TRANSFORMING OPERATIONS MANAGEMENT

A COMPLETE GIS
Water Utilities

esri | THE SCIENCE OF WHERE®

Introduction

As utilities are challenged to safely deliver better service with fewer resources, they require solutions that improve the efficiency and productivity of their operations.

Operating a utility is complicated. Many moving parts require coordination of staff, work, and network plans. Assets spread across the service area need to be managed and maintained. Managers must use resources effectively when prioritizing and scheduling work. Staff want to understand the work assigned to them and how best to complete this work.

Operations management is the conduit that brings many departments and information domains together. The work supports internal and external customers, and it is not always easy to communicate and collaborate with stakeholders. Decisions are often made with incomplete information. Many utilities use more than one technology solution to support their efforts. Important information is often stored in silos, which results in conflicting data and uncertainty, making everyone's job harder and less efficient.

Successful operations management optimizes resources to increase productivity and reduce lost time. A holistic operational perspective enables the coordination of staff and workload and delivers situational awareness. A full understanding can transform operations management.

Esri's ArcGIS® technology brings information together, creating a real-time operational view. Its modern data model stores authoritative data in one place. Easy-to-use maps and apps provide quick access to information across the organization. Together, office staff and mobile crews see what is happening in real time.

ArcGIS is a modern geographic information system (GIS). As such, it transforms operations, improving collaboration, coordination, and decision-making.

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The Work of Operations Management

Operations management is responsible for safely delivering water, every single day. Service interruptions and long hours during emergency conditions are part of the job. The work can be as simple as exercising a valve or as difficult as responding to a disaster. The goal is to optimize labor, equipment, contractor services, and materials—in support of unforgiving key performance indicators (KPIs).

Many tasks are completed daily: responding to complaints, calibrating equipment, inspecting and exercising assets, and more. Preparing budgets, monitoring work status, and creating reports are routine. Long-term capital projects and unplanned outage response are coordinated and communicated to customers. All this work is done while maintaining and upgrading the system—and striving for sustainability.

Responding to emergencies puts operations teams to the test. Occasionally, the work is overwhelming. Restoring service to entire communities in adverse conditions requires the best from everyone. Dedicated staff rise to the occasion to assess damage, document conditions, and make skilled repairs.

Operations management relies on accurate information and clear communication. Situational awareness leads the team to success.

"GIS provides a lifeline from the workers in the field to critical information to help them on a daily basis, whether it's being able to quickly locate a valve, isolate a main break, or find a meter to assist a customer. GIS enables us to have this information literally at our fingertips."

—Blake Weindorf, Director of Distribution, Central Arkansas Water
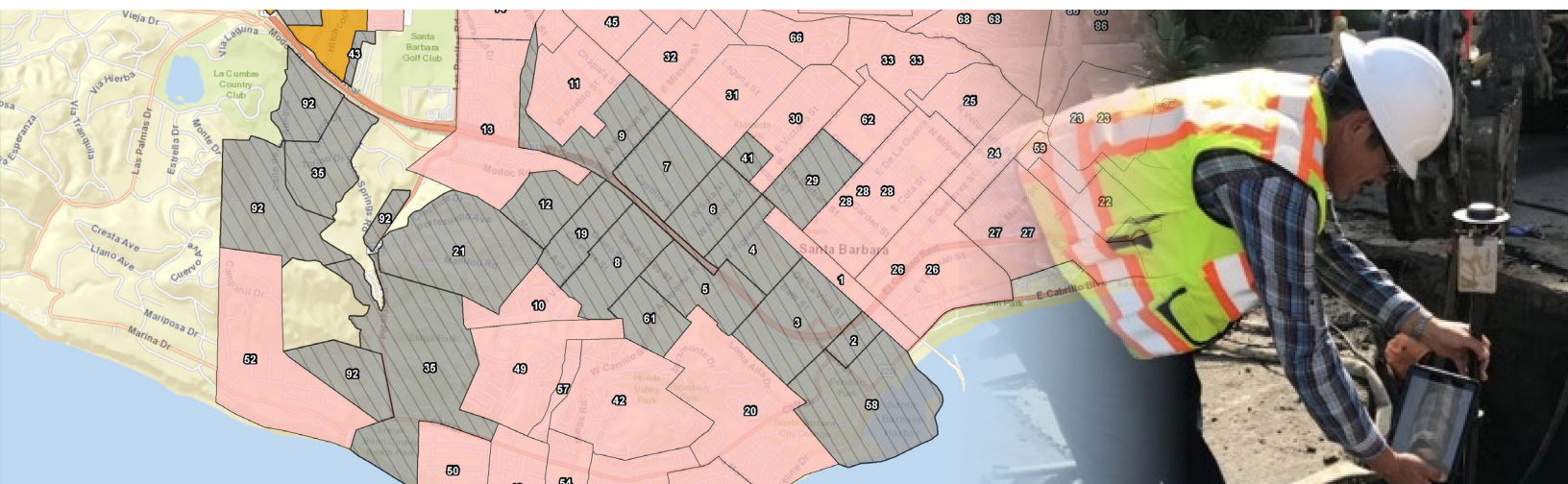
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Why Location Matters

Most utility processes revolve around where operations occur—their location. Successful operations depend on a solid knowledge of where crews, assets, and hazards exist. Achieving this requires a full appreciation of where and when work is happening as well as an understanding of what problems may occur.

Every aspect of operations management can benefit from location intelligence. Knowing crew locations reduces response time and optimizes routing. Asset information, visualized in maps and charts, helps staff plan efficient inspection and maintenance schedules. Tracking hazards keeps customers and staff safe.

ArcGIS strengthens the work of operations with visualization and analytics. Maps and apps enable staff to connect. Information is seamlessly available to all stakeholders, on any device, anywhere—day or night. Data exploration reveals patterns and trends, providing insights that cannot be gained from clumsy paper documents and spreadsheets.

Location matters because it is the common language that unites all utility workflows.

Establishment of a Centralized Enterprise GIS Utility System
ArcGIS has enabled the Water Supply and Sewage Authority (WSSA) to meet its strategic goal to improve access to data and services. The centralized platform connects administration, finance, engineering, customer service, and mobile staff. It integrates the hydraulic model and SCADA, providing access to updated and accurate water system information. Learn how they did it.

Location Technology for Making the Right Connections

ArcGIS uses location technology to transform operations management by showing how each task connects to the big picture. Seeing by location provides insights not evident in static reports or spreadsheets. ArcGIS delivers an all-inclusive view of the network with its environment. Easy access to maps, apps, and dashboards reinforces both workforce efficiency and situational awareness.

ArcGIS creates business value by improving the following:

Integrating Data

ArcGIS brings data together using location and puts it in the hands of those who need it. Connecting IT and OT systems can be difficult. Ensuring data quality and sharing information across these systems create a functional operational view.

Workforce Efficiency

Operations management represents a large percentage of a utility's labor hours. ArcGIS increases workforce effectiveness by making information available via apps and maps. It is easier to coordinate and complete work when mobile crews and office staff access the same information in real time.
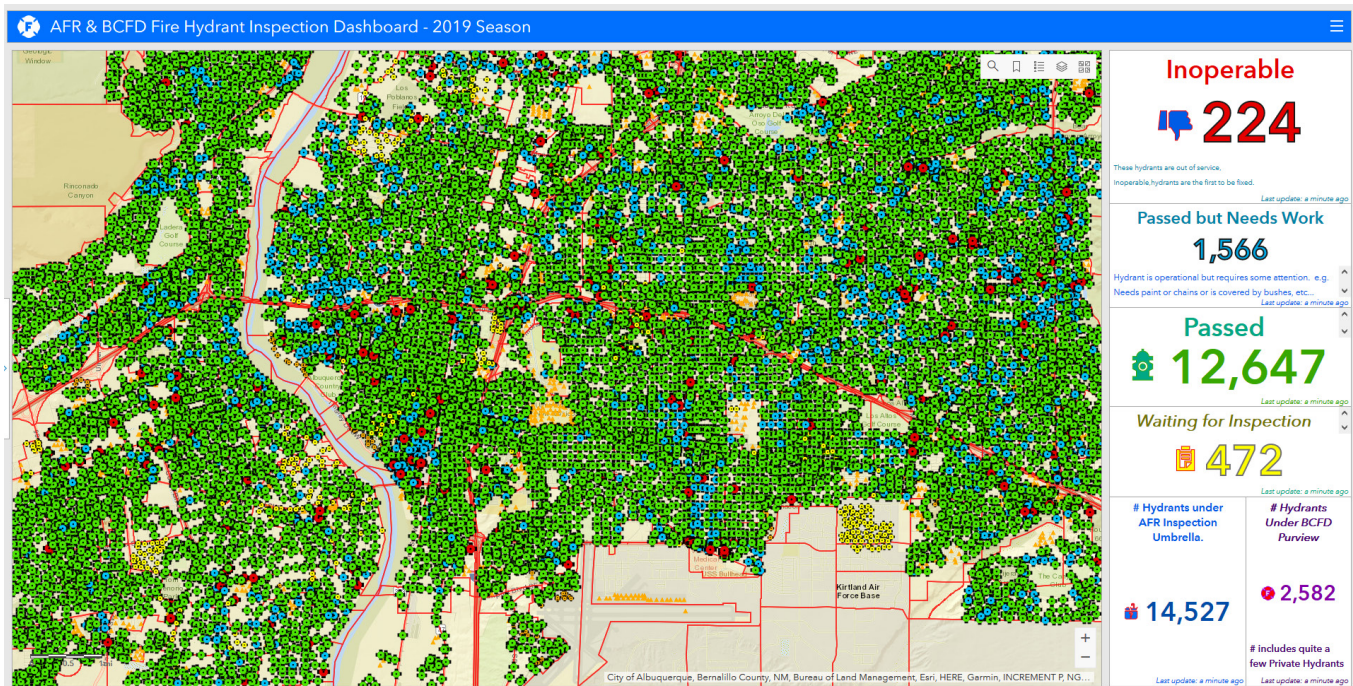
Situational Awareness

Operations management has many moving parts that can vary rapidly—personnel, assets, outages, and weather conditions. ArcGIS gathers the parameters of the entire operational environment. It visualizes and evaluates these parameters for smarter business decisions.

"Integrating ArcGIS, OMS (operations management software), and Eos Tools Pro enables staff to seamlessly access the information they need to do their work. Staff are able to collect data during capital improvement projects, new installations, and repairs while at the same time providing quick GIS updates and corrections. This gives our team greater confidence in locating hard-to-find water meters and improves repair time by knowing precisely where water mains and fittings are. Capital improvement projects benefit because we are able to generate real-time, as-built data visualized in our GIS."

—Nicholas Galati, Water Distribution Planner/ Scheduler, City of Santa Barbara, Public Works

Inoperable
👎 **224**
These hydrants are out of service.
Inoperable hydrants are the first to be fixed.
Last update: a minute ago

Passed but Needs Work
1,566
Hydrant is operational but requires some attention. e.g.
Needs paint or chains or is covered by bushes, etc...
Last update: a minute ago

Passed
🟢 **12,647**
Last update: a minute ago

Waiting for Inspection
🟨 **472**
Last update: a minute ago

 # Hydrants under AFR Inspection Umbrella.   **# Hydrants Under BCFD Purview**
🧰 **14,527**   🔴 **2,582**
 # includes quite a few Private Hydrants
Last update: a minute ago   *Last update: a minute ago*

Data and Integration

Noted thought leader Simon Sinek once quipped, "More information is always better than less." This is only true if the data is reliable and readily available. ArcGIS increases data accuracy with built-in rules and logic. It streamlines data integration with critical business systems. Turn data into information by visualizing, analyzing, and sharing it with everyone who needs to know.

Managing Data

Convenient mobile apps enable mobile staff to create quality data in real time. This digital workflow saves time and reduces errors often introduced in paper processes. Going further, ArcGIS Utility Network includes business rules that reduce workload and prevent common mistakes. ArcGIS even models full structural details in 3D. Dependable data, available in real time, makes everyone's job easier.

Connecting Systems

A modern GIS connects IT and OT systems, bringing data together using location. Location yields perspective. For example, customer information blends with real-time operational data to help staff fully grasp outage impacts. Today, nontraditional data sources like social media feeds are readily available to enhance operations in new ways. ArcGIS enriches utility data by easily connecting to outside sources such as live weather feeds.

A modern GIS connects operations staff with the critical information they need.

Streamlining Hydrant Inspections and Maintenance with ArcGIS and Maximo
The Albuquerque Bernalillo County Water Utility Authority continually strives to improve inspection and maintenance processes. Integrating ArcGIS and IBM Maximo enabled relevant inspection data and maintenance actions to be automatically generated and assigned. This has resulted in high user adoption, increased data quality, better visibility and traceability, accurate work prioritization, rapid deployment, and improved manageability. Read the story.
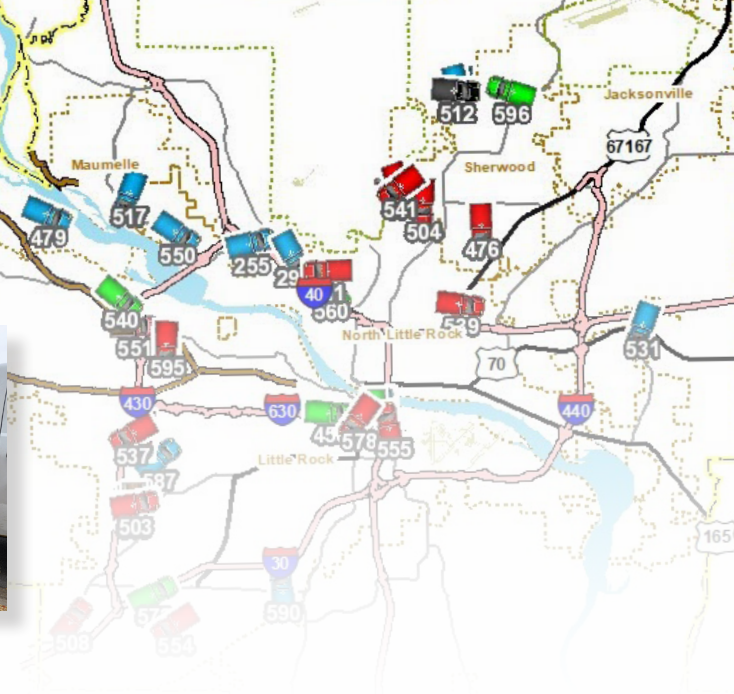
Workforce Efficiency

Operations staff represent nearly 70 percent of the typical workforce—their efficiency affects the bottom line. Analytics helps optimize activities, getting the most from every dollar spent. ArcGIS provides the resources utilities need to collaborate effectively, understand their work, and plan for the future.

Enabling Access to Information

Providing mobile apps to mobile crews is often the first step in increasing their efficiency. Using apps to access asset information saves time. They eliminate the never-ending searches in printed map books and trips back to the office to retrieve documents. Using mobile apps reduces the need for phone calls and emails that interrupt work. Apps automatically update supervisors, managers, and office staff. ArcGIS provides everyone in the organization a way to easily communicate and collaborate.

Analyzing Field Activities

Where are the biggest challenges and opportunities? Spatial analytics provides insight into work performance, detects patterns, and strengthens planning. It identifies which tasks are completed quickly and which are taking longer than anticipated. Are contractors performing as expected? Where are mobile crews spending most of their time? How can work be assigned to create more efficient routes? As utilities plan for the future, analytics can increase understanding and better prepare them for the challenges ahead.

Optimizing Resources

A modern GIS brings disparate types of data together, uncovering waste and revealing opportunities. Strategically scheduling crews and specialized equipment adds up to substantial savings. Schedules are based on today's work and tomorrow's objectives. ArcGIS provides the tools to better allocate resources, optimizing results.

GIS Touches Every Aspect of Central Arkansas Water
From the management of underground assets, like pipes, valves, and meters, to an automatic fire hydrant inspection notification system to efficiencies in the billing system, ArcGIS increases the quality of service provided every day.

Learn how GIS supports operations at Central Arkansas Water.
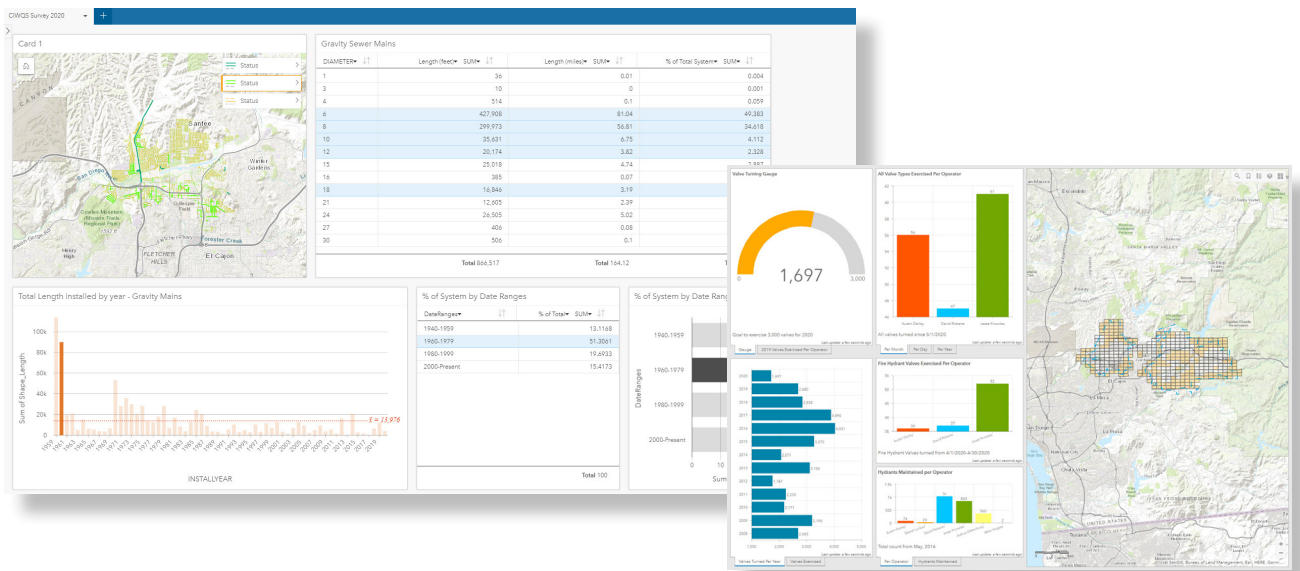
Situational Awareness

With an all-encompassing operational picture, managers can see exactly what is happening on the network, the status of work, and the impact on customers. Knowing what is happening at any given time is essential to optimizing resources and responding to unplanned events.

Communicating Changes as They Occur

The key to solid operations is agility—the ability to react quickly. ArcGIS consumes changes as they occur in real time. It delivers role-based alerts to everyone that needs to know— executives, employees, the media, and even customers.

Presenting a Common Operational Picture

ArcGIS has the unique ability to present real-time information combined with authoritative network information in an easy-to-understand form—on a dashboard, as KPIs, or via map visualization. When the network model is assembled with customer data, Internet of Things (IoT) sensors, and live data feeds, staff have a complete picture from which to work effectively.

Enabling Collaborative Teamwork

Teams perform best with a common understanding of current situations, hazards, and active work. Whether on a mobile device or at a control center, teams can execute plans simultaneously and share updates with no delay.
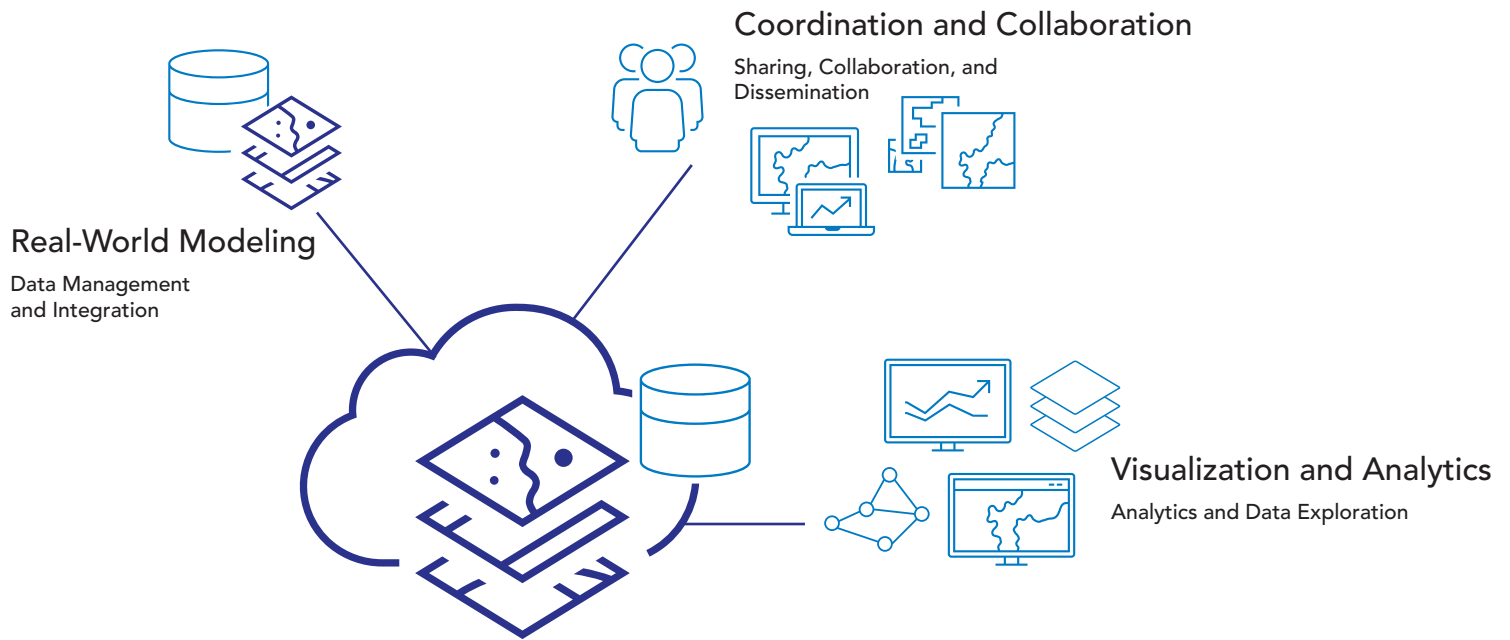
Situational awareness results when operations personnel have the right tools. They need modern tools to stay informed, react quickly, and collaborate.

> "The power of geospatial data and analytics at the fingertips of our employees drives greater efficiency and better decisions. It allows us to serve our community more effectively."
>
> —Allen Carlisle, CEO/General Manager, Padre Dam Municipal Water District

Building an Enterprise GIS to Support Efficiency across the Organization
Padre Dam Municipal Water District puts ArcGIS to work for its entire organization. Providing data, web maps, and applications for field and office use ultimately helps the entire district function efficiently and effectively. Read the story.

Coordination and Collaboration

Sharing, Collaboration, and Dissemination

Real-World Modeling

Data Management and Integration

Visualization and Analytics

Analytics and Data Exploration

The Complete GIS—
Strengthening Operations

Utilities face considerable current and future operational challenges. They have huge investments in their workforce and must capture as much value as possible. Most utilities already use some GIS capability for operations. Yet, how they use it is changing. GIS is much more than a digital version of a paper map. Today, ArcGIS brings all forms of data together around the universal language of location:

- A system of record—Precise network models enable streamlined data management. ArcGIS provides an authoritative repository for assets, locations, and their relationships to the surroundings.

- A system of insight—Powerful analytics uncover information by revealing patterns and trends. ArcGIS enables data exploration and understanding. Maps and apps deliver asset information and provide insight into the entire enterprise.

- A system of engagement—Easy-to-use solutions distribute relevant information to staff, customers, first responders, the media, and others. Like social media, these solutions communicate in real time, keeping all stakeholders up-to-date and engaged.

ArcGIS strengthens operations by giving managers a clear picture of where assets are, what work is in progress, and the real-time status of activities. Insight into past and present work supports effective scheduling and prioritization. ArcGIS provides a seamless means of communication, collaboration, and coordination for all participants, both inside and outside the utility.
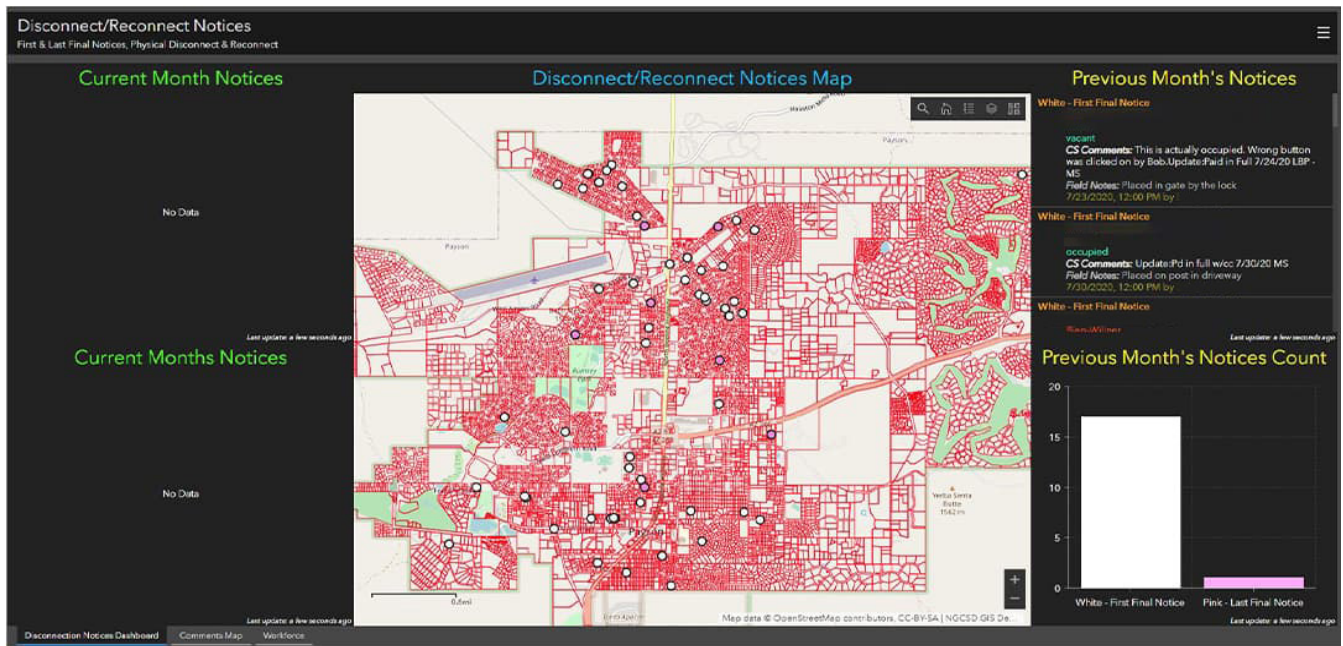
Transformation of Operations Management

To meet growing demands, utilities need solutions that improve the efficiency and productivity of their operations. Esri's ArcGIS technology has helped utilities all over the world. Location intelligence breaks down data silos, expands communication, and increases efficiencies.

ArcGIS includes tools and applications that manage data, share information, and visualize system status. Modern utility networks improve data quality with rules and logic. Web maps and mobile apps connect mobile and office staff. Applications such as dashboards display operational views of work—specific to the user's needs. Seeing field activities in real time improves workflows, resulting in more work completed in less time. Convenient analytics puts data to work, enabling greater resource allocation.

ArcGIS transforms operations management by presenting complete information and business intelligence. It provides full visibility into system management while at the same time giving staff the tools they need to work more effectively. That's The Science of Where®.

"I am amazed at how fast GIS has propagated throughout the NGCSD departments and is now the cornerstone of our operations."

—Garrett Goldman, District Manager, Northern Gila County Sanitary District

About Esri

Esri, the global market leader in geographic information system (GIS) software, offers the most powerful mapping and spatial analytics technology available. Since 1969, Esri has helped customers unlock the full potential of data to improve operational and business results. Today, Esri software is deployed in more than 350,000 organizations including the world's largest cities, most national governments, 75 percent of Fortune 500 companies, and more than 7,000 colleges and universities. Esri engineers the most advanced solutions for digital transformation, the Internet of Things (IoT), and location analytics to inform the most authoritative maps in the world.

Esri supports utilities in achieving their performance and visibility goals with skills, knowledge, and resources in the following:

- Mapping

- Spatial analytics

- Data-driven insights

- Real-time situational awareness and alerts

- Visualization

For more information,
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