

Watchgate Water Treatment Works

North West Water Plc

Application Background & installation considerations

Water treatment plant located in the Lake District, which treats and supplies drinking water to Manchester and the surrounding area. These specific meters are used to measure the flows into the contact tanks. The pipes are of internal diameter 1.8m (6ft) and constructed as follows; -

- Outer layer is concrete - believed to be about 150mm (6") thick
- Then a steel ¼" membrane (or can)
- Then a further concrete layer believed to be 15mm thick

Pete Lowell advised that" I think the pipe also may have pre-tensioned steel wire reinforcement wound around the outside of the "can" as we call it, embedded in the outside concrete. This wire must not be broken or cut. The cans I have seen are quite thin and only serves to make the pipe waterproof. The hoop strength is in the wire reinforcement. It sounds like this pipe uses the ¼ inch steel can as the strength member also."

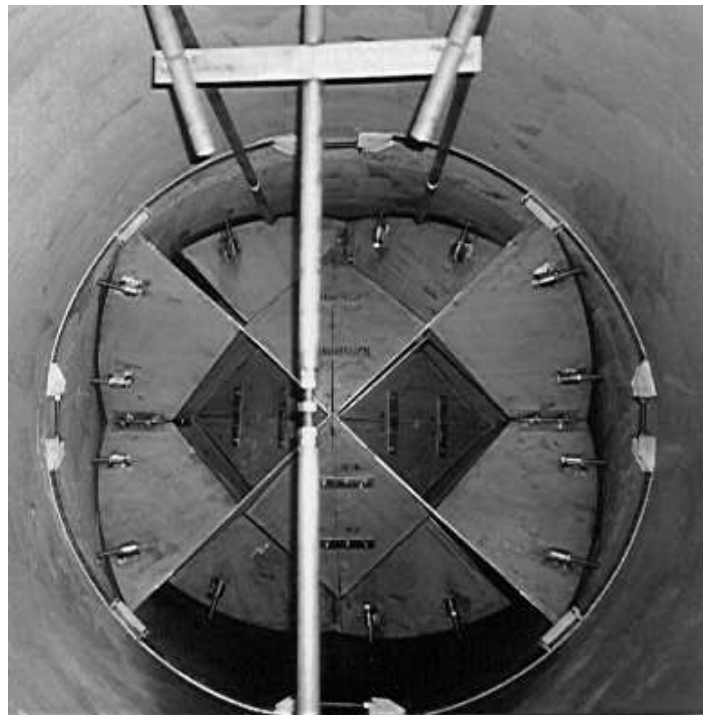
Based on this information we decided not to drill into the pipe, but instead to install the transducers on bands identical to those used on the London Ring Main.

From the drawings supplied by the customer, it was seen that there was a 45-degree bend upstream (horizontal plane) of the proposed measurement section and a total length of about 10d before the pipe exists into the contact tanks. Uncertainty required was 2%, therefore we decided to install 4 paths in a 2 cross configuration, this was positioned about 7d downstream of the bend.

Model 7634 (500Khz dual beam transducers) were used and all the mounting bands and trunking were made from 316 Stainless steel. Note that the 7634 mountings are made from 304 SS.

Installation details

At the time of installation we walked up the pipe, round the bend (which we knew about), we went about 10m and then went round another bend in the opposite direction, we then came upon the following...



This huge obstruction is a means of introducing turbulence in to the water, just before it adds chemicals to it (through pipes at top). We were totally unaware of the presence of such a device along with the additional bend.

So the view from the bend upstream of the meter is as follows.....

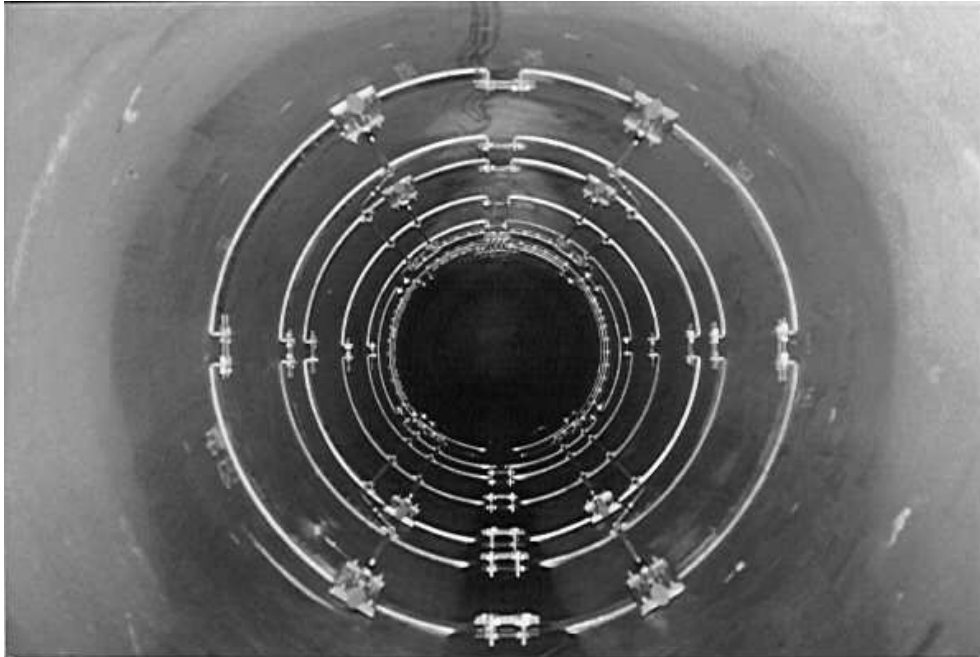


The water then goes through our meter section and emerges into the contact tank. Inside this is a vertical concrete wall about 10m in front of where the pipe enters, this again aids the mixing process. So view from pipe outfall is.....



The transducers are all mounted on expanding steel bands. All the cabling (HDPE RG108) is inside SS conduit and is taken out of the pipe using our standard penetrators. The exit point is an unused manhole, which allows the cables to be brought out into a chamber where the 7510's are mounted.

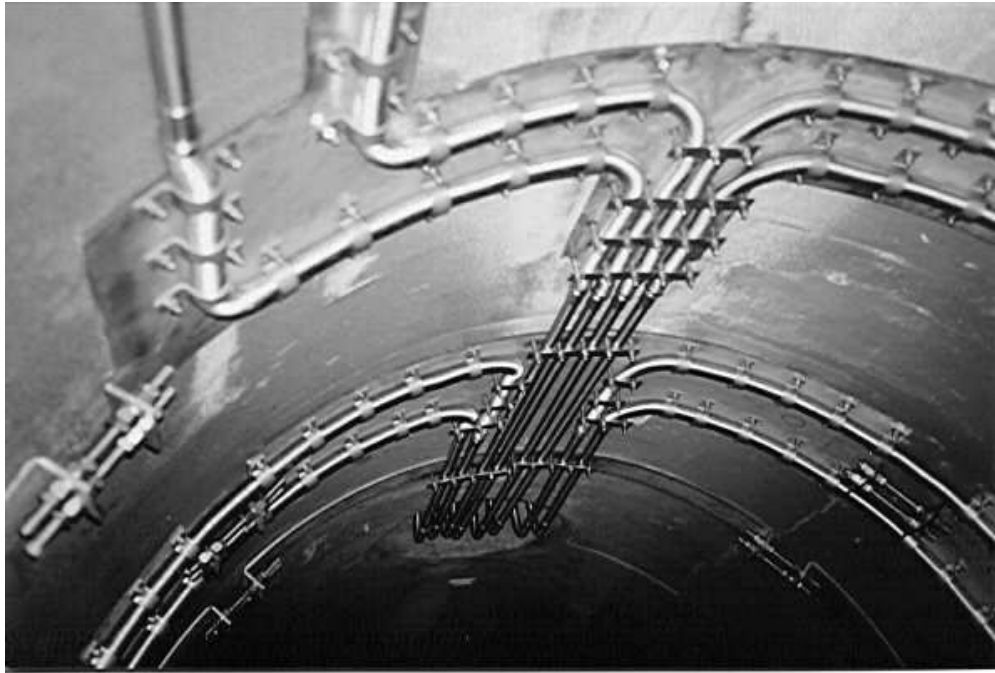
So looking at the whole pipe installation.....



A closer view of the transducer mountings



The conduit is then all brought round to the top of the pipe.....



Note the use of flexible stainless steel for the bends and where the conduit has to conform to the curvature of the pipe.

The cables then exit through manhole penetrators.....



A cover will be added over this to protect the cable conduit and to help keep the flow as straight as possible.

This work took 4 men about 3 days to complete. The SS conduit was cut and threaded on site and special equipment had to be hired to do this. A great deal of effort went into the design and build of all this, and a project time of about 1 week would be reasonable. All steelwork was cut and prepared by a specialist local contractor.

Customer has specified uncertainty of 2% for this job.

We will be installing three more of these over the next few weeks. Due to the availability of greater straight pipe on some of the others, a 2-path single plane configuration can be used.