GIS Improves the Process for Reviewing Applications for New Developments within Saint Johns County, Florida

Tom Tibbitts, Corey Bowens M.S.P.

ABSTRACT: New housing development applications occur daily in Saint Johns County, Florida. The GIS Office has created numerous procedures and tools to improve how the Growth Management Department handles these applications. These customized tools include ArcMap Map Packet Production, ArcMap Property Buffer Notices, and ArcIMS Drilldown Database Populating. When reviewing boundaries, enterprise GIS layers are properly built from legal descriptions and surveys to ensure accuracy. GIS improves the efficiency of the application process and the accuracy of the decisive information. Equally important, our office supports public awareness of these Development Applications. GIS tools create maps available through newspaper and television. During bi-weekly Board of County Commission and also Planning and Zoning Agency Public Hearings, our GIS Staff administrate the Audio/Visual presentations including dozens of maps. Throughout this process the GIS Staff maintain these applications along with an Enterprise GIS Data Library, and the legally adopted Comprehensive Plan Map Series.

Introduction

As of early 2005 Saint Johns County, situated on the Northeast coast of Florida, ranks 9th on a list for highest population growth rates for counties in the United States. This is a result of growth trends that started in the mid 1990's as people discovered the attractiveness of our region. Saint Johns County benefits by being close in proximity to beautiful Atlantic beaches, intracoastal waterways, the Saint Johns River, Ponte Vedra, and our Nation's Oldest City, Saint Augustine. This substantial growth was coupled with a large amount of new housing and commercial developments, which all needed review and approval from different County Departments.

The SJC GIS Division grew throughout the early 1990's and by 1996 was fully supported, fully operational, and taking the first steps towards building base map data accessible through enterprise applications. Data such as parcels, addresses, and aerial photography are now very critical to the operations of the County. This data is housed in ArcSDE and available through applications including ArcGIS, ArcIMS, ArcPad, and third-party applications such as ALI-Trakker. Initially, departmental maps were at the highest request. As a result of early reliable base map data, many advanced tools and software applications grew from the early success of GIS hardcopy maps. The GIS office has created numerous procedures and tools to improve how Growth Management Department handles these applications. The Board of County Commissioners, Planning and Zoning, Development Services, and Building Departments all have benefited from customized applications built to handle specific needs. To support the development review process, several datasets, maps, applications and tools were built by the GIS Division.

Saint Johns County GIS Division
Tom Tibbitts, GIS Mapping Coordinator ● ttibbitts@co.st-johns.fl.us
Corey Bowens, GIS Analyst II ● cbowens@co.st-johns.fl.us

The Development Review and the Application Process

Our development review process is responsible for ensuring that new developments meet county standards while respecting the land rights of owners. Development in Saint Johns County must meet many requirements and regulations in order to keep the area as a livable community. Development applications are reviewed by a wide range of county departments along with other government agencies. A review of the application should ensure the county code is met fully, but should not create an undue delay to the property owners and their agents. The Saint Johns County Geographic Information Systems (GIS) Division has supported the review process by expediting access to information and building processes to provide for accurate review, informed decisions, and timely turnaround times.

In Saint Johns County, the Growth Management Services Department (GMS) coordinates the Development Review processes. Many county offices are involved including GMS's Planning, Development Services, and Building Services Divisions, along with Fire/Rescue Services, Survey and Mapping, E911 Addressing, and more (fig.1). Within the GMS Department, several Programs are extensively involved in Development Review including Development Services, specifically Zoning, Current Planning, Comprehensive Planning, Transportation/Concurrency and Environmental Planning. These departments follow the guidelines that define goals, regulations, and procedures for development applications established by the County's Comprehensive Plan and Land Development Codes. Together these offices establish guidelines and review a variety of projects:

- Zoning Regulation reviews, which include re-zonings, modifications to Planned Unit Developments, telecommunications towers submittals, and special and temporary use permits.
- Land Development which focuses on proposed site plans and designs including subdivisions and commercial sites. Review activities include permit tracking, clearance sheet approval, pre-application review, subdivision plat review, construction review for roadways, drainage and utilities, landscape and tree review, and construction compliance inspection.
- Comprehensive Planning, also known as Long-Range Planning, is built around the Comprehensive Plan which is a master plan for the general design and development of Saint Johns County. Their mission "is to effectively manage growth and development by designating areas of anticipated future development which satisfy demand where feasible, in a cost-efficient and environmentally acceptable manner."

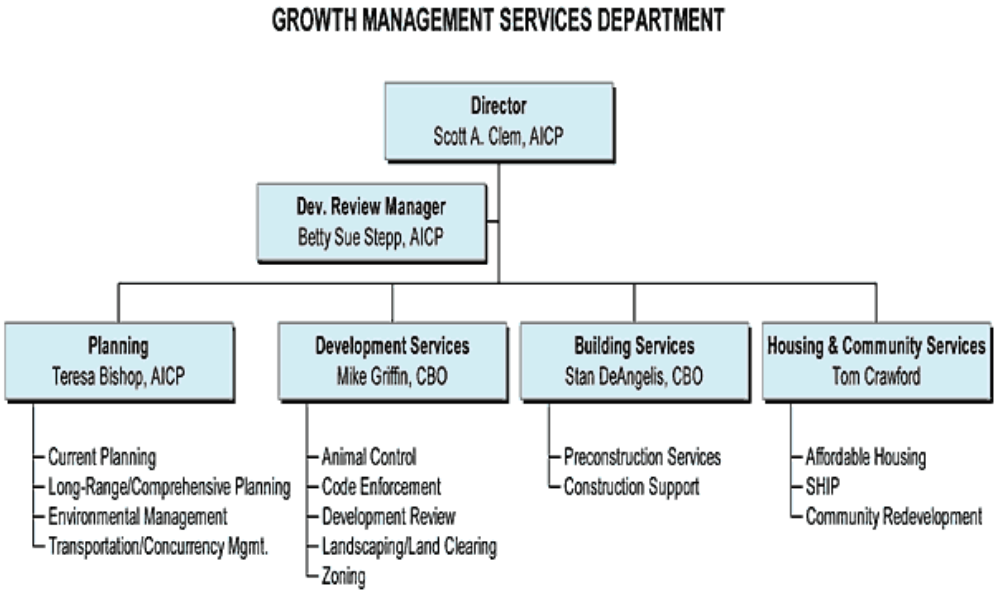


Figure 1

While each of these project types is unique, the general process is for an application submittal, followed by the DRC's application review for compliance and accuracy. In the case of non-compliance the applicant must resubmit applications with any required corrections. Upon compliance with the regulations, the DRC approved application is submitted for a vote by the Planning and Zoning Agency (PZA) and then the Board of County Commissioners (BoCC). Comprehensive Plan Amendments require approval by the Florida Department of Community Affairs (FDCA).

GIS Involvement with Development Review

Since the mid 1990's development have become synonymous with Saint Johns County. Around the same time the GIS division emerged with functional uses that transferred into practical solutions for other departments. One of the first success projects was building the Comprehensive Plan Map Series, which is a collection of 20 maps for informed growth management. The success, accuracy and significant cost-savings of the project would immediately make a name for the GIS Division. GIS continued providing solutions for Growth Management Services, and the success would spread into the daily workflow.

The new developments brought new infrastructure which meant updates to many GIS layers. For some of these layers, the development created new features to be mapped such as roads, addresses and parcels. For other GIS layers, the changes from development were directly tied to GIS layers through regulatory features, such as Future Land Use designations, Zoning, DRI's, Overlay Districts, Impact Fee Zones, and more. In the early years, our GIS program rooted ourselves within the Development Review process to ensure that we had the correct information for updating regulatory layers and infrastructure layers.

ESRI software soon became the tool for building regulatory maps. As mentioned in 1997 the Comprehensive Plan Map series was built with ArcEdit and ArcPlot which proved as a vast time and money-saver. The result was an immediately accessible tool for staff to coordinate with and with such a positive response more maps followed including:

- Overlay Districts
- Zoning Designations
- Impact Fee Zones
- Traffic Analysis Zones
- Road Network Links
- Inspector Zones
- Commissioner Districts
- Floodplains

While not very advanced compared to the overall possibilities of GIS, these early maps literally laid the foundation for future applications. With each map request, another layer was researched, mapped, and established with a procedure for updates. Having the data and the maintenance processes incorporated into the county procedures ensured that reliable GIS layers would be available for more advanced uses of the County's enterprise GIS.

The early success of GIS mapping was followed by complex GIS analysis. This followed with desktop GIS, starting with ArcView introduced in the offices represented by the DRC. The success of this brought about the demand for a full enterprise system utilizing ArcIMS and ArcSDE. The flexibility of these two tools helped reach new extents of GIS by easily installing software applications within existing Development Review software and customized applications. Having addressed the catalyst of GIS use in Saint Johns County, we can focus on the individual applications, processes and procedures that take place in which GIS is helping streamline and improve the Development Review Process.

Clearance Sheet ArcIMS Application

A significant part of the Development Review process is the procedure of submitting an application for review. Upon submitting the application, a SQL Server database is used to store relevant data. Several fields of the database collect information based upon the parcel of land being modified. For the benefit of saving time and improving accuracy, a customized ArcIMS service was designed to utilize the parcel to auto-populate these fields using a GIS analysis.

The ArcIMS application built queries our parcel layer based on a Parcel Identification Number (PIN). The selected parcel is then used in a 'Drill-Down Analysis' within ArcIMS. This is a form of an overlay analysis or select by location analysis. Attributes of polygons that intersect the selected parcel are returned by ArcIMS. This allows ArcIMS to contain values for a parcel's floodplain, Census Tract, Traffic Analysis Zone, Zoning District, Zoning Overlay District, Planning District and Impact Fee Zone. Because of the processing required, it is critical that these layers be stored in SDE for faster spatial analysis. Since ArcIMS is used, the results of the Drill-Down Analysis are returned using session variables in Active Server Pages (ASP) code. Figure 2 shows the fields that are auto-populated in the Clearance Sheet Forms.

The ArcIMS application is capable of running the entire analysis without user interaction. The Main Clearance Sheet web page sends the PIN, using ASP and session variables to the ArcIMS service. The results are returned the same way. However, it is preferable for an operator to use the application only as a tool, and for the operator to certify the data that is being auto-populated. A map interface allows the operator to view the parcel overlain with the critical layers. Aside from certifying the data, this is crucial when overlay layers do not share topological boundaries, such as flood plains, or feature types such as linear features. In these cases there may be more than one result per parcel for the operator to verify.

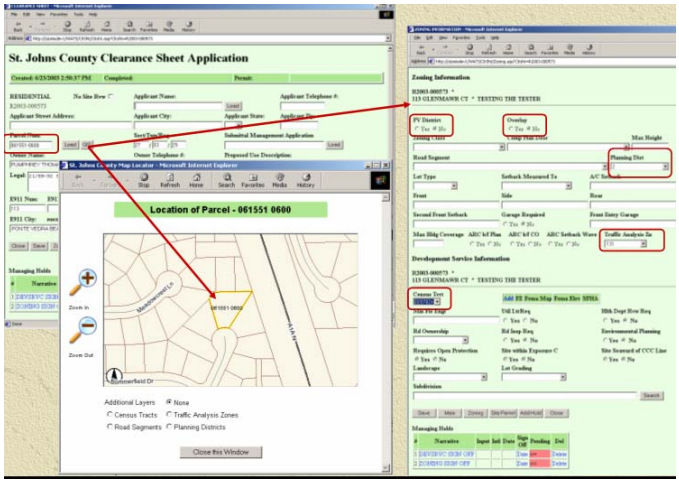


Figure 2, Clearance Sheet Drill-Down Illustration

The Clearance Sheet ArcIMS Application has been very successful and very reliable. This innovative solution is an eye opener to the operations with Saint Johns County that Geographic Information Technology can provide some very powerful and cost-effective solutions.

InstaMap Map Production Tool

InstaMap began in 1997 as a tool to advertise applicant properties graphically in the newspaper and has become a model tool for generating maps for application review. In its inception, custom tools created a map designed to be used for classified ads as a notification for a public hearing since the public better understood maps more than a legal descriptions. The application customized the ArcView interface for the purpose of creating maps consistently, accurately, and efficiently.

The value of the maps spread and the application expanded to cover a larger need, which was for a variety of maps for internal review of application parcels. The Planning, Zoning and Development Review staff wanted a set series of maps for reviewing applications. This series included a General Location Map, a Future Land Use Map, a Zoning Map, and an Aerial Photography Map. These maps are created at the application submittal, and are kept within the file so staff can quickly access crucial information relating to the project.

Our latest version of InstaMap is an ArcMap document customized with VBA and stored as a template. Through a form-based menu (fig. 3)the operator can adjust several settings and make several selections. The powerful customization interface for ArcMap has allowed extensive control of the mapping process with many options and many cartographic adjustments made automatically based on map characteristics.

Figure 3, InstaMap Menu and Tools

The maps generated by InstaMap were found to be so popular, that in 1999 the County Administrator and the County Commission insisted the maps be available for on-screen projections during the PZA and also the BoCC public meetings. This was the initial step towards our unique use of GIS as the hub for public hearing presentation materials. InstaMap was expanded to included tools to automatically export completed maps to a directory based on a project name where they can be used for presentation material.

The InstaMap Map Production Packets, while simple in their inception, have become vital in reviewing applications. County Commissioners, citizens boards, Administration, departments, along with the public, and applicants use the maps throughout the application process and during the public hearings. The speed at which they are prepared makes them readily available throughout the process. The accuracy of the maps clearly stands out as we have invested substantially into our data maintenance. What is lost on the end user is the consistency of the maps. Hundreds of these maps are able to be prepared with the same standards for quality cartographic display. In each case, the end user is able to quickly view the information on the map without having to decipher discrepancies within other maps. The importance of information accessibility is clearly paralleled by the ease of use.

Public Hearing Map & Presentations

Upon the request of Administration and the Saint Johns County BCC, the GIS office began coordinating the preparation of Visual Presentations during public hearings of the BoCC and PZA. Weekly and biweekly meetings would have digital presentation material, including maps for Commissioners, staff, applicants, the public audience, and the television audience. The original intent was for using live GIS search and display

tools available at staff and Commissioner request. With time, live GIS requests were replaced by a series of set maps for each agenda item which were being created by the department presenting an agenda item. These maps, now created with the InstaMap tools, include a Project Vicinity Map, a Project Site Map, a Future Land Use Map, a Zoning Map, and a series of Aerial Photography Maps (fig. 4). Maps were prepared for all Development Review applications. The GIS staff's task now became one to administrate the presentations and to coordinate individual department's work in the preparation of these maps to a similar cartographic standard.

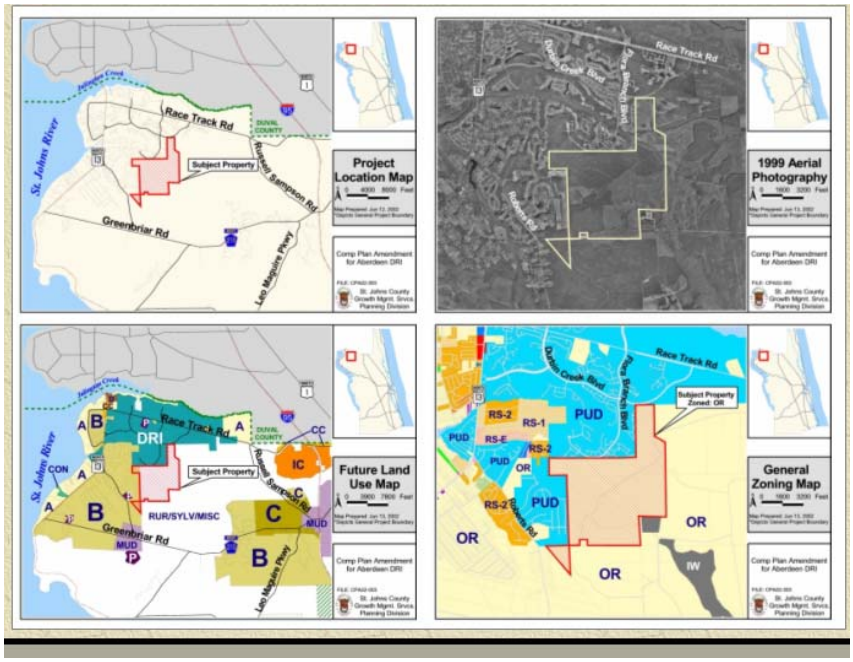
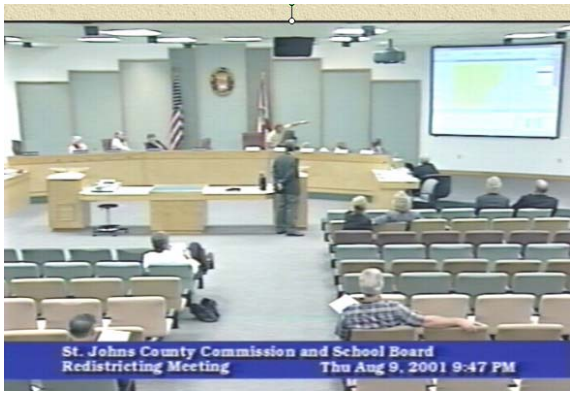


Figure 4, InstaMap Development Review Map Packet

The Public Hearing Maps reached an early approval with the Board but rose even higher with the County Commissioner Redistricting Public Hearings during 2001. New Commissioner Districts, based on Census 2000 Blocks, needed to be approved and presented by the Supervisor of Elections. Additional approval was required by a joint vote of the Board of County Commissioners and the County School Board. A consultant was not able to convince the 10 members to approve his plans. After much duration which went well into the late evenings the combined Boards insisted on starting their own plan from scratch and during these live televised hearings they presented their ideas directly to GIS staff who used ESRI's Redistricting extension for ArcView to build a half dozen plans on the fly. Each plan met state guidelines and one was selected and modified to become the approved boundaries for Commissioner and School Board districts.



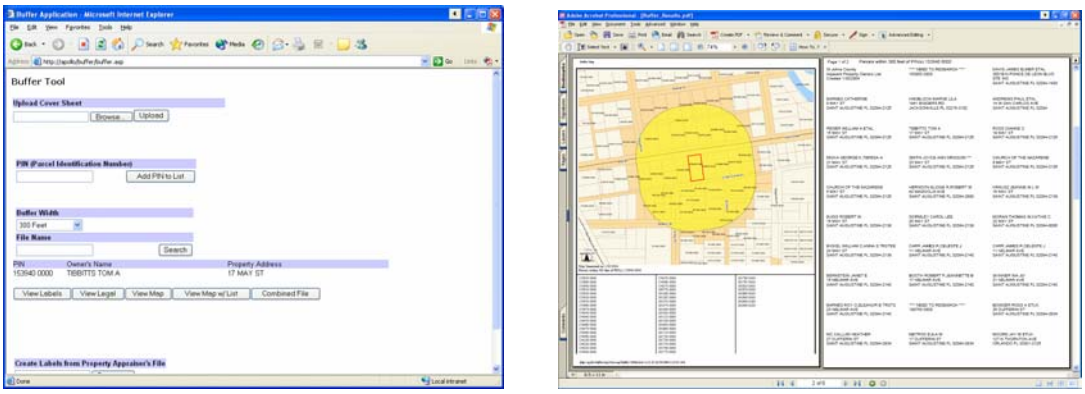
Live Televised Redistricting using ArcView.

Between the high profile presentations to the 5 minute agenda items, there were many unforeseen benefits of the Public Hearing Map and Presentation Display. Board Members and Administration's interest in maps was warranted as they rely on having trustworthy information to support their decision making process. Each department's use of GIS tools and software grew as they became more self-sufficient in presenting their information through intuitive maps. The GIS office was better able to focus on long-term goals and applications now that departments were more self-sufficient in preparing maps. Many of these previous 'request' maps had been last minute requests to the GIS office days before and at time during Public Hearings.


Map Displayed at a Public Hearings

Property Buffer Tool

Many Development Review Applications require a notice to the surrounding property owners of the intent to modify the land use. Before GIS, this task was handled by a separate agency, the Saint Johns County Property Appraiser. Since they maintained the Property Appraisal maps and were best suited for property research. In 2003, with completion of rectified parcel layer that was accurate and reliable, it was decided that a fully functional shared parcel layer would allow the BoCC to now prepare these surrounding property buffer records. A buffer tool was built in order to generate mailing lists for adjacent property owners.



ArcIMS Buffer Application with PDF Generated Addresses.

We are currently on our second generation Buffer Tool. The first generation Buffer Tool was built using ArcIMS which had the benefit of giving multiple users access. In order to better certify the property buffers, the second generation Buffer Tool was built in ArcMap with VBA. This allowed better error handling and review of the data while still generating a formatted pdf for printing directly to labels.

Conclusion

In conclusion, the initial beginnings of Saint Johns County GIS focused on building and maintaining dependable base map data. In time, due to increased development and County needs, GIS moved from primarily focusing on creation of illustrative maps to creation of practical applications. The result implemented more GIS in the Development Review process along with other County endeavors. Applications such as the clearance sheet, property buffer tool, and insta-map have improved the efficiency of the application process. At least for now, the GIS has been able to ensure a stronger process by providing accurate and efficient information. Over time, the investment in GIS has turned into an extremely powerful resource that has changed the way the Saint Johns County handles everyday business.

Acknowledgements

The author appreciates the support of the Saint Johns County GIS Division, which includes Gail Oliver, Mike Campbell, Troy Nagle, Corey Bowens, Bob Carberry, Rocky Agbunag, and Blaine Adams in their development of GIS which is explained within this document.

Author
Tom Tibbitts
GIS Mapping Coordinator
Phone: (904) 209-0784
Fax: (904) 209-0785
ttibbitts@co.st-johns.fl.us

Co-Author
Corey Bowens, M.S.P.
GIS Analyst II
Phone: (904) 209-0776
Fax: (904) 209-0777
cbowens@co.st-johns.fl.us

Saint Johns County GIS Division
4020 Lewis Speedway
Saint Augustine, FL 32084