



Legionella Monitoring Trial Miner's Court

**Report for
Coastline Housing**



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1. The Wireless Monitoring System

IceSpy® system 5 is a wireless temperature monitoring system that can continuously monitor multiple locations of a water system without installing expensive infrastructure such as cabling. Our realtime system can send notifications in the event of problems. Reports and graphs can be easily produced in our easy to use software.

Further to the success of a recent installation for the monitoring of temperatures of a domestic water system in the Netherlands for Legionella control Silvertree Engineering in conjunction with QES were looking for an opportunity to trial a similar system in the UK.

2. Coastline Housing's Monitoring Requirements

Miners Court is a 64 flat sheltered housing complex with combined water services consisting of both mains and tanks fed hot and cold water for domestic use. Coastline Housing currently contract QES Ltd to carry out Legionella risk assessments, consultancy and periodic monitoring & inspections in compliance with the HSE's Approved Code of Practice L8:2001. The current arrangement of employing engineers to carry out routine inspections to monitor the temperatures of the various outlets is labour intensive and costly. Additionally, periodic inspections only provide a limited understanding of the performance of a water system as they are subject to the condition at demand upon the water system at the time of visit. A number of non-conformances with the temperature control measures and water usage have been observed by QES during the routine monitoring visits however a more in depth understanding of the system was needed to identify the extent of these problems. Therefore a trial of an IceSpy® system was arranged to be carried on one of the water systems at Miners Court between September and December 2008.

3. Monitoring & Data Collection Arrangements

In order to demonstrate the flexibility and effectiveness of the IceSpy® system a range of outlets were selected for inclusion in this trial to monitor the following outlets using both surface and insertion type probes, as follows:

- A. Flat 50 shower: furthest hot water outlet from the calorifiers in Room 141
- B. Flat 50 kitchen tap: furthest mains cold water outlet from tank 4
- C. Disabled bathroom basin tap: nearest hot water outlet from the calorifiers in Room 141
- D. Flat 10 shower: furthest tank fed cold water outlet from tank 4
- E. Flat 3 shower: nearest tank fed cold water outlet from tank 4
- F. Hot water flow from the water heaters in Room 141
- G. Hot water return to the water heaters in Room 141
- H. Tank 4 stored water (probe inserted into water)
- I. Loft ambient temperature – adjacent to tank 4

The probes were installed on each outlet as listed below and communication established with the base unit situated in the main office on site. Readings from each probe were taken and transmitted once a minute to the base unit, which stores and automatically downloads the data to a PC in the main office. Up to date reports, graphs, and alarm logs for current or historical data are therefore easily accessed and exported (PDF, Excel etc) through the easy to use software.

4. Results

A sample of graphical results has been included in the appendices. A service of the Andrews water heaters was undertaken on 27th October 2008 – part way through this trial. The impact of this service can clearly be seen in these results.

Hot Water Flow & Return:	Prior to the water heaters being serviced service the hot water flow operated at around 55°C. After the service the hot flow increased to an average of 70°C, with the hot water return averaging around 50°C. The temperatures of both the flow and return were found to drop by up to 10°C overnight due to stagnation in the pipework.
Hot Water Distribution:	Since the servicing of the water heaters, water is now reaching in excess of 70°C at the nearest outlets and and 55°C at furthest outlets within 1 minute of running.
Nearest Mains	The cold water temperature remains below 20°C when regularly used, increasing to around 20°C overnight when stagnant.
Tank Fed Cold Water Distribution:	The water stored in tank 4 was continually at 34°C. This tank provides hot water via the aforementioned calorifiers and cold feeds to the mixer showers in flats 1 to 50. The nearest and furthest cold water outlets from the tank were providing water at no less than 30°C at all times.

5. Conclusions

The following conclusions relate only to this trial and are not observations or recommendations for the control of Legionella or other matter of water hygiene and safety.

- 1) The IceSpy® system has proved reliable in this installation and has provided high quality data showing many characteristics of the water system that would not be obvious from routine monitoring by hand.
- 2) Fluctuations in demand and the ability of the system to cope is demonstrated. Again, this sort of information is not determined through routine monitoring and spot checks.
- 3) Legionella risks associated with stagnation and ineffective temperatures are clearly demonstrated and could easily be overlooked by spot checks only.
- 4) Potential scalding issues are easily captured, highlighting the need in some instances for protection using devices such as thermostatic mixing valves.
- 5) The temperature of the combined flow from the 2 in no water heaters was monitored, however the stored water temperatures of the 2 individual water heaters were overlooked at this time. Any imbalance in temperatures between the water heaters and potentially low stored water temperatures in one of them would have been missed should the blended flow temperature be greater than 60°C. For fully compliant monitoring each water heater would need its own sensor in addition to the flow and return.

6. Cost Benefit Analysis

The cost to supply and install an IceSpy® system to meet the requirements of monitoring a water system of this nature would be in the region of £5,000. Ongoing costs are minimal – only the transmitter batteries would require replacing after a period of 5 years at £50 per transmitter.

It is clear that the IceSpy® system could replace a number of routine monitoring visits to Miners Court, however it is important to note that a number of other routine visits cannot be avoided in order to manage water hygiene effectively and in compliance with L8:2001. It would however be possible to omit up to 8 monthly visits in their entirety and shorten the duration of 2 visits from the current schedule. The annual saving on inspection costs, should this system be sufficient for the proposed premises, would be in the region of £1,000.

It is therefore feasible to state that the provision of an IceSpy® system for Miners Court would provide payback within 5 years, and provide significantly better data on temperature and consumption of water in a building.

7. Appendices

- 1) Water System Schematic Drawings (QES/MC/S001 & QES/MC/S003)
- 2) Graph of furthest cold main over 8 day period
- 3) Graph of stored water over A 24 hour period
- 4) Graph of ambient temperature adjacent to cold water storage tank over 24 hour period
- 5) Graph of tank fed cold water nearest outlet over 8 day period
- 6) Graph of tank fed cold water nearest outlet over 24 hour period
- 7) Graph of tank fed cold water furthest outlet over 8 day period
- 8) Graph of hot water flow from water heater over 8 day period
- 9) Graph of hot water flow from water heater over 24 hour period
- 10) Graph of hot water return to water heater over 24 hour period
- 11) Graph of hot water nearest outlet over 4 hour period
- 12) Graph of hot water furthest outlet over 3 day period
- 13) Graph of hot water furthest outlet over 8 hour period
- 14) Graph showing change in water heater performance after service