

Case Study: How PUC is Transforming Underground Infrastructure Management

1. The Challenge: Description of the problem your organization faced before the project or program.

At PUC, we are responsible for hundreds of kilometres of underground water and electrical infrastructure, some dating back more than 100 years. Like many utilities, we faced challenges associated with legacy records and paper-based workflows, which limited our ability to maintain accurate, accessible information about underground assets.

Critical information uncovered during locate activities was often not retained in a centralized digital system, making it difficult to share knowledge across departments and build upon previous investigations. This resulted in duplicated effort, operational inefficiencies, and increased uncertainty when identifying underground infrastructure.

2. The Approach: Details about the initiative action taken.

Recognizing the need for a more modern and reliable approach to underground asset management, PUC established a standardized process for capturing high-accuracy field data and integrating it into a centralized GIS.

In 2025, PUC transformed its locate operations by integrating Real-Time Kinematic (RTK) satellite positioning technology with its Geographic Information System (GIS), fundamentally changing how underground infrastructure is mapped, managed, and protected. The initiative combined RTK- and Bluetooth-enabled locating equipment with the TerraFlow Utility Mapper mobile application and ArcGIS Online, creating a seamless workflow between the field and the office.

This modernization improved positional accuracy from several metres to approximately 2.5 centimetres, providing field crews with a more reliable method for identifying, documenting, and verifying underground assets. The objective was simple: provide technicians with accurate, accessible information whenever and wherever it was needed. By capturing field data directly at the source and synchronizing it with GIS, asset information became immediately available for future locate requests, planning, maintenance, and capital projects.

To support long-term data quality and organizational collaboration, PUC also developed GIS-based workflows that capture RTK measurements, photographs, notes, and supporting documentation in a single system of record. ArcGIS Dashboards were implemented to monitor asset discrepancies, track resolutions, and provide visibility across the Locates, GIS, Engineering, Water, and Electric teams.

Together, these technologies and workflows established a continuous improvement cycle in which every locate contributes to a more complete, accurate, and reliable digital record of PUC's underground infrastructure, enhancing safety, efficiency, and decision-making across the organization.

3. The Outcome: Measurable results and industry impact.

By integrating RTK and GIS technologies, PUC has significantly improved how its underground infrastructure is mapped, managed, and protected.

The initiative increased asset location accuracy from several metres to just a few centimetres, creating a reliable and growing database of verified underground asset locations. Each field capture is automatically stored in the GIS, providing a permanent digital record that can be used for future locates, engineering projects, maintenance activities, and operational planning.

The new approach has reduced duplicate work, improved collaboration across departments, and strengthened organizational knowledge by replacing paper records and temporary field markings with accessible digital information. Crews can now quickly return to previously documented asset locations using precise coordinates, photos, and field notes, improving efficiency and confidence in the field.

The initiative has also enhanced safety by reducing uncertainty during excavation activities and helping protect critical underground infrastructure from accidental damage.

Key outcomes include:

- Improved underground asset location accuracy from metres to centimetres.
- Creation of a permanent, centralized digital record of underground infrastructure.
- Reduced repeat locate efforts and improved field efficiency.
- Better information sharing across Locates, GIS, Engineering, Water, and Electric teams.

- More informed planning, maintenance, and capital project decisions.
- Reduced excavation risks for workers, contractors, and the public.
- Greater protection of critical underground infrastructure.
- Fewer service disruptions caused by accidental asset strikes or unnecessary excavation
- Enhanced efficiency, resulting in faster turnaround times for customer locate requests.

4. Lessons Learned:

This initiative reinforced that accurate data only delivers value when it is captured, retained, and easily accessible. While RTK technology dramatically improved positional accuracy, the greatest benefit came from integrating field data directly into the GIS, creating a shared source of truth that can be accessed and used across the organization.

PUC also learned that every locate presents an opportunity to improve asset records. By embedding the capture of RTK coordinates, photos, and field notes into routine workflows, day-to-day locating activities now contribute to the ongoing enhancement of underground asset data.

User adoption was another critical success factor. Field staff quickly recognized the value of recording additional information during locates and actively identified opportunities to refine the process and expand system capabilities.

The initiative also highlighted the importance of cross-department collaboration. Shared workflows and dashboards improved communication between Locates, GIS, Engineering, Water, and Electric teams, enabling discrepancies to be identified, tracked, and resolved more efficiently.

Most importantly, PUC learned that small process improvements can generate significant long-term benefits. By ensuring field discoveries are permanently captured and preserved within the GIS, the organization is continuously building a more accurate, reliable, and accessible record of its underground infrastructure, improving safety, efficiency, and decision-making with every locate completed.

5. Quotes/ Images

“By integrating RTK and GIS technologies, we have transformed how underground infrastructure is mapped, managed, and protected. What was once a locate activity is now an opportunity to improve our asset records, strengthen underground infrastructure protection, enhance safety, and provide more accurate information for future planning, maintenance, and operations.”

- Robert Battisti, Senior Vice President, Integrated Services and Customer Solutions, PUC Services Inc.

“Every RTK point, photo, and field note captured in the field strengthens our digital record of underground infrastructure. By integrating that information directly into GIS, we have created a single source of truth that supports planning, operations, collaboration, and underground asset protection across the organization. What started as a locate process improvement has become a continuous investment in safer, more reliable, and more informed infrastructure management.”

- Craig Martin, Manager of Geographic Information Systems, PUC Services Inc.

Photo: A PUC locator maps underground pipe and cable locations with an upgraded locate device to prevent damage before and during excavation.

