



Water Leakage Investigation Survey

Leisure Park, County Durham.

Mains water meter information

Size (mm)	15-28		32-50		75-100	✓	125-200		Above 200mm	
Serial number (Meter 1)	87004									
Readings (1)	87543.800				Time:	10:05 26 January 2015				
Readings (2)	87653.650				Time:	17:00 27 January 2015				
Location	Meter located in medium sized chamber in grass verge in Industrial Estate (off Bondisle Way) – accessed with pair of small lifting keys.									

Leakage Activities

Acoustic sounding	✓	Correlation	✓	Ground microphone		Environmental Inspection	✓
Other	Isolation of valves around the site, inspection of all pipework connections						
Pipe traced	n/a	CAT & Genny			Distance		
Pipe correlated	Accelerometer		✓	Hydrophones	Distance	52m	

Background Survey Information

Water consumption through the meter supplying the Park is consistently higher than expected, suggesting leakage or other unidentified water consumption on the network around the park.

Prior to the survey, data logging has confirmed the nightline to be just under 1 litre per second (around 58 litres per minute). Meter readings taken during periods of minimal water use throughout the survey have confirmed this volume, which is accounting for over 95% of the total volume of water supplied to the site at present.

Summary of Survey

Pipework & Metering

The water meter supplying the park is located off site in the village itself. It is located in a medium sized chamber on the Industrial Estate, off Bondisle Way. From the meter, the exact route of pipework to the park is not known, though it is anticipated that it runs within the railway bridge deck that spans the nearby River Wear.

After crossing the river, there is a main isolation valve (wheel valve) that controls the supply into the park - this is located adjacent plot 32. There are only 2 other main isolation valves on the park, which means isolating high numbers of plots if any remedial work is required.

Pipework consists of mainly blue MDPE (Medium Density PolyEthylene) with a few sections of black poly laid in older areas of the park. The diameter of pipework ranges from 20mm to 90mm.

The meter was checked several times throughout the survey and was always found to be recording water consumption at a minimum rate of 58 litres per minute (just under 1 litre per second or 83 cubic metres per day).



Meter location



Meter

Leakage Survey Activities

To confirm the integrity of the first section of pipework from the meter to the park itself, the main controlling valve was closed whilst the water meter was monitored. With the valve closed, the meter remained stationary, confirming that this section of pipework across the river was not suffering from leakage.

After identifying the other main isolation valves, all water connections on the park (approximately 300) were acoustically sounded for leak noise. This included: The Acorns, Meadow View, Maple Rise, Evergreen Way, Hazel Corner, Ash Grove, Pine Ridge, Rowan Bank, Sycamore Drive and Riverview. Whilst being acoustically sounded for leak noise, the connections were inspected for any above ground leaks on connections and fittings underneath each plot.

The water supplies to a number of water features around the park were also checked for leakage but none was found.

The washrooms in the Crazy Bear bar/restaurant were also inspected for water efficiency, and it was found that both urinal cisterns had no water saving device fitted. Instead, each urinal cistern was controlled by a 15mm screwdriver operated isolation valve. This means that a constant flow of water is being consumed by each cistern which is unnecessary during periods of low use or when the building is closed.

All drainage chamber lids found were also lifted and inspected to check for water ingress but none was found.

A number of potential areas of leakage were found whilst carrying out the acoustic sounding on the park. Of these, two were confirmed to be definite leaks. Other areas of acoustic noise could be attributed to water use or boilers running. The two areas for further investigation were:

1. Riverview, between plots 56 & 57;
2. Sycamore Drive, supply pipe to plot 10.

Detailed acoustic sounding and leak noise correlation was then carried out to pinpoint the exact area of leakage in both locations.

Both leak locations were excavated during the survey so that repairs could be carried out.



Leak location 1 – plot 57 Riverview



Leak location 2 – plot 10 Sycamore Drive



Leak location 1 – split fitting (pressure off)



Leak location 1 – no insert fitted to 50mm MDPE



Leak location 2 – split on fitting

Throughout the leakage survey it was noted that all visible water infrastructure (service connections to each plot) was generally in very good condition. However, a number of plots were found to have missing or poorly installed pipe insulation:



Missing insulation



Poorly installed insulation

Summary & Recommendations

Summary:

1. Leakage confirmed to be 58 litres per minute (**approximately 83m³/day or over 30,000m³/year**) – **Cost £ 64,944 per annum.**
2. Two below ground leaks identified:
 - a) 57 Riverview – 50mm off 90mm MDPE connection. Split fitting and missing insert.
 - b) 10 Sycamore Drive – 20mm off 50mm MDPE connection – split fitting.
3. All connections (approx. 300) checked for leak noise and visual leaks;
4. Urinal cisterns in Crazy Bear bar/restaurant - no flow control devices fitted;
5. Pipework insulation missing from above ground pipework to a high number of plots.

Recommendations:

1. Repair both leaks with appropriate fittings;
2. Fit automatic flow control devices to urinal cisterns in Crazy Bear bar/restaurant:
Cost to supply only 2No P.I.R Urinal Flush Controls £ 250 + VAT
3. Check all connections to caravans and replace pipe insulation or repair as necessary.
4. Inform H₂O the date and time the leaks have been repaired so we can download the water data logger and prove the water savings and then submit a claim for a leakage refund.

Survey carried out 26th and 27th January 2015.