Esri News
for Water & Wastewater
Summer 2014

ArcGIS Improves Pipeline Inspection and Repairs

By Joshua Damron, Engineering Technician, City of Healdsburg, and Cori Criss, Infrastructure Technologies Founder

Three of the most important wine production regions in Northern California converge at the city of Healdsburg. With 12,000 residents, the city has put its small-town charm to work as a wine-tasting destination. That puts a tremendous amount of pressure on Healdsburg's Utilities Department to ensure that out of sight is out of mind when it comes to wastewater and stormwater pipeline systems. The small utility moved its pipeline data management to the ArcGIS platform to improve pipeline inspection and prioritize repairs.

GIS technology has automated pipeline data management tasks and greatly increased the accuracy of the reporting process. The platform provides department-wide access to data needed for capital improvement. From an administration and planning standpoint, integrating inspection data with GIS improves Healdsburg's ability to report and justify replacement projects.

"We are stepping away from reaction- or time-based maintenance and moving toward condition-based maintenance by utilizing GIS as the primary record of asset conditions," Terry Crowley, Healdsburg utilities director, said.

With 60 miles of wastewater and 35 miles of storm pipe, Healdsburg has been grappling with best practices for managing the conditions of its wastewater and stormwater infrastructure. A growing concern has been that critical system information was

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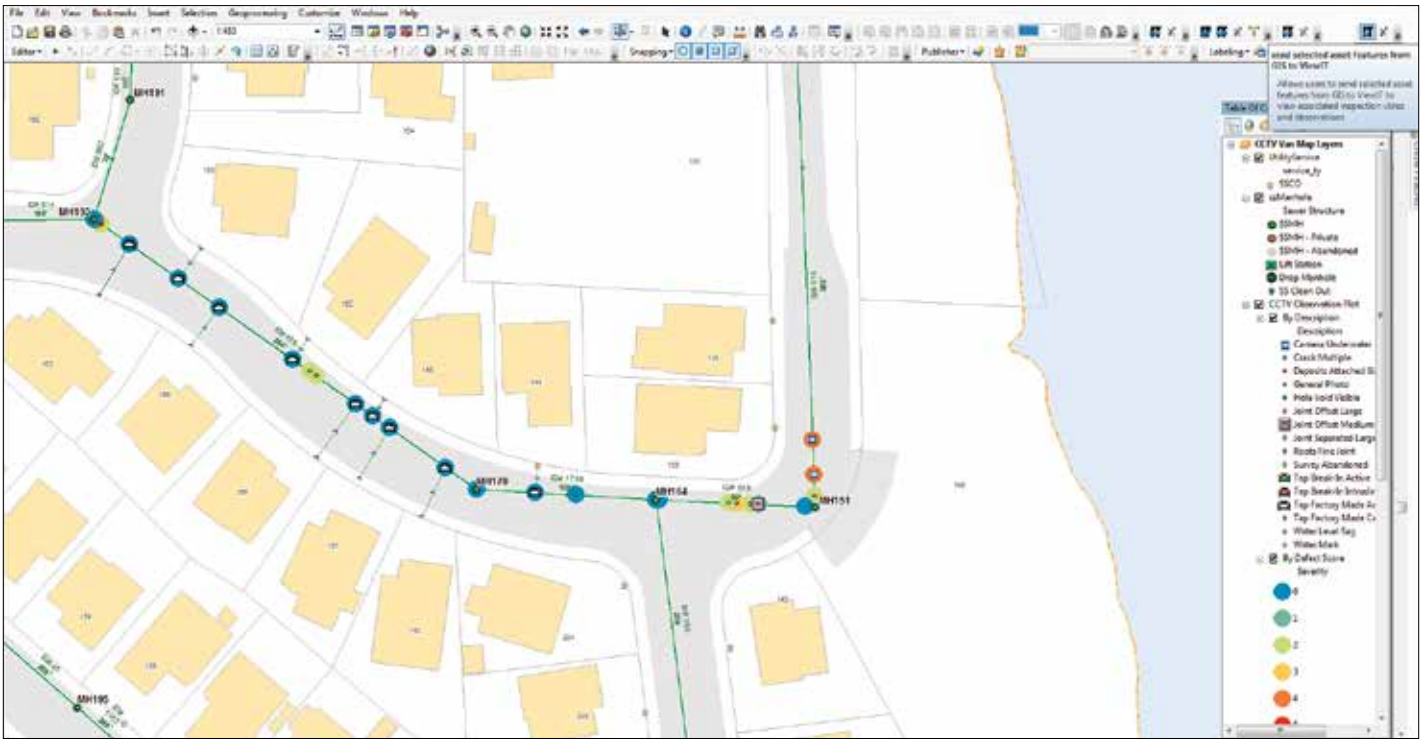

↑ By coding the severity of pipes needing repair, managers can prioritize work orders. Orange and red indicate the most severe problems. Fieldworkers can use the map interface to view inspection videos and other observation information.

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not being tracked or made available to engineers and field crews. Historically, lateral closed-circuit television (CCTV) inspections have been performed by city crews, and mainline CCTV inspections have been performed as needed by a contractor. Documentation for both tasks included VHS tapes and DVDs stored in cabinets as well as miscellaneous CCTV video files in dozens of locations saved on the city's servers. Lacking a single repository for video files or a method for efficiently mapping known pipe conditions, crews had to rely on their combined recollection of maintenance needs to prioritize repair and capital improvement work items.

In response to increased reporting requirements, Healdsburg decided to purchase a CCTV equipment van and implement ITpipes inspection software developed by Infrastructure Technologies. ITpipes has an open and flexible database design and it integrates with the ArcGIS platform. This allowed the department to automate a large part of the field CCTV inspection process, provided access to information department-wide, and greatly increased the accuracy of reporting processes.

In the CCTV van, ITpipes features allow the efficient collection and documentation of accurate observation data. Whether in the office or in the field, staff can schedule and prioritize inspection or cleaning needs using either ITpipes or ArcGIS attribute fields. Data is updated by the mobile CCTV team. GIS guides crews through their prioritized inspection and cleaning tasks.

Using a truck-mounted laptop located in the vehicle or work area vicinity, a crew member can open a map and see pipes that that need inspection. When ready to inspect a pipe, the worker clicks the line transfers on the map interface and sees the asset's associated attribute data. Completed inspection information is

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↑ Healdsburg Utilities Department staff keep the wastewater and stormwater pipeline systems in top condition. (Photo courtesy of City of Healdsburg.)

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stored in a database along with associated observation reports and media files.

Back in the office, the data gathered from the field is easily migrated to the master video inspection database in SQL Server. Both detailed reports and media files are accessible across the department.

The GIS solution has bridged the communication barriers between field and office staff and greatly improved everyone's confidence in the accuracy of Healdsburg's pipe data. Automatic quality control alerts ensure that pipe features and inspection information collected in the field can be safely used to update GIS asset attributes. GIS gives an alert before any attribute information, such as pipe type, size, or installation year, is overwritten by potentially erroneous field data. This enables crews to efficiently communicate possible errors while preserving the integrity of the attribute data.

Users access inspection videos stored in the ITpipes database via a map interface. Staff can also review multiple inspections of the same pipe simultaneously, side by side.

In the past, staff would inspect a pipe and assign needed repairs to a work order, but, due to staffing limitations, the repair might not take place as scheduled. Now, the system automatically organizes repair data. The user can see the severity of problems. The severity criteria can be changed as needed by the manager.

Healdsburg added pipeline ratings to the program so that when an inspection is complete, staff know the general status of a given line as compared to others.

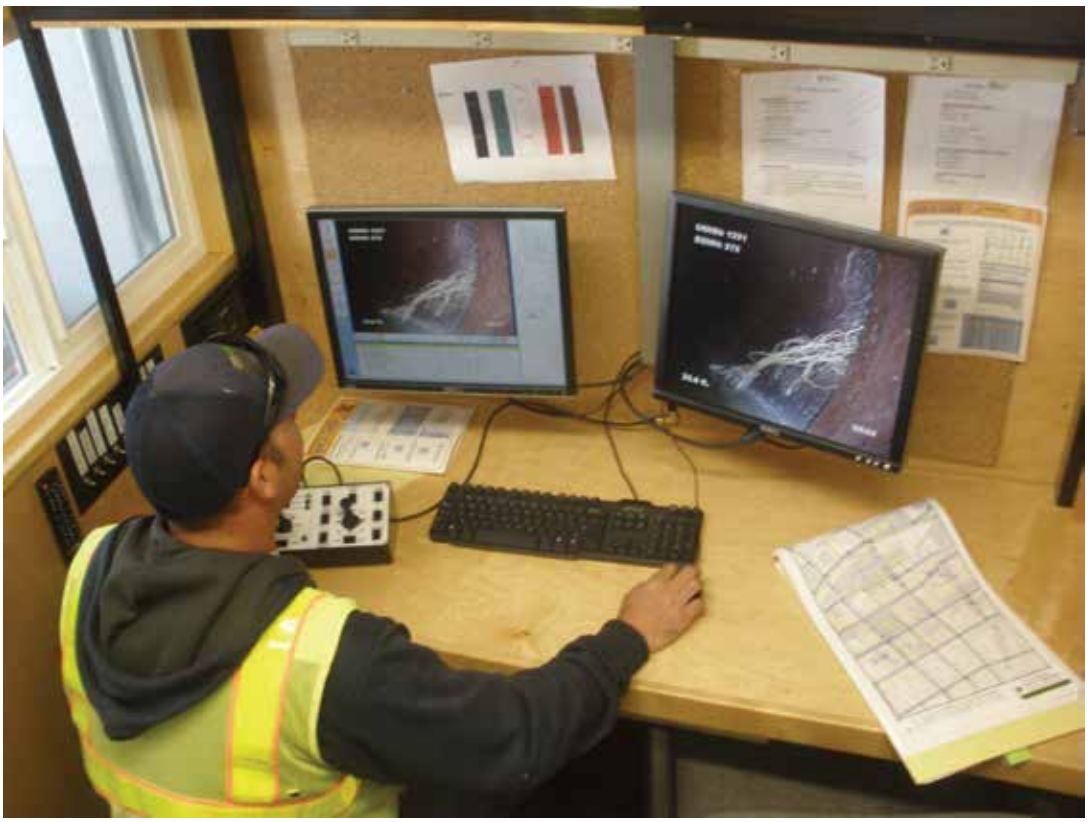
ITpipes users easily create and save single and multiple field queries and drill into inspection data. Moreover, they can bring any field into the GIS pipe feature class. This means users can easily query a list of lines by specific condition and severity.

GIS users can show feature lines related to inspection data. Or they can plot the actual locations of inspector observations (e.g., pipe defects and service taps) along the pipe feature beginning at the manhole. By visualizing the data, engineers can immediately determine whether excavation for a repair could potentially impact other nearby utilities.

Healdsburg managers can now give contractors lists of repairs, video, and photos. Contractors can instantly see the project location and details.

GIS helps staff streamline repair tasks and more efficiently produce details for contracted projects. Packaging background data for an in-house repair or a capital improvement project takes minutes rather than days.

Author Joshua Damron is an engineering technician at the City of Healdsburg. Contact him via e-mail at jdamron@ci.healdsburg.ca.us. Coauthor Cori Criss is the founder of Infrastructure Technologies. Contact her via e-mail at cori@itpipes.com.



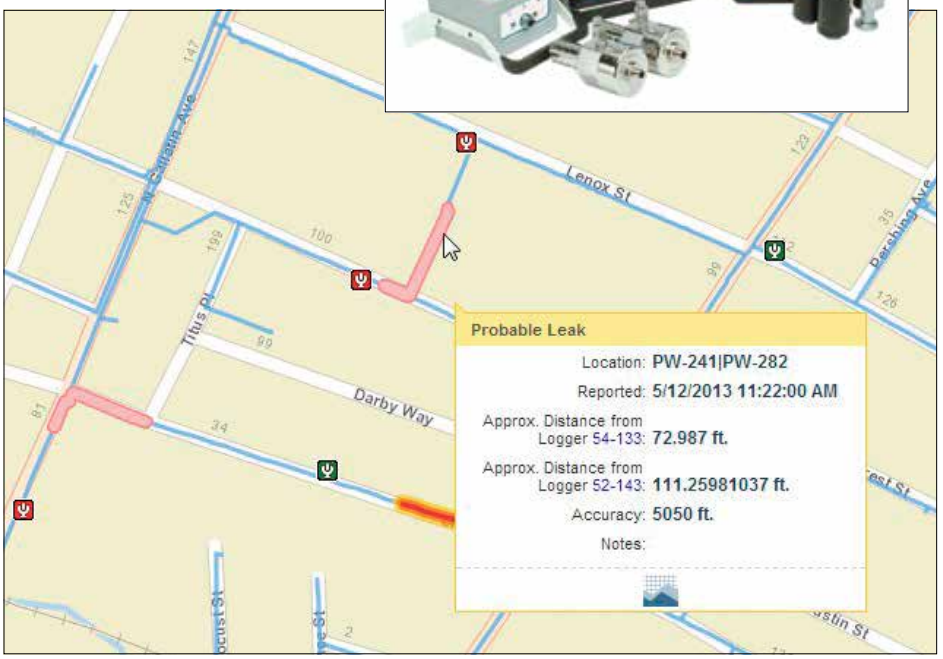
↑ Healdsburg Utilities Department staff members use GIS to help them keep wastewater and stormwater pipeline systems in top condition.

New Leak Detection Tool Reduces Water Waste

Underground leaks are responsible for millions of dollars of water loss. Acoustic technology by Echologics accurately detects leaks and assesses the condition of water pipes without digging and disrupting service.

A division of Mueller Co., a company known for its innovative water distribution products of superior quality since 1857, Echologics works with municipalities across North America and around the globe to help them efficiently and cost-effectively do the following:

- Reduce nonrevenue water.
- Improve water conservation.
- Prioritize capital spending.
- Better understand water infrastructure.
- Pinpoint leaks in all sizes and types of pipes.



↑ Echologics acoustic technology locates leaks and displays them using an ArcGIS web application.

ePULSE

On average, 30 percent of water pipes are 40–80 years old. Echologics' ePulse is a noninvasive pipe condition assessment service that provides municipalities with an accurate measurement of a pipe's structural thickness, which is an indication of a pipe's remaining life. Its core technology of the assesssment service uses a proprietary, acoustics-based leak detection system and a comprehensive proprietary database.

EchoWave

Echologics' 100 percent noninvasive transmission main leak detection service involves two hydrophone sensors spanning from 300 feet to more than 5,000 feet. They are mounted separately outside a selected pipe on existing appurtenances. An acoustics correlator detects the noise and measures the sound travel time created by any leaks that may exist between the two sensors. Leak locations are within 3 feet (1 m) of accuracy.

EchoShore

EchoShore monitors water systems remotely via a permanently installed fixed leak monitoring system. This centralized network continuously monitors critical transmission mains. It alerts utilities to leaks and transient events that can result in catastrophic main breaks. EchoShore delivers information in a timely manner wherever the user is and helps address issues before they become larger.

EchoGIS

EchoGIS is a web portal that enables users of Esri ArcGIS web maps and apps to use ePulse, EchoWave, and EchoShore project data. Taking full advantage of the ArcGIS platform, Echologics uses GIS solutions to ensure a common platform, rapid and organized data management, and dependable results.

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Enterprise GIS Improves Water Service Analysis

By Christi Nelson, GIS Programmer Analyst, East Bay Municipal Utility District

During Geography Awareness Week, staff members of the East Bay Municipal Utility District (EBMUD) in Oakland, California, talked about the many ways they use GIS. Hosting its own GIS Day in November 2013, EBMUD employees shared how GIS technology is being used among the utility's many divisions.

EBMUD provides drinking water to 1.3 million customers in Alameda and Contra Costa Counties. Water is delivered from Pardee Reservoir in the Sierra foothills through a series of pipes and facilities to the East Bay.

EBMUD maintains a 332-square-mile service area and manages about 55,000 acres of watershed lands. Its award-winning wastewater treatment protects San Francisco Bay and services 650,000 customers. All these services require the use of GIS as an analytical and communication tool.

The event's tagline was EBMUD GIS: Past, Present and Future. GIS Day participants, representing various divisions, discussed how EBMUD's use of maps had changed over time. Maps displayed in the gallery and on laptops demonstrated the progress of the utility's GIS

↑ A water quality engineer explains a map display created to show every water sample collection site in the EBMUD service area. (Photo is provided courtesy of East Bay Municipal Utility District.)

↑ A biologist explains a map of habitat restoration efforts to grow the Chinook salmon population. (Photo is provided courtesy of East Bay Municipal Utility District.)

technology. Giant books of old maps and Excel spreadsheets lay across the tables. They provided examples of how data was studied in the past. Today, maps have been converted from MicroStation to ArcGIS format. Data is now stored in an Oracle database and displayed and analyzed in GIS. Employees use GIS every day.

The engineering services, water treatment, and distribution division uses GIS to manage the utility's network, including pipes, meters, valves, and other critical facilities. GIS is used to create as-built maps, locate breaks, prioritize pipeline replacement, and more.

The water treatment and distribution division can now quickly map and analyze over 400 sample sites each month to maintain high water quality.

The wastewater environmental services division uses GIS to monitor flood-related sewage overflows. Overflow locations are geocoded, and density analysis results are used to create heat maps. These maps have made a significant difference in targeting locations for public outreach programs. The division also uses GIS suitability analysis to streamline the search for potential customers and market development for the utility's Resource Recovery Program.

Other staff members demonstrated their use of GIS for in-depth analysis and modeling. EBMUD's fisheries and wildlife division used GIS to model salmon habitat in the Mokelumne River. The map output located the best restoration sites for salmon spawning, which was used as the basis for a restoration project. The project activities have increased salmon spawning areas by 30 percent since 1990.

The water resources planning division demonstrated flood inundation and impacts at Chabot Reservoir. Staff used GIS to assess the risk of dam failure and create dam break scenarios that give insight for preparedness planning.

The pipeline infrastructure division used GIS to build the Pipeline Fragilities: Damage Prediction model. It maps the possible impact of seismic activity on buried pipeline systems.

The watershed and recreation division displayed its integrated pest management GIS application that allows rangers to monitor and manage invasive species on a daily basis.

The water conservation division presented a mapping application designed to determine landscape water budgets for commercial irrigation customers.

The customer service division discussed its service order mapping application that geographically groups service orders. The GIS application saves time, energy, and money.

One of the highlights of the day was a discussion about the future of GIS at EBMUD. The applications division described the features of ArcGIS 10.2 and demonstrated future mobile maps and web applications for fire hazard assessment, a GIS portal, and a parcel viewer. Many users and managers wanted to learn more about mapping and data collection apps for their smartphones and tablets.

More than 60 participants and attendees saw the map gallery, explored map applications using smartphones and tablets, collected GPS data, and decorated an edible cake map. The event allowed collaboration between groups. Colleagues learned more about the work that goes on among different divisions. Management was given information about technology that will soon be available. Everybody learned more about the benefits of using GIS technology.

For more information, contact Christi Nelson, GIS programmer analyst, EMBUD, at cnelson @ebmud.com or 510-287-7081.

Esri has resources and materials to help organizations host GIS Day events. Find them at gisday.com.

GIS Web App Adds Efficiency to Field Operations

Denver Water E-MAP Portal Makes GIS Data Available 24/7

By Brenda Reum, Manager, Geospatial Information & Technology, and Jonathan Spitze, Scrum Master, Geospatial Asset Management

Leaving its era of paper mapping behind, Denver Water, based in Colorado, moved to GIS for better database management, advanced mapping capability, and report production. Its new E-MAP system is a geospatial information portal for both office and mobile field users. E-MAP is built on Esri ArcGIS software. Staff easily accesses updated pipe network and other distribution maps and data. The system has lowered the water service's costs for map production and reporting.

Denver Water proudly serves high-quality water to 1.3 million people in the city of Denver and many surrounding suburbs.

Established in 1918, the utility is a public agency funded by water rates and new tap fees, not taxes. It is Colorado's oldest and largest water utility.

In 2008, Denver Water was facing a problem. Field-workers were using five-year-old paper maps to do their work. This led to confusion in the field because those maps no longer provided accurate information. Additionally, these map sets were 1,200 pages of 21" x 22" paper bound in 14 books. In fact, a special box was built on many of the trucks to store these map sets because of their size and weight.

In 2009, Denver Water launched a project to reprint all map sets. Consideration was given to moving to an electronic solution at that time, but the users resisted because they were very happy with their paper maps. So Denver Water continued reprinting the map sets to reflect the most current information.

Unfortunately, changes to how Denver Water stored spatial information as well as technology improvements led to additional issues and requests. One example is Denver Water's completion of a project to rectify its database to Real Time Kinematic precision GPS coordinates. When printing at 1" = 200' scale, this change caused overplotting of symbology in tight intersections. The solution for these areas was to plot additional map pages at 1" = 100' scale. The extra pages were included in the new map sets. Because of these extra pages, the map sets grew to more than 1,700 pages per set.

These types of challenges led to what became an almost two-year process of creating and printing the updated map sets. Finally, in October 2011, Denver Water was ready to start printing. It had reduced the number of required sets to 59, but at 1,700 pages a set, it was still a large effort. Printing was done in two shifts, five days a week, with each set taking about a week to print and bind. The cost of producing these map sets was pricey, to say the least.

↑ A rack was created in the back of trucks for printed map sets.

↑ Field crews used these paper maps at the site.

↑ A field-worker taps directly into the E-MAP GIS via a truck-mounted Toughbook. Using the GIS Pipe Network Viewer in the familiar Windows presentation, he sees the entire pipe network, including feature information, and uses GIS functionality, such as zoom and pan, at will.

While re-creating and printing the map sets, Denver Water also began the development of E-MAP, which makes geospatial information available to office and field-workers. The E-MAP application was developed using ArcGIS for Server and Silverlight, Microsoft's contemporary application development platform at the time. Denver Water IT staff defined the requirements and, by working with a group of dedicated stakeholders, ranked them. The team met regularly to review progress as the project proceeded. In January 2011, the first release of E-MAP was put into production in parallel with the old mapping system.

The first release was used by the key stakeholders to refine functionality and continue to develop new requirements. By September 2012, Denver Water was able to turn off the old system and rely only on E-MAP in the office and the field. Since that time, new capabilities continue to be added through quarterly releases.

Some of the robust functionality in E-MAP includes the ability to create work orders against any asset in the database. A break isolation tool identifies valves that need to be turned to isolate a break as well as the customers that will be affected during the outage. Users can turn on numerous layers of supporting data, such as imagery, asset data from other utilities, Esri basemaps, and data specific to different types of work such as corrosion prevention. Over the last few years, the field crews and office workers have become reliant on E-MAP and consider it critical to their work processes 24/7.

Although the robust E-MAP application is running on mobile laptops, the employees in the field still have paper maps in their trucks. Denver Water considered stopping the printing of paper maps, but employees were concerned that there could be times where they would not be able to access E-MAP. As a solution, the IT staff built a lightweight custom mapping application called the Pipe Network Viewer. It displays pipe and other distribution system data for the field crews. It is a Windows-based Windows Presentation Foundation (WPF) application using ArcGIS Runtime. It provides access to the entire pipe network and attributes about the features through a dynamic map interface. The application can be used even without network connection in the field. This is something employees cannot get from paper copies.

The Pipe Network Viewer is kept current by an automated process that pushes updates to Denver Water laptops whenever these are connected to a docking station at any of its facilities.

Now field crews have up-to-date access to the maps with data considerably more current than their paper copies could ever be, even when a wireless connection is unavailable.

Denver Water continues to strive to provide quick, easy, and reliable access to facility data to those in the field, as it is critical to efficient field operations. When new and better options become available, Denver Water technology will continue to evolve.

Migrating to ArcGIS Platform Improves Service

By David Poore, GISP, GIS Manager, Norwich Public Utilities and
Edward Juarbe, GISP, GIS Analyst, Norwich Public Utilities

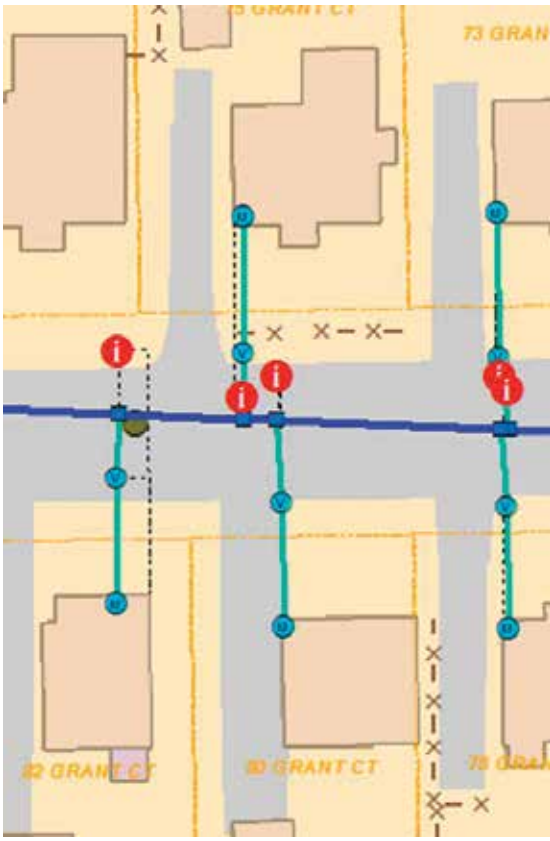
Norwich Public Utility (NPU) is using Esri's enterprise GIS to improve its customer service. The utility now manages its water distribution and wastewater collection data on the ArcGIS platform. An essential task for transitioning to the new platform was to make legacy data compatible with ArcGIS. NPU worked with a data migration vendor to set up a highly effective data migration solution that resulted in the delivery of a geodatabase that is 98 percent accurate.

NPU is a small municipally owned company in southeast Connecticut that owns and manages electric, gas, water, and sewer utilities in its service area. It has been serving the utility needs of Norwich, Connecticut, for well over 100 years. In that time, NPU had developed many forms of record keeping, including paper maps, spreadsheets, and computer-aided drawings. NPU was using an aging GIS solution based on SQL Server/ArcObjects to house much of this data. Management knew that greater benefits would be gained from adopting a complete Esri platform solution. In 2011, NPU entered into an Esri Small Utility Enterprise License Agreement (SU-ELA).

NPU immediately contracted Esri Professional Services to implement ArcGIS for Server and assist with the development of an extract, transform, and load (ETL) procedure to copy GIS data into the geodatabase. This allowed NPU to quickly start using ArcGIS mapping applications.

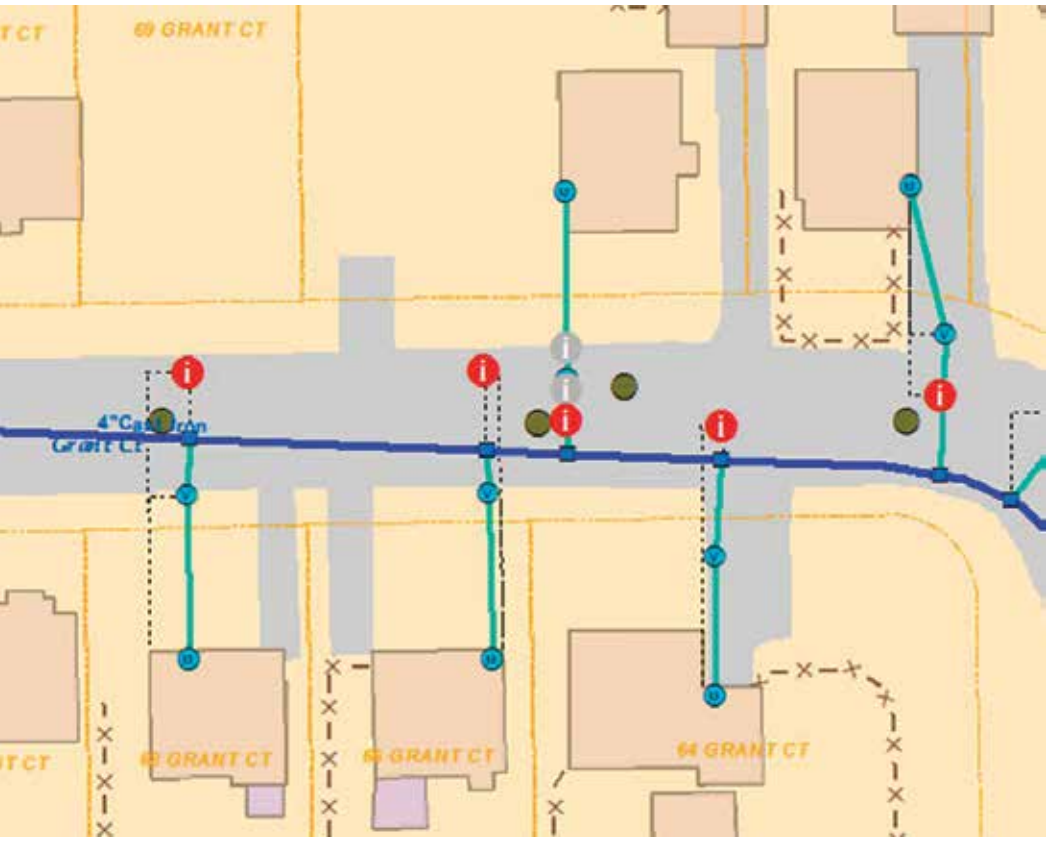
The municipal utility adopted the Esri Local Government Information Model as the framework for storing GIS data. The data model harmonizes GIS datasets and web services, integrates maps, and connects information with other city services that need to share important information such as parcel data. This laid the foundation for the road to data migration and consolidation.

↑ Example above shows a completed edit cycle with overshoot between service and card service tap location and GIS water main.



In late 2013, NPU embarked on a project to digitize water service laterals and migrate existing data. Old, handwritten service dimension records with limited information of varying quality and existing distribution data (mains, valves, and hydrants) were warehoused in a legacy GIS. NPU's objective was to ensure high-quality water service data development and migrate existing data into ArcGIS without breaking the bank. NPU posted bids for vendors to migrate the data and meet requirements to ensure high-quality data. These requirements led to simple yet effective processes and solutions.

To ensure data integrity, NPU required that the data vendor receive a 98 percent data accuracy score before NPU would accept final data delivery. NPU implemented a data accuracy scoring system that calculated the score fairly. During the kickoff phase, NPU identified spatial location and attribute data such as service material type and diameter. When the vendor was ready to submit the final dataset, NPU reviewed 5–10 percent of



↑ Red Points on Map indicate where service taps should be from service cards. Note GIS water main position indicates main may be out of position. NPU did not resolve these discrepancies; however, this still provides value and a base for a future main correction project.

the data, gave a point for each correct location and attribute, and calculated the data accuracy rate based on total possible points.

NPU also required that the vendor have a Project Action Resolution (PAR) system in place that would support the project's communication and work processes. The system would enable NPU to help the vendor correctly interpret service cards and records, which were old and lacked high-level detail. The PAR system made it possible to respond to numerous questions without jeopardizing quality or adding cost or time. The old methods of sending numerous e-mails back and forth, having phone meetings, or waiting on redlined maps were not acceptable. The resolution system needed to be efficient, dynamic, and simple.

Engineering and environmental consultants Tighe & Bond designed a PAR system that, in practice, proved very effective. Using Esri's ArcGIS for Server, Tighe & Bond developers provided a data issue feature service on the utility's servers that could be directly accessed in ArcGIS from any NPU analyst's desktop. Using this simplified work process, analysts reviewed points. When they found ambiguous data, they placed a corresponding data issue point on the map along with a predefined priority status and a description. Periodically, analysts would review and edit points and document the error resolution. Using NPU's responses, Tighe & Bond accurately completed the data digitization project. There were no phone calls, no e-mails lost due to large attachments, and no waiting for paper maps. Rather, the PAR communication exchange was quick and dynamic.

One unanticipated benefit of the initial data migration was that the process set up the framework for improving the spatial accuracy of existing water main data. This is because a data issue point was placed everywhere that the service tap—digitized from measurements off the service card—was greater than five feet off the main. These points created a framework for a future project to improve the accuracy of the distribution main data. As the data migration team updated and added new features to the database, it used ArcGIS Attribute Assistant to automatically populate those attributes. The team also used ArcGIS Data Reviewer to automate data validation processes. This saved time and improved accuracy.

As Esri continues developing custom applications tailored to the Local Government Information Model, NPU expects to be able to quickly provide many improvements to the quality of its existing services to the community. NPU now manages its water distribution and wastewater collection data using ArcGIS for Server and ArcGIS for Desktop tools. The utility has deployed various Flex and ArcGIS Online applications and mapping products. In addition, its developers are taking advantage of Esri's prebuilt Flex applications and providing GIS tools to non-GIS users to help them solve everyday problems. In the end, that's what GIS is all about!

For more information, contact David Poore, GISP, GIS manager, Norwich Public Utility (davidpoore@npumail.com); Edward Juarbe, GISP, GIS analyst, Norwich Public Utility (edwardjuarbe@npumail.com); or Nathaniel C. Norton, GIS director, Tighe & Bond, (NCNorton@TigheBond.com).

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Solutions That Add Value to Your GIS

By Lori Armstrong, Esri Water/Wastewater Global Industry Manager

Sure, GIS maps your pipes, but what else does it do? GIS can do a lot, but some municipal utilities confine its capabilities to rudimentary mapping. Fortunately, water, wastewater, and stormwater managers have blazed a path of innovation to design proven solutions that are improving municipal management. Esri has created platform technology and online services to help you access these solutions and tap the potential of your GIS.

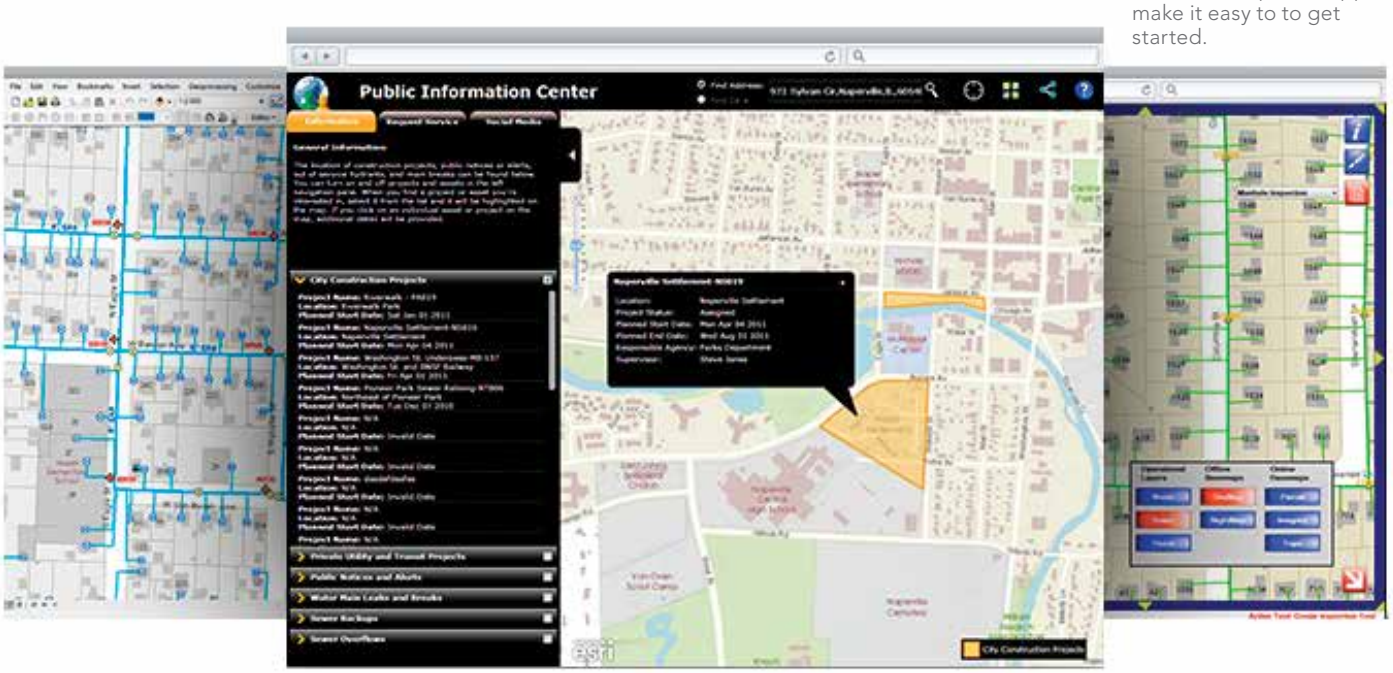
For a municipal service, the ArcGIS platform is a means to publish utility maps as well as connect with customers, collaborate on capital projects, and improve field operations. The more that people use the platform, the better it works. They can share information with everyone rather than keeping it on their desktops. Not only does this improve efficiency and create a broader understanding of the system, it also allows data to be used in different ways. For instance, by pairing water demand data with zoning information, a manager can see water use relationships and create a water conservation plan. The plan can then be shared on a public website that has a searchable interactive map.

Another way to create, publish, and share web maps is by using ArcGIS Online. Use this Esri service to analyze data and collaborate on project designs. ArcGIS Online, at arcgis.com, is an incredible resource that has a massive library of datasets and maps. You can find ready-to-use solutions, such as the Water Utility Network Editing map, which helps you set up workflows for managing your department's water, sewer, and stormwater utility data.

ArcGIS Online also offers ready-to-use apps for smartphones, tablets, and desktops. A handy app for utilities is Collector for ArcGIS. Use it on a mobile device to edit or collect data, track and report on areas you have visited, and update your map. Search "water utilities" to quickly find many other apps and models you can use.

ArcGIS Marketplace is a worldwide community of Esri partners that develops cutting-edge solutions and services for the ArcGIS platform. On this site, you will find all sorts of wonderful apps, such as CitySourced, which invites citizens to report problems such as broken mains or fire hydrants and hosts a forum for discussing community concerns.

ArcGIS for Water Utilities (solutions.arcgis.com/utilities) is another excellent resource for solutions. Peruse this wonderful collection of maps and apps and find an application that is right for you. Some examples are the Capital Projects map, the Sewer Overflow Notification map, and the Drinking Water Advisory app. You will also see apps for improving customer services, optimizing field operations, and improving water conservation. Watch videos on topics ranging from configuring dashboards to geoprocessing. If you are new to GIS, the ArcGIS for Water Utilities site has maps and services to help you get started and get the most out of your GIS.



↓ ArcGIS maps and apps make it easy to to get started.

ArcGIS Online Solves Budget Dilemma

City of Princeton Water and Electric Departments Lead the Way

By Micah Williamson, Cloudpoint Geographics

The City of Princeton, Illinois, is now storing its water, electric, and telecommunication data on the Esri ArcGIS Online platform. By using this GIS cloud service, city departments are able to share data and affordably extend GIS for better city management.

Princeton is a small town with about 7,700 residents, located in north-central Illinois along Interstate 80. The city owns and operates its electric utility, water distribution, and wastewater reclamation services.

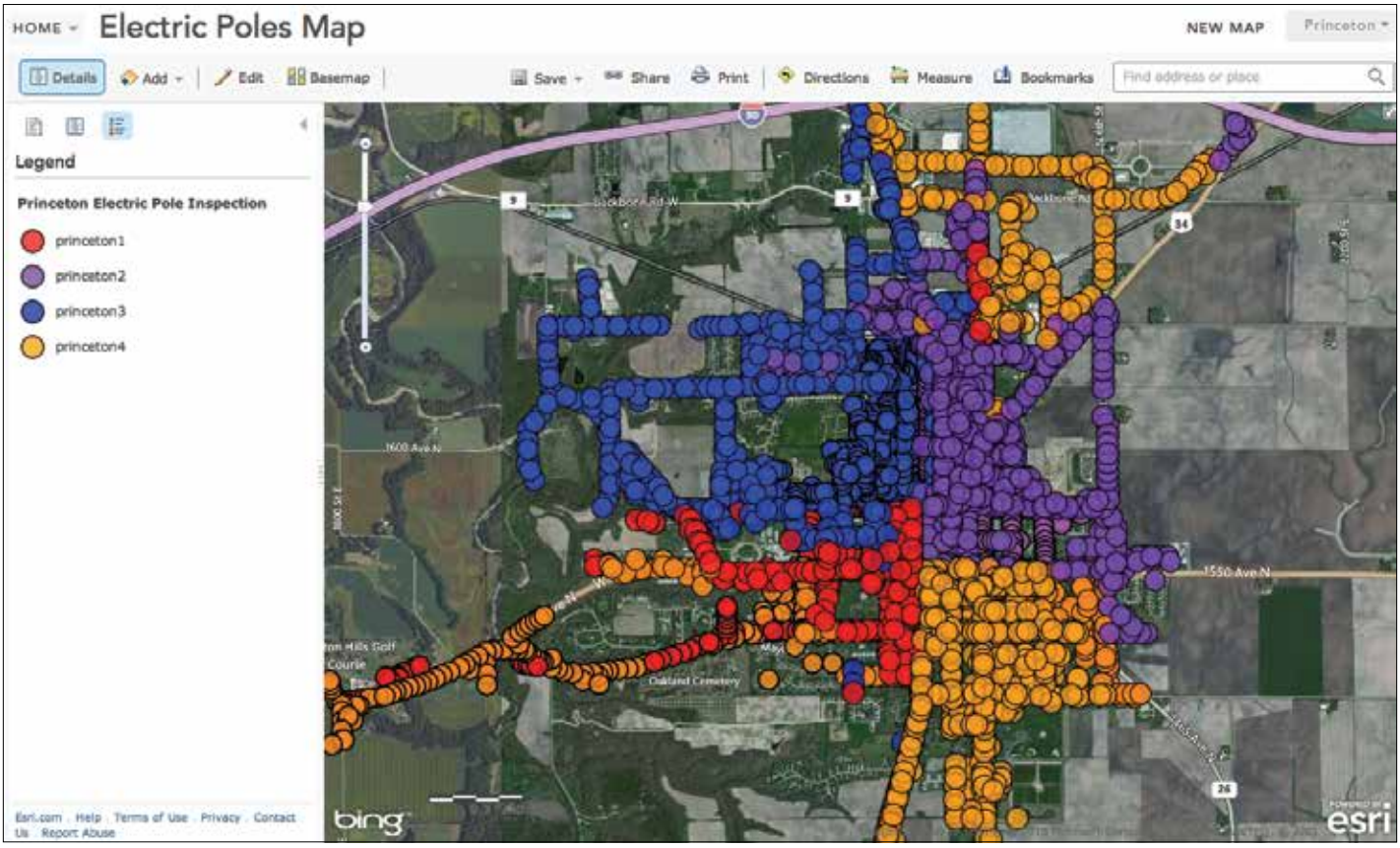
The electric department was purchased January 1, 1900, by the city council for $12,000. In 2003, the electric department entered the telecommunication business, forming a partnership with Connecting Point/IVNet of Peru, Illinois. At last count, the electric department served 4,300 customers, maintaining 2,063 poles with 1,107 streetlights.

Over the past 10 years, with a new 1.5-million-gallon water tower and three-story treatment facility, Princeton's water superintendent, Mike Eggers Sr., and his staff have been constantly busy. In addition to their regular maintenance and emergency projects, they are always working on some stage of planning, fund-raising, or construction.

In May 2013, the water and electric departments contracted with Cloudpoint Geographics, Inc., of Roanoke, Illinois, to help create and improve the digital records of these two valuable municipal utility systems. ArcGIS Online was the primary collection and distribution mechanism for this type of GIS work.

City managers felt that purchasing iPads equipped with 4G-LTE may send the wrong message to constituents and taxpayers. So, instead of purchasing the iPads outright, the city decided to rent four preconfigured mobile data collection devices from Cloudpoint. Using the Esri Collector for ArcGIS app and putting the iPads in kiosk mode, four teams from the electric department inventoried and photographed over 2,500 utility poles in about two-and-a-half months. For the first time, the city has an accurate GIS inventory that includes the number, condition, and kinds of electric poles it has.

Cloudpoint Geographics is currently migrating the electric department data into the Esri MultiSpeak information model,



↑ At Princeton Electric Department, just four employees are needed to use ArcGIS Online to keep track of the electric pole inventory.

↑ Princeton Water Department now has GIS cloud-based access to more than 4,600 images of previous digs, repairs, and extensions.

which is endorsed by the National Rural Electric Cooperative Association. Eventually, the department's computer-aided drafting data will be used to supplement the model to create a clear picture of the complete electrical distribution system.

Throughout the decades, meticulous record keeping within the Princeton Water Department has set the expectations and standards high. In particular, one small sketchbook has been handed down from each retiring superintendent to the next with the care and reverence usually reserved for precious, holy books. In fact, staff has nicknamed this sketchbook "the Bible" out of respect for the information it holds. Cloudpoint was allowed to scan its pages to assist in the digitization of Princeton's water system, but the book could not leave the city and was required to be returned within a single day.

Thankfully, the Esri Local Government Information Model has a place to insert main breaks and other project data. This means field staff no longer need to make trips to the office for research before heading out to a water main break. Both the sketchbook and the photos are now available in ArcGIS Online, giving users access to priceless data.

These same high standards of record keeping have been applied to about 4,600 photographs (digital or scanned) and the addresses associated to each JPEG. Using the exchangeable image file format (Exif) metadata, department employees have given each picture an approximate address. Cloudpoint extracted this information, geocoded it, and added links. It published the data in ArcGIS Online so that water department staff could access the data while working in the field.

City employees have high expectations about increasing the locational accuracy of their data; publishing some data for the public; and, hopefully, expanding the use of GIS into other city departments.

Learn more about Cloudpoint at cloudpointgeo.com. Download a 30-day trial of ArcGIS Online at arcgis.com.

Esri on the Road

Team Water/Wastewater Meeting
July 12, 2014
San Diego, California, USA
esri.com/industries/water/community/team-water

Esri User Conference
July 14–18, 2014
San Diego, California, USA
esri.com/user-conference

StormCon
August 3–7, 2014
Portland, Oregon, USA
stormcon.com

The International Water Association World Water Congress & Exhibition
September 21–26, 2014
Lisbon, Portugal
iwa2014lisbon.org

Water Environment Federation Technical Exhibition and Conference
September 27–October 1, 2014
New Orleans, Louisiana, USA
weftec.org

National Rural Water Association WaterPro Conference
October 6–8, 2014
Seattle, Washington, USA
waterproconference.org

Pollutec
December 2–5, 2014
Lyon, France
pollutec.com/SALON-2014.htm

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