

From Mylars to Enterprise Geodatabase

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Abstract:

The City of Fullerton recently migrated to ArcGIS for the tracking and managing of their Water and Wastewater systems. The City will also be using Mapplet.Net, which runs on ArcIMS and ArcSDE, and MapLibrary, a repository for large quantities of georeferenced data. DCSE has been assisting the City in the migration process from the hand drawn mylars and CAD as-builts to GIS. This paper outlines the City's strategy in leveraging the GIS System as per their requirements and also the internal transformation to Enterprise GIS at the City.

Introduction – City of Fullerton

The City of Fullerton is located 22 miles southeast of metropolitan Los Angeles, in the Center of North Orange County. The City was founded in 1887, and has 485 miles of water mains and 380 miles of sewer. The City converted their water and sewer systems maps from paper format to GIS and are beginning to use the GIS system.

From Paper to Digital

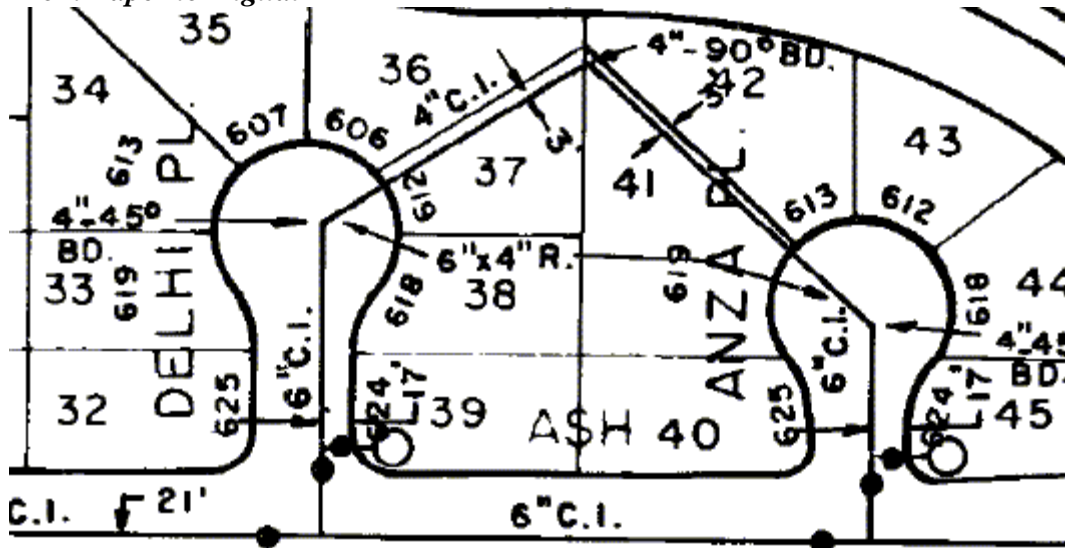


Figure 1: Snapshot of the Scanned Paper maps.

The City has been using paper maps for a long time, and these maps have been *created by hand*, with a great deal of effort and consist of the many details that the City crews need when they are out on the field. Since the media was paper, and there was no concept of seamless data, the maps were made with an overlap area along each edge, showing facilities in that area. Truly, these maps are great examples of cartography that were in use until the City switched over to digital format. The goal of the maps was to convey the

approximate location (within 20') of the facilities, and the information related to the facilities.

DCSE converted the City's data from paper to Geodatabase format. The source data used were the source atlas maps and as-builts. The data was digitized with reference to parcel data that the City obtained from the County. Aerial photos were also used as a reference. The City was highly involved in every step of the conversion process. The following were the steps involved in arriving at the finished product:

1. Customized geodatabase design as per the City's requirements.
2. Source material scanning, inventory
3. Pilot test
4. Digitization, done phase-wise
5. Annotations – feature linked and non-feature linked.
6. Internal QC
7. Anomaly resolution
8. QC by the City
9. Implementation of the QC feedback for the entire project area.
10. Merge all the phases.
11. Atlas tool development

Some Interesting Experiences During Data Conversion...

The annotation on the maps consisted of lot numbers, addresses, pipe diameters, valve and hydrant identifiers and water meter sizes. The City was very enthusiastic to implement the feature-linked annotation in *ArcGIS 8*.

Using feature-linked annotation was a great way to check the attributes as well. What you see (as annotation) is what you get (from feature attribute tables). And it definitely saves time during data QC and maintenance as it automatically updates on updating the feature.

The City also implemented the "Offset" feature type for showing dimensions (distances from pipe to curb) and found many options to show the dimensioning similar to the source atlas maps.

The project had a schedule of phase-wise conversion; the City grid tiles were grouped into 18 regions. Hence the annotation was also developed for each region. Merging feature linked annotations were the most challenging part of the conversion project. When all the regions were merged, the linking between annotations and features was lost. The workaround was to create another field for with a link to the features in annotation, and in the features and re-link them.

Another task was replication of the manhole annotation. The annotation was at an inclination, consisted of depth, slope, and manhole number separated by a line. All this was accommodated using a complex expression for labeling.

The Digital Atlas Maps

The City has migrated from all paper and Mylar to digital maps in a little over a year. The City found immediate benefits of using GIS after the conversion was completed. Also, the City now has seamless data that is not restricted to the grid frame. Though it is a wonderful idea to use digital data in the field (using hand-held devices), due to some constraints, the City plans to do this at a later date.

The City plans to use the maps made from the digital data in the office and to a limited extent, in the field. The users will provide input in order to make the maps more efficient. The City is looking into changing the page size (current page size is 17" x 22") based on such input. The City will then implement the input, and print all the atlas books required for their day-to-day operations.

In order to ensure that the process of making maps is simple and easy, DCSE developed an Atlas tool for the City. The flexibility of the tool enables the City to print the Atlas of the size and scale they need at any time.

The Atlas tool is based on the DSMapBook program from ESRI and can generate maps based on the page numbers. The special customization done for the District includes automatic hydrant and valve counts at the bottom of the page.

The Atlas tool has the options to print the maps, or export to various formats like PDF, JPEG and EPS. It also has a good tool to zoom to a page in the atlas quickly.

One interesting fact about ArcView 9: ArcView 8.x had a limitation that the annotations are always drawn on top of any polygons. The City had a detail blob that was supposed to be covering dense areas of maps shown on separate detail sheets. As long as the City was using ArcView 8.x, the detail blobs were converted to graphics in the mxd and hence drawn on top of the dense areas, covering annotation in that area. With ArcView 9, this issue was resolved - there was no need to create graphics in mxd for this purpose. ArcView 9 displays layers exactly in the order shown in the Display tab in TOC.

Leveraging the GIS System

The City started using Mapplet and MapLibrary with a small group of users. The user group will expand as the City gets acquainted with the new system, and after input from the users.

Mapplet is a .NET-based GIS enterprise application which can be used to access data and documents across the enterprise with a single GIS-based front end. Built on Microsoft's .NET technology, Mapplet.NET is integrated with ArcMap Server, a component of ArcIMS from ESRI. Mapplet.NET allows access to data from all aspects of the utility system including Customer Service, Field Operations, Engineering, Finance, and any other enterprise data.

Mapplet was in use during the conversion process too. DCSE placed some flags on Mapplet that indicated features with anomalies (example – manhole depth mismatch – etc).



Figure 2: The City communicated responses to anomalies using Geoshapes on Mapplet.

The City looked at the flags and posted the resolutions using the Geoshapes in Mapplet. This process is efficient and saved time in communicating the anomalies.

MapLibrary is a web-based application for publication of production-quality maps generated in the ArcGIS software from ESRI. It allows a GIS organization to author customizable metadata about their map artifacts and publish them to the enterprise, all with just a couple of clicks. These maps then become accessible for searching, viewing, and printing by the enterprise via a browser. MapLibrary assists GIS organizations in providing service for their customers faster and more efficiently, while eliminating the

need to reproduce maps over and over again. MapLibrary includes an ArcGIS extension, which allows for direct publication of maps into the library from within ArcMap. The City's Rastorex system (a document cataloging system) is also converted to MapLibrary enabling faster searches and systematic Map generation workflow.

Conclusion

The City finds it very flexible using GIS for their engineering needs. Now that the maps and data are digital the City is developing a workflow to maintain and update the data. The City is coming up with new uses for the data everyday. The use of hand-held devices in the field will help the City update their seamless data and the use of seamless data reduces the amount of set up work for the field crews.

References:

ESRI ArcGIS documentation

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