district heating pipework ran above the ground and our designers collaborated with the University's project manager to agree a suitable route. Once this was agreed in principal, our CAD team visited the site and performed an in-depth survey and then create the construction drawings.

Creating Solutions to Utility Services Clashes

In some instances, the most simple district heating solution cannot be applied because that route would cause a clash with existing buried services and our designers encountered this on the University of Warwick project.

In this instance there was an existing 600mm sewer pipe under the existing district heating, surrounded in concrete as well as multiple communications and electrical cables which were sitting in the original route of the district heating network.

Our team were able to overcome this using "off the shelf" logstor products. Our engineers utilised 5-degree curve pipe which was set at a vertical curve to overcome the clash with the sewer and the parallel T joints were set in a manner that the pipework could be installed with the correct flow and returns.

One issue identified in Phase 1 was that the existing district heating pipework, which had been installed in 1966, may have contained asbestos. It was determined that the safest way of mitigating this was to leave the original pipework buried and to lay the district heating pipework above it. By doing this the original pipework remained undisturbed and the installation progressed safely and without delay.