

Title: Empowering sewer operations teams with rapid on-site detection and monitoring of sewage contamination

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Management of sewage-related contamination in waterways remains a critical challenge, particularly during sewer spills or when ageing infrastructure fails. Traditional laboratory methods for detecting faecal indicator bacteria are often time-consuming, costly, and delay critical operational responses.

This study presents a solution to this issue. The ZiP-P2 platform, using the ZiP-Bactx-P2 test, provides a novel, field-deployable method for detecting human-specific *Bacteroides* spp.—a well-established proxy for sewage contamination for over 20 years.

The ZiP-P2 system delivers semi-quantitative results within 10–20 minutes, using a rugged, portable instrument suitable for remote field deployment. This approach allows operational teams to perform geospatial and temporal sampling on site, rapidly guide source-tracing and remediation decisions, and verify mitigation efforts through integrated digital reporting and mapping workflows.

Data from field deployments across urban drains, creeks, and river systems demonstrate the platform's ability to detect contamination events in real time, reducing result turnaround from days to minutes. This significantly improves operational efficiency by enabling immediate, on-site decision-making and real-time centralised data reporting, while reducing reliance on laboratory testing and cutting associated costs by up to 90%.

Adoption of the ZiP-P2 system marks a major advancement in water sector innovation, delivering fast, actionable microbial data when and where it's needed most.

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