# Asset Management Goes Digital

## Kirkland, Wash., Uses GIS in Three-Pronged Attack on Pipeline Maintenance

By Bradley Kramer

Governments across the United States have been finding ways to automate daily tasks, using computers to do away with paper records. Throughout the last decade, many municipalities and utility districts have taken that approach with buried utility assets.

In Kirkland, Wash., city officials have undertaken such an approach with three related tools, implementing a geographic information system (GIS), along with a utility maintenance management application and a closed-circuit TV (CCTV) inspection system, in an effort to streamline the city's asset management.

Kirkland started mapping its existing sanitary sewer and surface water drainage pipelines in 2002. Instead of simply converting old paper maps to a digital database, work crews went out and collected field data, re-plotting utility assets with handheld units that operated ArcPad, an ArcGIS mapping software package from Environment Systems Research Institute (ESRI). The process took approximately six months to complete, but it was worth it, city officials say, because the end result was a superior, fully digital map.

Although re-plotting the maps is often more expensive and certainly more time-consuming, the end product is more accurate and current, says Karl Johansen, a GIS consultant with Kirkland. Converting utility maps to GIS can also be done by trace digitizing of paper maps, but sometimes those maps can be out of date or poor quality. Re-mapping the pipelines allows the municipality "to see what really exists."

Some municipalities use a combination of both approaches — in-the-office and in-the-field mapping — because paper sources tend to be so marginal, Johansen says. Kirkland, located along the east shore of Lake Washington to the northeast of Seattle with a population of more than 45,000 over 11 sq miles, made a conscious business decision to go with the more ambitious approach of completely re-mapping its pipelines digitally.

Once the field mapping is complete, ArcGIS allows the user to do more than simply see what's there. The software also includes a large set of map editing tools, analytical functions and data management features that help improve productivity and aid decision-making.

"It can store so much information and it can sort it," Johansen says. "It's more than a map."

The GIS software can store characteristics about the items mapped and creates layers for various information. In the case of pipelines, it can be used to determine flow information, such as direction and capacity. All the user has to do is insert a set of parameters and ArcGIS does the computing.

For instance, Johansen says that the software can analyze a storm sewer to see if it is adequately sized for a particular drainage basin. The GIS database can store information such as pipe material, age, diameter, slope and length, among other things. That information then can be used to generate an analysis of why a certain area is experiencing flooding, say, from a pipe that is too narrow.

GIS, however, is only one part of Kirkland's three-pronged approach to maintaining its buried infrastructure. Along with GIS, the city uses an asset management software system, called Hansen Information Technologies, version 7.7. Hansen provides an inventory of infrastructure assets, records and manages work orders and uses GIS data to help plan maintenance duties such as pipeline inspections, rehab work, construction projects and other routine maintenance. The software can be used to collect data revisions that can be ported to the GIS database for final editing.

The third component of Kirkland's asset management program is the inspection process itself. The city uses a CCTV inspection truck, which it purchased in November 2005, along with an inspection reporting software developed by CUES, called Granite XP. This software system links to both ArcGIS and Hansen. Granite XP records CCTV inspection data and creates a history for the asset, which helps synchronize any work done on the pipeline.

The OZII crawler camera relays video of pipeline inspection to CUES Granite XP software, where crews can record data to be later entered into a GIS map.

Kirkland crews went out in the field to re-plot utility assets instead of converting old paper maps.

The CUES software allows the user to view work orders created in Hansen, by which the user can then start a project with Granite XP, creating a timeline and assigning the personnel and equipment to the job.

However, the stumbling block Kirkland officials ran into was properly integrating all three systems.

## Going Paperless

GIS has allowed Kirkland to digitize all of its buried asset maps. Hansen has allowed the city to convert its maintenance supervision to digital applications. And, CUES has made it possible to capture, store and manage inspection data. However, inspection crews still must print out paper maps and work orders to do their jobs. Inevitably, notes are made on the maps and work orders and much of that information eventually needs to be entered into the GIS database.

"Here's where it's a little messy," Johansen says.

There seems to be a digital gap in Kirkland, and the city is looking for ways to stop that paper from sneaking through.

Ideally, the city would like to go completely wireless with its pipeline maintenance program, says Kyle Coulson, information technology systems administrator for Kirkland. Instead of using paper, the inspection crews would use some sort of wireless interface to record any information, which either could be immediately entered on the digital map or easily transferred later.

Kirkland is currently in the process of finding the right piece of hardware for the job such as a tablet PC, PDA or notebook computer. However, the tool has to be rugged enough to withstand the rigors of field work.

One of the main hurdles to this process is funding. Not only is wireless technology expensive in its own right, Coulson says, it becomes more so once "ruggedized" hardware becomes a factor. The city is trying to find a solution that is both affordable and durable.

## All Aboard

Kirkland prides itself as a government that embraces technology, Johansen says. However, just because a system theoretically simplifies and expedites a process, that doesn't mean everyone is excited to use it. A major factor in getting the digital asset management program to work is getting personnel to work with it.

New technology can be difficult for some to use. Technology needs people to embrace it for it to be successful, Coulson says.

Kirkland has been lucky in that it has workers who have been enthusiastic about and embraced this asset management system. "It's given them the ability to go about their work more easily," Johansen says.

Bradley Kramer is assistant editor of *UIM*.