

Bespoke analytical trailers built by PPM for Northumbrian Water

When Northumbrian Water identified the need to design two towable trailers equipped with analytical equipment for continuous measurement, they approached Pollution & Process Monitoring (PPM) to complete the bespoke build.

The trailer monitoring project is referred to as SWAT (Site Wastewater Analysis Trailer) by Northumbrian Water. The project was managed by Loren Jennings, project sponsor was Laura Evans and Technical Support was provided by Mark Gibson (Operational Technology Engineer). Mark was responsible for the instrument selection and liaised with PPM to define the overall design, from the initial concept to the final outcome.

However, it's no easy task to complete a bespoke monitoring station and even more challenging to pre-mount the instrumentation within a towable trailer environment. The usual considerations of sample delivery, sample pre-treatment, sample distribution, automatic compressed air cleaning, reagent bunding are also coupled with making the trailer a suitable environment, to house the analytical instrumentation.

The roof of the trailer had to be insulated, the walls adapted to take the weight of the instrumentation and bench top space integrated to allow Scientists to perform analytical measurements. Base units were also installed to provide ample storage during transit. Lighting and heating integrated to make the environment suitable for the specialist instrumentation.

The two trailers were similar but slightly different. One was designed to capture data at the inlet to the treatment works measuring raw sewage. The other trailer was designed to measure after the treatment process, on the final effluent.

Both trailers were equipped with instrumentation to analytically measure Ammonia, Iron, Total Phosphate and Alkalinity. Probe measurement of pH, COD and temperature were also integrated into both trailers. Additionally, the inlet trailer was configured for Redox and



Conductivity measurement whilst the outlet trailer was configured for Turbidity. The design also accommodated retrofitting of additional probe parameters in each of the trailers as spare access points have been provided.

The signals from all the instruments were wired back during the initial fabrication of the analytical trailers, to a common signals box so that they could be simply connected into an NWG approved telemetry outstation for remote data capture.

Since the probe technology would need to be routinely removed for maintenance, consideration had to be given to how to do this with the minimum of effort. Sample isolation was necessary so the other parameters could also continue to be measured.

Sample acquisition was a critical aspect of the design. None of the instruments can perform reliably without receiving a continuous supply of sample. The sample has a propensity to foul and rag, so is often a challenge. The sample pump



requirement may be slightly different on each and every site, so a common approach would be required. PPM worked with NWL to test and approve a suitable funnel/strainer arrangement which would facilitate reliable availability of process sample to the pumping arrangement. The design included regular compressed air back purging to automatically clean transfer lines. The pumping system was contained within the trailer making commissioning a simplified process. Mains power (240 VAC) needs to be connected. The strainer arrangement and drainpipe installed in an appropriate place for a representative sample to be taken with the drain routed to a suitable drain point, the instruments powered and analysis may begin.

The ability to deploy the trailers quickly and obtain real time data will prove to be of great assistance for site profiling. It will save time and provide a more detailed

picture of process events, to optimise treated water quality and augment environmental improvement.

The mobile trailers, which will be deployed on treatment sites across the region wherever and whenever necessary, will be named after past employees, as part of the company's legacy project.

Laura Evans (Project Sponsor) recently commented "We've spent the last year working collaboratively with supplier Pollution & Process Monitoring Ltd to design and develop the SWAT trailer to help us improve that process and I'm so proud that we've now got a real-life, working product".

"The trailers will provide a vast amount of information that we've never had before, sending information about the wastewater quality 24/7 and removing the need to take samples that only tell you about the wastewater at that moment in time.

This will give us much better insight into the wastewater flows entering and leaving our works and will help to make us more efficient, both in terms of making sure we're using the right amount of chemicals to treat the water, as well as proactively identifying any potential issues.

"We're passionate about protecting the environment and more importantly, using the SWAT trailer means we're able to better monitor and improve the quality of the final treated product from our works, before it's returned to the environment".

Mark Gibson (Operational Technology Engineer) commented "PPM have proven to be an excellent collaborative partner. PPM have been considerate and flexible, incorporating specific NWL design and instrument specification requirements. PPM have produced a high-quality product one which leaves us best placed to make on-line measurements on very demanding applications".



Site attendance will take place in the Autumn to help commission the trailers and provide training on the operation and maintenance of various aspects of the installation.

For further information on how PPM can support your operation please contact:

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