

# Cities, county, non-profit pool resources for utility data

In a county government setting, implementing GIS solutions can alleviate or solve many problems or difficult situations through its recordkeeping and information management capabilities. One such situation presented itself to the Jefferson County GIS Department when in the fall of 2006, one of the eight city utility managers inquired about GPS utility data collection and the possibility of Jefferson County purchasing a high-end GPS collection unit. At that point, the city's daily water and wastewater operations revolved around old, as-built drawings stained by years of use and accurate information existed only in the memories of city utility staff. In order to provide the city with the best possible utility system maintenance, they wanted to work from maps that displayed data such as hydrants, manholes, water meters and utility lines in their actual locations.

The other seven cities in Jefferson County experienced these same issues. Many of the maps they used for their daily operations dated prior to 1960 and did not include

expansions, extensions or maintenance records. These maps also contained handwritten notes and adjustments, making the process of duplicating old paper maps even more

complicated. Furthermore, since no backup of the data existed, in the event of an emergency, no outside aid-providing entities could know the locations of utility infrastructure and any additional information would be lost. GPS point collection provided a way to capture these locations accurately with the opportunity to record data about each feature and display the information through a digital map interface. Both for daily operations and emergency situations,

accurate records of utility data greatly aid maintenance, expansion and rebuilding efforts.

In thinking about infrastructure data collection, the Jefferson County GIS Department entertained ideas such as asking each city to individually complete GPS collection; however, with eight cities individually collecting data, eight groups would use different sources and methods, thus making the data inconsistent in both accuracy and attribute

content across the county. The cities' lack of GIS software further complicated the situation, since even if they collected data, they did not have the additional base-map data, training, computers and wide-format printers that make GPS data valuable. In order to achieve consistent accuracy across the county, Jefferson County and the cities needed to form a cohesive plan to first acquire GPS data and then to use the data to aid in daily operations.

The Kansas Rural Water Association provided the data collection services the cities needed. Although KRWA had not collaborated with a county and multiple cities before, they expressed interest in the project and agreed to participate in the collaboration to get the project accomplished. In the fall of 2007, the Jefferson County GIS Department met with the city clerks and utility managers to gauge their interest and ability to finance a

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The water lines shown in this graphic of the city of McLouth do not follow a perfectly straight grid pattern, typical for most water systems.

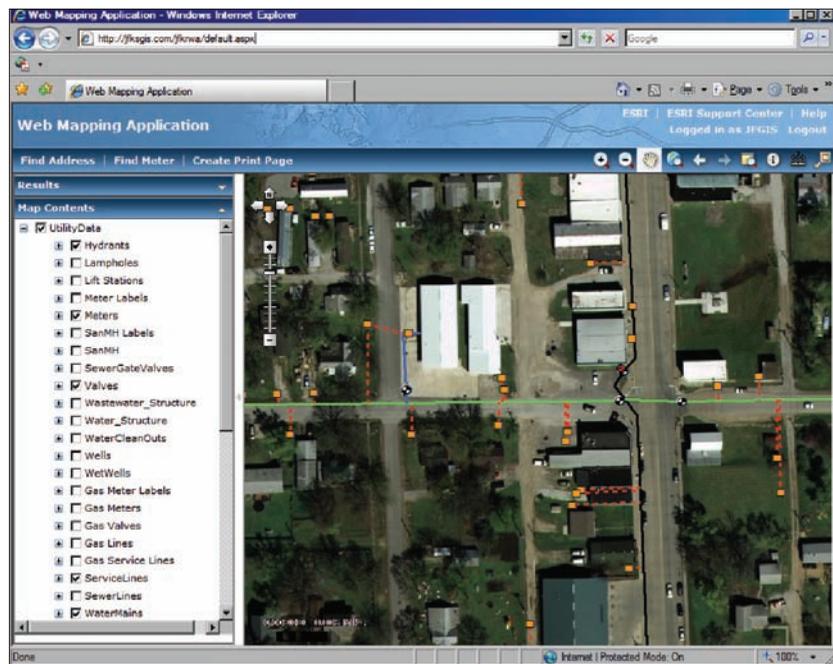
portion of the project and then provided additional information to the city staff so they could start a dialog with their city councils.

While the city councils discussed the project, the Jefferson County Commissioners approved the initial scope of the county's portion of the GPS collection and settled on a financing arrangement in which the cities paid for data collection inside their boundaries and the county covered KRWA's travel and lodging costs. In an additional measure to lessen the expense for the cities, the Jefferson County GIS Department would complete certain portions of the data interpretation, such as drawing water and sewer lines and double-checking the data with each city's utility staff. The Jefferson County Counselor drafted an agreement between the cities and the county specifying financial responsibilities, project expectations and data security measures.

As part of the project outline, the cities agreed to share their GPS data with the county under strict limitations of secure data backup and internal reference usage.

During the planning phases, the Jefferson County GIS staff attended training on building mapping websites and started thinking about creating utility infrastructure websites for the cities. Providing maps over the internet offered an efficient way for the cities to view their data without needing large numbers of paper maps or purchasing and learning how to use GIS viewing software. With the capabilities offered through ESRI's ArcGIS Server, the map websites enabled the cities to view and query their data and, hopefully in the future, edit both spatial components and attribute information for their infrastructure.

After several months of discussion and planning, all eight city councils in Jefferson County decided to pursue the GPS data collection project and signed agreements with Jefferson County and KRWA. Several of the cities' engineering firms already collected GPS data during utility update projects, thus reducing the number of points KRWA needed to capture. To expedite KRWA's GPS collection, each city's utility staff pre-located any meters, valves, manholes or other data and then worked with the KRWA staff during collection. In the spring of 2008, KRWA collected the data for all eight cities; after each city's collection, KRWA post-processed the



Example of Web site hosted by the Jefferson County GIS Department.

GPS data to account for weather and satellite conditions then forwarded the GPS data to the Jefferson County GIS Department where they added utility line geometry and attribute information such as line sizes, materials, repair records and water meter accounts.

Each city then checked their data, verifying locations and associated information, a process completed in October of 2008. During this time, each utility staff met separately with



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the GIS Department for several hours. Instead of checking data on a paper map, the GIS Department went portable, bringing a laptop and additional monitor so issues were immediately corrected using the capabilities of GIS software, such as measuring and attribute updates. Each city's staff knew their infrastructure inside and out, explaining variations in line locations around water towers and sewer lagoons and providing information for line sizes and materials often without needing to consult their maps. This information was critical to represent the city infrastructure correctly, since in many locations the lines deviate from a straight path.

In the summer of 2008, during the data processing phase of the project, an opportunity became available through the Kansas Water Office offering a 50% reimbursement of costs incurred during GPS water infrastructure collection. Although creating additional paperwork for the cities, the grant opportunity not only provided financial assistance, but also reinforced the importance of GPS infrastructure collection. Seven of the cities in Jefferson County met the eligibility requirements (a rural water district maintains one city's water infrastructure, thus the city only paid for wastewater data) and participated in the grant.

Utilizing the capabilities of ESRI's ArcGIS Server, the Jefferson County GIS Department built a website for the cities to view their data. For maximum security of the data, each city only views utility data for their particular jurisdiction, but can view base map data such as aerial photography, parcels and roads for the entire county. The website currently mimics the functionality of Google Earth or Yahoo! Maps in the zoom, pan and print capabilities, but extends functionality to include identifying features, an interactive measuring tool and the ability for users to specify visible data layers and some labels. The website became available to the cities in January 2009. Jefferson County has also extended an invitation to any rural water districts in the county with electronic data that would like to include their data in the on-line mapping service provided by the GIS Dept.

**“With the infrastructure improvements that have been completed over the past 18 years, the city of McLouth did not have an updated and complete map of any of its utilities. They were either on handwritten sketches on old maps, as-builts, or in a certain person's memory, which is not the way to try and find a certain utility in a hurry. For the past five to six years, we have tried to come up with a program that the council felt was within our budget to get an accurate mapping of all the utilities and failed, that is, up until KRWA and Jefferson County GIS office teamed up and made an offer that we could not refuse. This was before we knew about the grant available from the Kansas Water Office, which makes it unbelievable. This has saved the city more than \$10,000 compared to using a mapping service.”**

*– by Carl Chalfant, City Superintendent,  
City of McLouth*

*Kristen Jordan is a native Kansan and works for the Jefferson County GIS Department as the GIS Project Manager.*



**Table: Breakdown of city information and costs.**

| City         | Population | KRWA Hours | GPS Points | Cost to City | Utilities Collected    |
|--------------|------------|------------|------------|--------------|------------------------|
| McLouth      | 811        | 51.25      | 1,237      | \$ 1,793.75  | Water, Wastewater, Gas |
| Meriden      | 716        | 17.50      | 169        | \$ 612.50    | Wastewater             |
| Nortonville  | 577        | 39.75      | 540        | \$ 1,391.25  | Water, Wastewater      |
| Oskaloosa    | 1106       | 53.25      | 907        | \$ 1,863.75  | Water, Wastewater      |
| Ozawkie      | 559        | 38.00      | 528        | \$ 1,330.00  | Water, Wastewater      |
| Perry        | 852        | 28.25      | 709        | \$ 988.75    | Water, Wastewater      |
| Valley Falls | 1158       | 30.00      | 785        | \$ 1,050.00  | Water, Wastewater      |
| Winchester   | 555        | 21.25      | 390        | \$ 743.75    | Water                  |