City of Grapevine, Texas

City of Grapevine Makes Big Strides in GIS

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Paper Abstract

The City of Grapevine, TX is a small, but growing city located on the northern end of the Dallas/Fort Worth Metroplex. In 1999, John Jennery, the City IT Manager, with the backing of Assistant City Manager Bruno Rumbelow, successfully applied for an ESRI Local Government Start-Up Grant. This case study will review how Grapevine was able to leverage the grant and create the foundation for what has blossomed into a comprehensive Enterprise GIS. Taking a closer look at one of the city's department we will examine how the Planning Department utilized ArcObjects to automate the entire Zoning and Land Use Case Management process. The City of Grapevine is an outstanding example of how a GIS can flourish in a small city when it has dedicated, capable personnel and the backing of city administrators and department directors.

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Background

The City of Grapevine, Texas is a small, but thriving city centrally located north of the Dallas/Fort Worth metroplex. In fact, the majority of DFW Airport is located with the city limits of Grapevine. The City is also home to the Gaylord Texan Resort and Lake Grapevine.

In April of 1999, the City of Grapevine Information Technology Department received an ESRI Local Government Start-Up Grant, which provided them with the core GIS software they would need to start building a GIS. A few months later, the City, headed by the Assistant City Manager and the Information Technology Manager, contracted the services of a GIS consulting company to conduct a Needs Assessment, GIS System Concept Plan and an Implementation Action Plan. The plan encompassed three phases of development that involved 12 to 18 months of work to complete each phase. It was determined that the position of GIS Project Manager would be contracted on a part-time basis for the first two years of the project. During this time Phase I and half of Phase II were completed. In November of 2001, the City hired Teri Landrum, GIS Administrator, to complete Phase II and III of the Implementation Plan and manage the GIS full time.

Phase I focused on data conversion. It was soon determined that the existing City AutoCAD data lacked accuracy and the desired attribute information. The data acquired from external agencies also did not meet the standards of accuracy that were sought by the City. Much of the data had to be researched, recreated and/or adjusted to meet the City's needs. Although this process was time consuming and expensive, it facilitated data maintenance efforts that required the City to reevaluate their current methodologies and figure out better ways to manage the data to improve accuracy and accessibility.

By the time the City was ready to begin Phase III, the basemap data had been developed, an ArcIMS application providing public access to the data was available online and a map generation application was available for internal use. The City began to evaluate third-party applications in hopes of quickly leveraging their current investment and integrating GIS with current work flow processes. One of the most successful implementations was the use of Zoning Analyst from Geographic Information Services, Inc. (G/I/S) to manage the Zoning and Land Use Case Management process.

Before GIS

Before GIS and Zoning Analyst, the Case Management process at the City of Grapevine was inefficient and time consuming. After the applicant submitted a request for a Zone Change, the pertinent information was entered into a table created in Microsoft Word.

The data was entered free form, was often incomplete and did not adhere to any standard naming conventions. The public hearing property owner research involved the use of hard copy maps from the county Appraisal District. The maps were tiled into grids that did not line up at the borders nor did they line up with any of the available aerial photography. The vectors from the Appraisal District maps were made available as an AutoCAD export from MicroStation but the accuracy issues still existed. The department chose to add case numbers as annotation to the file for reference but it was a manual process and case numbers were often mistyped or didn't get added at all. Researching the zoning history of a piece of property would take hours or even days if it had a lot of past activity or was politically sensitive.

Once the property was located on the map, the 200-foot notification buffer had to be determined manually by using a scale and a compass. Since the map only contained legal descriptions, the actual property owners were found in the certified tax roll by determining the subdivision/block/lot or abstract/tract of each property. The certified tax roll was only available as a printed document at the time so the property owners and addresses had to be copied from the log and typed into a document to produce mailing labels. This task became more tedious when the 20% rule was required to be applied. In most cases, a planimeter was used to determine area by tracing the boundaries of the protesting properties. Since the tax maps were inaccurate, calculating the 20% rule was sometimes "guess work".

The next step would involve producing a location map of the property requesting the zoning change. Creatively utilizing the copy machine, a copy of a portion of the tax map was clipped out at a 1 inch equals 200 feet scale, taped to a map template and copied again to produce the location map. Descriptive text, leader lines and crosshatching were often created by hand. As employees became more skilled at using AutoCAD, they were able to clip out the property using CAD tools and place it into a basic CAD map template.

The notification method and the inaccuracy of the source data were major issues of concern for City Administrators. The law that governs the process provided some protection from litigation but the City had to prove they used due diligence in defining the property in question and contacting the effected property owners.

How the Problem was Solved

Zoning Analyst is an ArcObjects application designed to assist a Planning Department with its daily zoning and land use decisions as well as manage the case management process. The primary benefits to the City were providing a source for public information, efficient case management, generating public notification letters and end user map production. It also included comprehensive tools for Land Use Analysis, Setback Creation and Analysis and Case History Tracking. And the fact that the map data behind the application was being maintained by a GIS insured that it was consistent, accurate and up to date.

Almost over night, the City of Grapevine Planning Department was able to conduct business more efficiently. Within hours of installing the application, they were able to set up meetings, create agendas, determine 200-foot buffers as well as the property owner addresses, create mailing labels and print location maps. Since the GIS was carefully planned and designed with future applications in mind, the data met the requirements needed to utilize Zoning Analyst. Additional layers such as aerial photography and legal description annotations were added to further enhance the map and make it even more useful. Now the case management process only takes about 30 minutes. When the application is received, the secretary can locate the property by using the address, legal description or by zooming into the map. There are several ways that she can determine if she is selecting the correct property. Since the parcels are linked to the Certified Tax Roll, the ownership information can be matched with what was given on the application. Since the legal description annotation is on the map, the secretary can also compare it with the plat. Once it has been verified that the property has been properly identified, a case can be created. Zoning Analyst automatically transfers the ownership information and the current zoning classification to the case record. The type of case, meeting location and time, proposed zoning and comments are added to the record. The property owner notification is as simple as opening the case, using the buffer tool and exporting out the ownership information to whatever format the organization chooses to work with. There is also a built in mail merge function as well as an agenda generator. If there is opposition to a proposed zoning change, Zoning Analyst can track which properties are involved and notify the user when more than 20% of the physical property within 200 feet is opposed by the owners. The task of manually calculating the area and percent in opposition is no longer a source of uncertainty or stress. The last step of the process involves creating the location map. After the case is open, it's just a matter of switching to the map view, setting the scale and using the tools to add any descriptive text. A map template can be created as part of the Zoning Analyst set-up process that defines the location of the title, scale bar, north arrow, etc. that automatically loads when the user is ready to produce a map. At the City of Grapevine the administrative staff is responsible for case management and notification. Since it no longer takes the majority of day to prepare a case, staff can work it into their daily routine. Zoning Analyst has provided a means to create and manage development cases that staff can feel confident using.

Although the implementation of Zoning Analyst was very successful, there was one unexpected setback. The City discovered that the Word document containing the last 15 years of case history could not be imported into a database. As mentioned previously, the text was entered inconsistently and without standard naming conventions. It was also difficult to determine the property location since only vague descriptions were included in the table. Through the City's GIS Department, a student intern was hired to enter 15 years of historical cases. He used the official ordinances to determine the property boundary as well as important information relevant to the case. This process also revealed several errors in the existing zoning layer that wouldn't have been caught otherwise. As a result of having the City's case history in Zoning Analyst, the "Show Area History" tool provides one click access to all historical cases for a particular area. Researching ordinances and manually tracing property history is a thing of the past.

Zoning Analyst is now a one-stop portal for planning and development activities in the City.

Conclusion

The investment that the City of Grapevine made in GIS and in third-party products like Zoning Analyst has definitely paid off. Accurate data, improved efficiency, delegation of case management responsibilities and utilizing improved technology are just a few of the benefits the City has seen. Not only did GIS improve an existing and inefficient process but it created confidence and enthusiasm for GIS as a whole. The City of Grapevine depends on GIS in every department within the City. Paper maps have been replaced with digital ones. Flat files have been replaced with databases. An ArcIMS site on the intranet is where staff goes to find a location, identify the diameter of a water main or find out how large a building is. GIS is flourishing in the City of Grapevine.

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