

# TIMING, TECHNOLOGY, AND COOPERATION COMBINE TO CREATE A SUCCESSFUL GIS

by Matt Sorensen and Russ Wetzel

Timing can often be a critical component in the success of a municipal government program and this has certainly been the case with the city of St. Joseph, Missouri's (72,663 pop.), geographic information system (GIS) mapping program. Cooperation can also be a major factor. These elements came together to effect the history and the ultimate outcome of the city of St. Joseph's GIS mapping program.

In 1992, city officials had the foresight to realize the potential a GIS program could bring to their management capabilities. A GIS program was appealing on numerous levels since it had the ability to manage the City's infrastructure in a computer-based mapping system. However, GIS technology capable of supporting a municipal GIS for a city the size of St. Joseph was still in its infancy. Nevertheless, the city administrators decided to take the first steps that would eventually lead to the program's successful development.

### First Steps

City personnel within the public works department began developing the initial data for the GIS. This included street centerlines, council district boundaries, bus, and snow removal routes, drainage areas, and other



This image demonstrates the city of St. Joseph's sanitary sewer network and associated attributes within their GIS mapping program.

relevant data.

In 1996, the City acquired black and white six inch resolution, aerial photography and two foot contours. The purpose for acquiring this data was to assist with a storm water master plan. The City saw this as the perfect opportunity to put their GIS program to work.

During the early stages of the City's GIS program, the system was being utilized but far from its fullest extent. Despite all of the high hopes the City had for this new technology, many of the inherent limitations due to computer hardware, software, costs associated

with data development, staff training, and other technological issues were making it extremely difficult to maintain the City's GIS program. In essence, the mapping program, against the backdrop of technology limitations at that time, was proving its initial downfall. By 1999 most data development and maintenance ceased.

### New Life

Then in 2003, after four years of a stagnated GIS program, timing and cooperation came into play as the City and County joined forces to breathe new life into the GIS program. Great advances in computer hardware and software helped the City with the rebirth of their GIS. Midland GIS Solutions, a Maryville-based GIS firm,

began developing a combined city of St. Joseph and Buchanan County, Missouri, geographic information system. Over the next 18 months Midland GIS Solutions developed numerous data layers for both the City and County. The City and County cooperated in establishing a cost sharing and data sharing agreement that helped offset some of the startup fees.

New, six-inch resolution, natural-color aerial photography was obtained along with new, two-foot contour data. Midland Surveying, Inc. provided survey-grade Global Positioning System (GPS) coordinates for numerous



**Midland GIS Solutions field technicians, Phil Lubeck (left) and Ethan Herbek obtaining the survey grade coordinate position for a manhole location and completing an inspection that involves opening the manhole, determining condition ratings, and gathering pipe and other relevant data.**

any desktop or laptop computer with Internet access. The City quickly moved to acquire additional GIS software licenses and mapping grade GPS data collectors with ArcPAD field collection software for their street and sewer department.

## Sewer Data

Today, the city of St. Joseph is moving rapidly to incorporate their combination sewer data into the GIS. Plans are currently underway to GPS locate and inspect approximately 8,755 manholes throughout the City. Midland GIS Solution's field technicians will visit each sanitary sewer manhole and obtain a survey grade coordinate position for each. In addition to acquiring an accurate coordinate position, a detailed manhole inspection will be performed for each manhole. This will involve opening each manhole, collecting pipe inverts, assigning manhole condition ratings to all inclusive elements, recording pipe diameter, pipe material, and other relevant data. Sewer outfall locations along the Missouri River and sewer creek crossing data also will be collected.

Much of the current effort with assimilating the City's combination sewer data into the GIS is being driven by the imminent EPA and DNR regulations to help minimize sanitary sewer overflows (SSOs) and combined

section corners throughout the City. The section corner control process assisted with creating a solid framework for the cadastral data development and an excellent control network for subsequent data layers. Layers such as: road centerlines, rights-of-way, subdivisions, lots, parcels, water boundaries, city limits, fire districts, and school districts were created in the GIS program. Additional layers incorporated into the GIS included: city zoning, MoDOT bridge data, FEMA flood zone data, levee boundaries, and U.S. Census data.

Perhaps the most significant break for the City's new GIS program came out of a simple lunch meeting between Midland GIS Solutions, city of St. Joseph's Assistant Public Works Director Andy Clements and Buchanan County Assessor Scot Van Meter. At this meeting, renewed cooperation towards a Web-based GIS was discussed. The inclusion of Midland GIS Solutions' Web GIS product and Web hosting capabilities added the final contributing factor to the ultimate success of the City and County's GIS program.

Once the City's Web based GIS went online things began to move very quickly. City administrators, department mangers, councilmembers,

utility maintenance staff, and other city employees began to access and use the GIS program on a daily basis. The GIS program immediately began assisting the City with daily decision-making processes. The City's GIS program could now be obtained from

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# SUCCESSFUL GIS INITIATIVES

sewer overflows (CSOs). Federal programs such as cMOM, which stands for Capacity, Management, Operation, and Maintenance of municipal sanitary sewer collection systems, regulate poorly performing satellite collection systems that contribute to sanitary sewer overflows (SSOs) during peak overflow periods in regional collection systems across the nation. cMOM stresses reporting, public notification, emergency response, and audit requirements for all municipalities nationwide, regardless of size. A primary objective is to accurately track and document whether or not operation objectives are being met. The City's GIS will significantly contribute toward meeting this federal requirement.

## Timing And Cooperation

The success of St. Joseph's municipal Geographic Information System is a product of foresight, timing, and cooperation in every sense. All of the efforts the City made during its early program contributed

to the success of its latter program. Imagine a city the size of St. Joseph with impending EPA regulations having to quickly develop a system capable of meeting those requirements. A municipal GIS, especially one that is accurate and built on quality standards, takes significant time and expense to develop. In this case, the cooperation the City found with the County was a key component in getting much of their foundational data developed. The ability to have road networks, rights-of-way data, jurisdictional boundaries, and land ownership information greatly assisted the development of their utility network. Having quality mapped data for their combined sewer system and quickly available to field personnel will help streamline the City's ability to accurately assess, report, and quantify their combined sewer system capabilities for these federal assessment programs.

For cities facing similar situations there has never been a better time to begin implementing an accurate GIS

for your municipality. Advancements in computer hardware, GIS software, data collection, and development are making GIS within reach for any size city. With the continuing advent of Web-based technology, the application of Web GIS has never proven more beneficial. The city of St. Joseph's municipal GIS is a living testament to foresight, commitment, cooperation, and timing. All of these factors put together contributed to the ultimate success of the City's GIS program. □

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