

ENHANCING EFFICIENCY AND ACCURACY IN RESIDENTIAL PFAS INVESTIGATIONS USING MOBILE TECHNOLOGY AND DATA ANALYTICS DASHBOARDS

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Background/Objectives:

Due to non-polymeric per- and polyfluoroalkyl substances (PFAS) in groundwater, thousands of residential properties potentially contaminated by recalcitrant compounds require field visits and well water sampling. Due to the large amount of data, rigorous schedules, and multiple teams working onsite and remotely, a mobile, digital management system was required to capture on-site data and communicate with stakeholders in an expedited manner, while utilizing modern web security protocols. This system, designed specifically for a confidential project, integrates multiple digital platforms into a cohesive, streamlined, and real-time data workflow.

Approach/Activities:

Innovative mobile technologies were employed at thousands of residential properties to sample for recalcitrant compounds. Hundreds of properties were found to be contaminated and required follow-up action. Site investigation and remediation work are managed by the authors' organization using several mobile technology platforms, Microsoft® SharePoint, Microsoft® SQL Server, Esri's ArcGIS Desktop, and the Enterprise online web mapping interface to allow multi-user editing of Geographic Information Systems (GIS) site features and shared visualizations. The project team uses rapidly developed custom-built forms to track residential visits, sample collection, hand delivery of drinking water bottles, result letters delivery, construction of residential granulated activated carbon (GAC) units or installation of reverse osmosis (RO) filters, and site construction/remediation activities. An on-prem-SQL server and SharePoint Cloud served as the fundamental data storage management system for visualization, tracking progress, capturing resident interactions, and communicating contamination boundaries. Finally, the team tracks project progress through a geographic and tabular interface using ArcGIS for Power BI Analytics Dashboard. The dashboards, which are continuously refreshed, allow for read-only access to credentialed team members to view maps and status updates made by other team members.

Results/Lessons Learned:

The presentation results will focus on return on investment (ROI) analysis on several project elements. The team is realizing considerable time and cost savings through digital data collection with immediate display and automation of reports, as well as error avoidance using constrained digital data entry that includes on-screen warnings and validation. There is also an ongoing savings in application development effort due to the self-service model of the analytics dashboards and statistics queries. Team members are trained to create their own reports and visuals based on the established database model in the SQL server. We are also presenting lessons learned based on field staff feedback on data entry efficiency and hardware considerations, such as cellular connection and peripheral attachments (bar code reader and mobile sample label printing). The successful implementation of the project objectives would not have been possible without the use of this mobile, digital data management and reporting approach, particularly in light of the regulatory deadlines and compliance issues faced by the project teams. We learned ways to quickly turn around data collection and deployment of field crews to accomplish sampling and delivery of drinking water, ensuring compliance.

About The Author

Yoav Rappaport is the Spatial Data Integration Lead at ParsonsX, the innovation hub of Parsons Corporation. He specializes in enhancing efficiency and accuracy in environmental investigations through advanced mobile technology and data analytics dashboards. With over 27 years of experience in GIS, database management, and decision support systems, Yoav leads the development of web mapping applications and mobile data collection workflows for residential PFAS investigations. His expertise includes integrating field data, laboratory results, and geospatial analytics into interactive dashboards that support rapid decision-making and regulatory compliance. Yoav holds a degree in Geology, a Master's of Marine Science, and an MBA, and has managed teams for large-scale infrastructure and environmental projects, ensuring high data quality and actionable insights for clients nationwide.

