

CASE STUDY

Water quality monitoring during construction work, Mersey Gateway, UK



Client

Merseylink Consortium

Project background

The Mersey Gateway project was a major civil engineering scheme to build a new six-lane, cable-stayed toll bridge over the River Mersey and a 9.2-km road network connecting the new bridge to the existing motorway network.

RSK services

Much of the land covered by the project had been used for industrial activities during the last century. Consequently, a monitoring team, including members from RSK companies Structural Soils and RemedX and the wider RSK group, became involved in the project in 2014 to take pre-construction water quality samples; to undertake on-site testing in a mixture of borehole monitoring wells and surface watercourses across the site; to submit the samples for chemical analysis; and to report. This work continued during construction and is still ongoing.

For the work, the team installed and maintained various data loggers to identify and record gas concentrations, water levels and the impact of changing tidal ranges. The team maintained and sampled more than 100 individual monitoring installations on a frequency ranging from weekly to quarterly, depending on the phase of construction.

Project challenges

This large-scale project offered a variety of challenges, all of which were overcome:

- managing access to multiple landowners' and other stakeholders' property over an extended period to ensure minimal disruption
- delivering high-quality representative water quality samples using low-flow sampling techniques
- having first-class calibration procedures in place to ensure demonstrable accuracy of equipment at all times and identify any drift over a sampling visit
- utilising data-logging technology to build a comprehensive picture of changing gas and water quality conditions over time
- ensuring excellent communication with laboratory partners and other suppliers to ensure timely sample delivery without deviations.



Services provided

- Weekly or monthly water level monitoring using manual dip tapes and water level loggers
- Weekly or monthly gas, flow and volatile organic compound concentration monitoring across 100+ borehole installations
- Weekly or quarterly water quality sampling using calibrated equipment before, during and, now, after construction to identify changes in water quality across a large and diverse site

Deliverables

In situ field readings of pH, electrical conductivity, temperature, dissolved oxygen, redox potential are recorded during micro-purging to evidence when a sample is representative of ground water conditions. The results are reported to the client monthly.

Water levels across the site are recorded manually and continuously, in some cases, and are delivered to the client as metres below ground level data. In addition, datum points were all surveyed in by the team to represent water levels as metres above ordnance datum.

Chemical analyses are reported on receipt of the results from the UKAS accredited laboratory and are in AGS 4 format.

Novel techniques and innovation

Continuous gas concentration and water level monitoring used data loggers to identify potential tidal and atmospheric influences. Nitrogen purge and recovery monitoring in conjunction with vacuum canister sampling was used to assess volumes of methane and volatile organic compounds effectively in problem borehole locations.

Added value

Through efficient communication with stakeholders, the team ensured access to all locations without hindering ongoing site work. In addition, an education and information dissemination programme they provided helped to keep other contractors informed of the monitoring installation locations and thus prevent damage.

For further information, please contact:

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