

# water writes

ESRI • Winter 2005

GIS for Water/Wastewater

## Web Application Integration to a Work Order System

By Fred Wong, Union Sanitary District

The Union Sanitary District is an independent special district that provides wastewater collection, treatment, and disposal services to the residents and businesses of the cities of Fremont, Newark, and Union City in southern Alameda County, California.

The district serves a population of 322,450 and maintains 760 miles of wastewater mains in a 60-square-mile service area. The daily average dry weather flow is 29 million gallons of water per day. The district has 130 employees, and the annual operating budget is \$20,450,000.

### Background

The GIS program began in 1996 with ArcInfo and ArcView running on a few workstations, and during the early years much of the time was spent on data conversion. A GIS task force was formed within the district to identify and prioritize applications that were to be developed. The task force compiled a list of 17 applications with the highest priority for a GIS connection to the work order system.

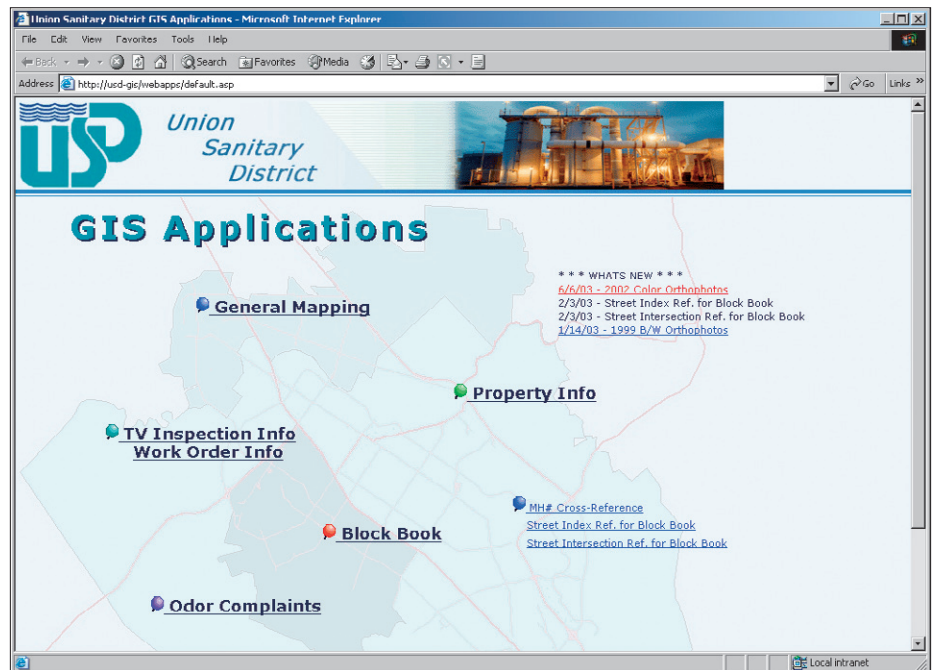


Figure 1

In 2002, the district decided to implement Web-based applications on its Intranet to deploy GIS throughout the organization. ArcIMS was installed on a dedicated GIS server, and MoosePoint Technology, Inc., was contracted to help create the initial ap-

plications using their GeoSmart product to quickly build the application. GeoSmart is a browser-based application that allows easy creation and updating of Web applications using wizards to go through a series of steps that will build the application.

Application	Purpose
General Mapping	For general mapping with 30 data sets that may be overlaid for ad hoc mapping
Property Info	For looking up parcel information such as property owner and mailing address
TV Inspection Info/Work Order Info	For locating a main and recalling a TV Inspection Report or work order summary via link with the Hansen Infrastructure Management System
Block Book	For locating a block book sheet with the latest mains and manholes update
Odor Complaints	For displaying locations of odor complaints

### Priority Applications

The highest ranked application needed was for a GIS connection to the work order system. One of the reasons this was such a high priority was the district has more than 10 years of sewer main and manhole work order data in the Hansen Information Technologies system.

Four other applications were also initially developed to meet some of the other priority applications (Figure 1). The initial GIS

*Continued on next page*

Continued from page 1

## Web Application Integration to a Work Order System

applications that have been developed have similar basic functions but are customized for different specific purposes.

The applications have been designed to provide more data and details as the view is zoomed to. There are two basic steps: (1) Locate the main, manhole, etc., by zooming in on the map and searching by address or street and cross street or query for a manhole number and (2) Identify/Select the main,

manhole, or other feature. There are several other standard functions such as viewing various data layers and getting their information, printing, clearing the previous data, and returning to the main menu.

### Work Order Database Integration

As the highest priority application, the TV Inspection Info application was designed to perform three primary functions. The key

function was to view the TV inspection reports for the selected main. The report data from the Hansen system database includes the TV inspection number, the date, the operator, the upstream and downstream manholes, and the readings with distances from the camera setup, clock position of the lateral or defect observed, the code/defect, a short description, the code/defect, a short description, and the associated comment (Figure 2).

A second function was to list all the past work orders for the main to get an idea of whether it historically has had problems and what has been done (Figure 3).

The third function was to provide a Cleaning Area Report. The district has a 72-month maintenance program for the mains so each of the mains will be cleaned and checked for defects during that period. Each main is assigned to a cleaning area, and grouped work orders are issued to the crews. The Cleaning Area Report is a tool for the crews or supervisors to quickly view how the cleaning work is progressing (e.g., if 50 percent of the year or quarter is over, approximately 50 percent of

### Available Data Sets

Some of the available GIS themes include

- Odor Complaints
- Pump Stations/Plants
- Sewer Manholes
- Sewer Mains
- Laterals
- Sewer-Historical
- Storm Water Inlets
- Storm Water Mains
- Hydrants
- Water Valves
- Water Mains
- Survey Control
- Curbs
- Contours
- USD Grid
- Railroads
- Streets
- Sewer Easements
- Drainage Basins
- Rights-of-Way
- Parcels
- Tracts
- Streams
- Lakes
- 2002 Color Aerial Photos
- 1999 Black-and-White Aerial Photos
- USGS Topo Map

### Future Application Functionality

A new function of the TV Inspection Info application will be a link to videos of the TV inspections. Similar to the other hyper-linked functions, the digital videos will be

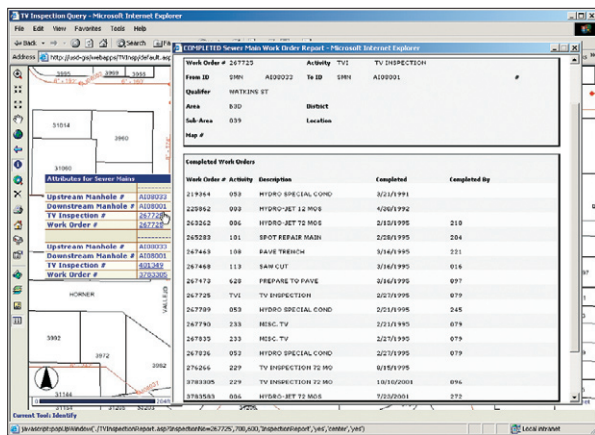


Figure 2

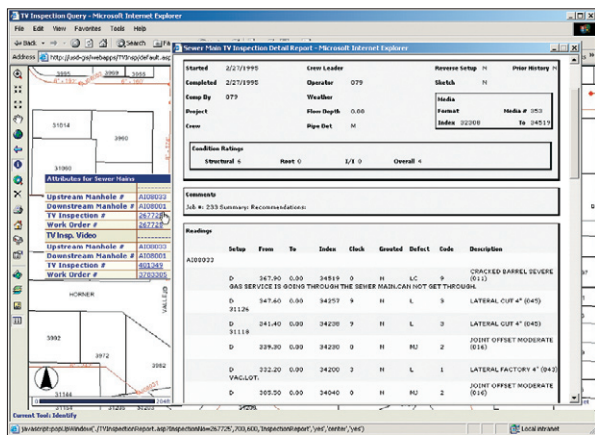


Figure 3

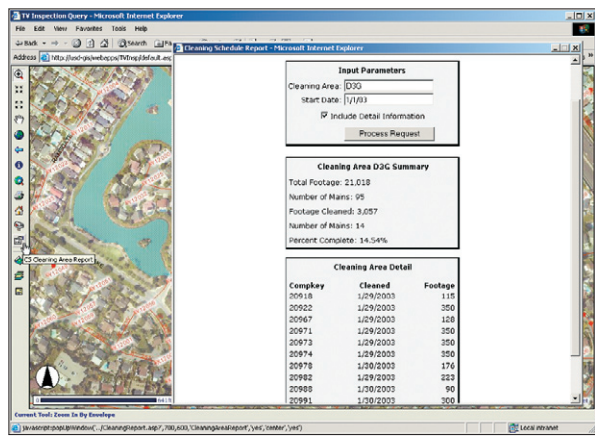


Figure 4

Continued on next page

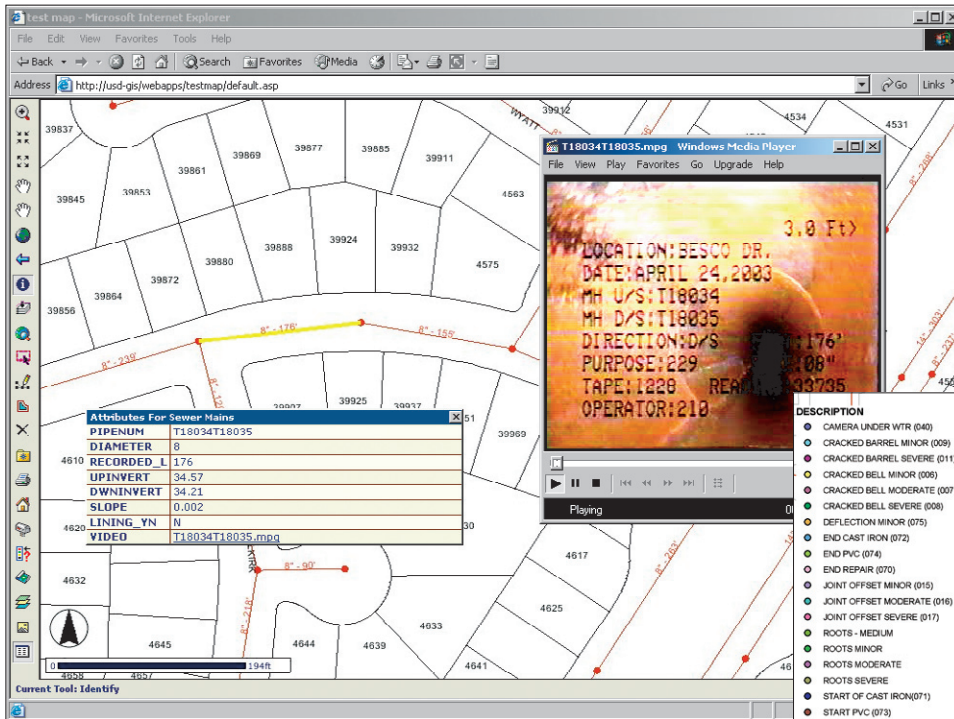


Figure 5

Continued from page 2

## Web Application Integration to a Work Order System

another attribute listed for the main, and when the attribute is selected, the videos will be streamed over the Intranet from the GIS server to standard media player software on any computer. Currently, the TV inspection videos are recorded on VHS tapes that waste valuable cabinet storage space. Moreover, when a tape is checked out, it can be hard to find by someone who needs to see it. By transitioning to digital videos, the storage is on hard disks or other media, freeing up cabinet space; in addition, by making it accessible through the GIS, more than one person can view it simultaneously if the situation warrants. A prototype of the GIS application with streaming digital video has been developed and tested with good results (Figure 5); the district is investigating the cost to convert to digital video capture in the TV trucks and to convert the videos on VHS tapes.

### Benefits of Web-Based GIS Applications

Some of the benefits of using Web-based applications for deploying GIS enterprisewide are that it provides easy and user-friendly access to information for all staff. Having information organized within one source also

makes accessing information more efficient when responding to customers or trouble calls, and it helps to provide consistent support to everyone.

There are also benefits from GIS integration with the work order system. An easy-to-use tool to locate and identify any particular piece of infrastructure, GIS can quickly display the information about the main, manhole, or other components of infrastructure. Then there is the ability to create new GIS data sets, such as pipe defects, from the data in the TV inspection reports so that the defects, for example, can be color coded and mapped for a graphical presentation (Figure 6).

### Software

The GIS server is a Dell PowerEdge 2450 server with Windows 2000, IIS, and Microsoft Internet Explorer. ArcIMS and GeoSmart provide the map services and applications. GeoSmart handles the connection to the Hansen system Microsoft SQL Server database. The applications are in ArcXML with some of the special functions in ASP and Java scripts.

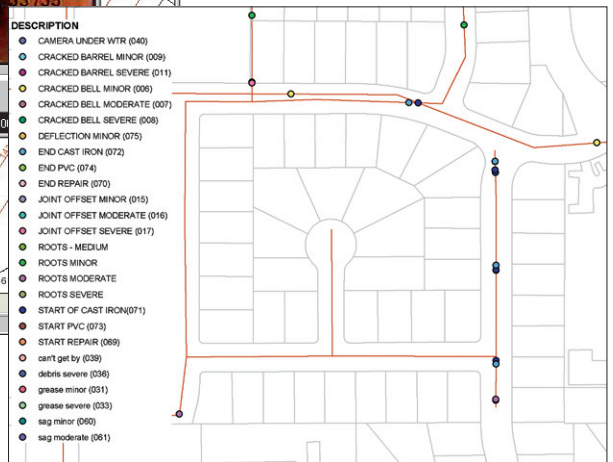


Figure 6



### ESRI

380 New York Street  
 Redlands, California  
 92373-8100, USA  
 Telephone: 909-793-2853  
 Fax: 909-793-5953

For more information on ESRI, call

**1-800-447-9778**

(1-800-GIS-XPRT)

Copyright © 2005 ESRI. All rights reserved. ESRI, the ESRI globe logo, ArcView, ArcInfo, ArcIMS, and www.esri.com are trademarks, registered trademarks, or service marks of ESRI in the United States, the European Community, or certain other jurisdictions. Other companies and products mentioned herein are trademarks or registered trademarks of their respective trademark owners.