

Building Local Government Enterprise GIS In a Limited Fiscal Environment

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Abstract

Enterprise GIS Administration solutions to beating the all too common challenge of development of an enterprise GIS from a decentralized and distributed department based GIS with limited impact to budgets due to current depleted fiscal environment. The approach includes the implementation and development of prioritized focused phased projects using the existing enterprise GIS and IT resources to build an integrated rules-based GIS database design from the existing environment. The approach includes the evaluation of existing GIS datasets, GIS resources, elimination of redundancy, creation of GIS-based data service-levels, implementation of GIS standards, and taking advantage of the GIS software (ESRI ArcGIS) to deliver an enterprise level database supporting City needs. This report is the culmination of the first of five fiscal years of the project. The results are based upon the previously identified enterprise needs, accomplishments, and pitfalls of the enterprise GIS program, and the baseline of the previous departmental GIS.

Introduction

In many local governments a common challenge to implementing a successful enterprise GIS is a need to bring results to the users while the implementation is in progress. Other agencies whom are not able to secure the high cost of a complete enterprise GIS implementation must develop them from their existing resources and face a higher challenge in showing early enterprise GIS results and creating an enterprise GIS environment.

This paper reviews the all too common challenge of developing and enterprise GIS while ensuring a limited impact to budgets by focusing the implementation within the agency and bringing results to the users early in the implementation. Even without complex hardware, database, and software systems there is still a potential to show immediate and useful enterprise collaboration while keeping the investments in new technology and data to a minimum while expanding on the existing decentralized departmental GIS. The approaches and software technology are scalable as the enterprise GIS grows and smoothly integrate with a complete high performance enterprise GIS.

The goal for this paper is to explain how to realize enterprise GIS results through processes that a typical local government or public agency may go through to keep the costs to a minimum while demonstrating realistic results. Following the format as described within this paper the agency should be primed for enterprise GIS data sharing and build the requirements to step up to a more advanced enterprise GIS implementation.

It is assumed that the agency has a currently implemented decentralized departmental GIS that has limited impact to the agency enterprise. There also is an inquiry into the needs and applications of an enterprise GIS within the agency. Within this agency a commonly shared central coordination or administration of GIS data, database, and standards do not exist.

Decentralized and Distributed Departmental GIS

In many local governments (counties, regional agencies, and cities) across North America the initial investment in GIS was primarily from the division or departmental approach. The GIS was an application purchased to meet a specific goal and the data was limited to accomplishing this task. Many other information systems, like GIS, implemented within local governments were developed as specific applications to meet the immediate needs of the organization.

These implementations may have been formed in a single or multiple departments to achieve separate goals with minimal coordination toward an enterprise approach. The resulting landscape of GIS is a decentralized, or limited central point of coordination and administration, and distributed, various departments, environment that is a challenge to the enterprise nature of GIS.

A decentralized departmental GIS is one that has been developed as an approach to providing specific applications to meet the immediate needs of an organization. They are typically departmentally, or division focused, lacking the enterprise foresight and interoperability that is paramount to organization wide applications. Within many local governments they evolved from Computer Aided Design and Drafting (CADD) systems where the graphic management precise record of assets and cadastre are primary needs. Typically these systems are developed from the desktop environment as the GIS grew from a few workstations and dedicated staff in those departments.

The decision to investigate enterprise GIS sometimes comes from the increasing need to foster the sharing of common GIS datasets, eliminate redundancies, increase spatial and informational accuracies, and build supporting applications to increase the dissemination of data throughout the organization. The need for sharing information based upon a commonly shared set of GIS layers, a basemap, is a requirement for the implementation of enterprise GIS. The enterprise GIS is built upon one or more departments focused on departmental goals without a commonly shared and managed framework database that is centrally managed and administered. Thus there is a need for the development of an enterprise GIS framework.

Limited Fiscal Environment

With budget shortfalls and reductions due to drops in revenue and shared funding in the past few fiscal years, the limited nature of the public budget has become the norm of government operations. Public budgets by nature are limited in their fiscal period, capital, and cash flow due to the constraints on government funding, recovery of costs, limitations on fees, the public bidding process, and open management of financial records. In addition competing implementation needs and replacement of systems and assets also are major factors impacting the enterprise GIS. Therefore a limited fiscal environment is a key constraint to keep at the forefront of the management and planning of any enterprise information technology and GIS evaluation or implementation.

GIS, which traditionally is a high-impact program for most public budgets, has suffered from the limitations of funding the technology and database development while retaining a high expectation for the delivery of results and requirements set by the decision makers and stakeholders. With the limited availability of funds some agencies have been unable to grow an enterprise GIS and have remained in a decentralized and distributed departmental GIS until the funding is available to complete the work.

The cost of developing enterprise GIS in a moderately sized organization may be enormous when compared to the return on the investment (ROI) for other enterprise system implementations and the existing systems. Traditional high level enterprise GIS software is costly requiring a server, high profile databases, and specialized software applications. The advantages gained from the implementation of enterprise GIS are typically: increased data sharing, efficiency gained from the elimination of redundant data maintenance, and a single point for coordination or administration of the GIS. These returns on investment related to enterprise GIS, while all are not necessarily monetary gains in receivable accounts, are commonly hard to grasp when reviewed by most decision makers.

In addition the inquiry into enterprise GIS may review alternative funding sources such as: grants, public-private partnerships, intergovernmental agreements, data sharing, and fees (impact, usage, license, etc.). The cost recovery however based upon those fees is rarely enough to offset the implementation and ongoing costs of the GIS. Since GIS is not a static entity, like other commodities, the data is always in flux and constant edit while the demand remains high and is expected to be accurate and have a relatively reasonable precision. Therefore with the non-static nature of the data and systems, the costs are not necessarily fixed and maintenance costs can be high and should be a priority for compensation by the financial decision makers.

These factors are limiting to many public agencies that have existing GIS resources but remain in a decentralized mode. There is a need for a process to attain enterprise GIS as part of an agency with a limited fiscal environment.

Evaluation of the Enterprise Needs

Once it is decided upon the need for an enterprise GIS the agency should gather stakeholders from each participating department or division. This group of stakeholders should be part of a steering committee designed to guide the evaluation of the needs for enterprise GIS. It is highly recommended that the stakeholders have some GIS, database, information systems, or user experience or background, but it is not a requirement. The committee members will most likely be made up from a mix of executive, managerial, and technical staff. If possible a governance structure should be set up to ensure that the committee reports their findings to either an executive or executive committee within the agency.

The committee should keep in mind when evaluating all areas of the GIS the following goals:

1. Centralized administration of Data,
2. Centralized sharing of Data,
3. Expanded use for technology,
4. Enabling communication related to GIS and GIS-based systems and applications,
5. Centralized procurement process,
6. Governance that is shared by departments/divisions.

The committee should then embark, at a minimum, on the following steps over a reasonable period of time to complete the evaluation. The time period will vary depending on the size of the agency and the amount of existing GIS data and applications that are employed. The approach includes the evaluation of:

1. Existing GIS datasets,
2. GIS resources,
3. Elimination of redundancy,
4. Creation of GIS-based data service-levels,
5. Implementation of GIS standards, and taking advantage of the
6. GIS software to deliver an enterprise-level database supporting agency needs.

1) Evaluate Existing GIS Datasets

For those agencies that have existing GIS datasets that may be limited or extensive the evaluation of the existing datasets is first step at bringing the enterprise approach to the decentralized participants. Reviewing all native GIS layers, GIS enabled spatial databases, associated location-based databases, and other enterprise databases is essential to identifying the true status of the data. Some agencies may have extensive redundancies in the data from department to department that could be eliminated or tied together through the GIS.

The criteria for evaluating the existing GIS data should be graded into foundational requirement, an intra-departmental requirement, and a strictly departmental requirement. The foundation requirement is the key data layers and data that the enterprise requires to function in all participating departments and divisions. The intra-departmental requirement is a layer of data that should be applied to more than one department or division, where the departmental requirement only serves the departmental needs.

After the data layers have been graded they should be reviewed for:

- a. Completeness in coverage and scope,
- b. Detail of information contained within,
- c. Spatial accuracy and precision of the data,
- d. Accuracy of the information contained,
- e. Precision,
- f. Spatial integrity, and
- g. Applicability for to the enterprise.

There is a danger in blindly trusting that the existing GIS data layers that are currently in use will be adequate for the implementation in an enterprise GIS. It should be noted that these layers were created as part of a decentralized departmental GIS where they were used for a particular purpose and may not

have the accuracy or detail that is required by other external users and their applications. Therefore it is always a good practice to review the existing data prior to applying it to the enterprise, however the review should also take into account that the goal is to get reasonable data out to the enterprise. This may be accomplished by setting limits, such as 80% compliance, where the data is accurate to be able to push data to the end users. The allowance of 80% would get data to the users while it is identified for reviews on increasing the accuracy of the data.

The data should be cataloged and tagged with the grades achieved as part of the evaluation so that the data can be prioritized for enterprise readiness, update, or elimination.

2) Evaluate GIS Resources

Since the case is an existing decentralized and departmental GIS seeking to expand to an enterprise GIS, a complete review of all potential GIS resources should be performed. This review should include all other non-typical GIS related resources such as (but not limited to):

- a. personnel,
- b. hardware and GIS software systems,
- c. existing tabular and non-GIS databases,
- d. Computer-Aided Drafting and Design data, and
- e. hardcopy maps or atlases.

Evaluation of the resource areas should include analysis of the current staff including their how their skills, abilities, educational attainment, and (most important) their experience with GIS, databases, and information systems align with the goals of an enterprise GIS. This would include a review of existing and potential job descriptions, new positions (such as a GIS Administrator/Coordinator), and the training requirements for the potential implementation.

The existing network, servers, tabular and relational databases, asset inventories, non-GIS information, and GIS related software technologies should be identified and evaluated for potential application for an enterprise GIS. Answers to the following types of questions must be outlined such as:

- a. Is there a need for a centralized repository for enterprise data,
- b. Is there a central point available to the enterprise for serving data and data storage,
- c. Is the system, network and hardware, adequate to support enterprise GIS data traffic, and
- d. Is the current software adequate enough to be able to be applied to the enterprise?

The criteria for evaluating the data should be graded into foundational requirement, an intra-departmental requirement, and a strictly departmental requirement. The foundation requirement is the key data layers and data that the enterprise requires to function in all participating departments and divisions. The intra-departmental requirement is a layer of data that should be applied to more than one department or division, where the departmental requirement only serves the departmental needs.

External traditional tabular and non-GIS databases should also be included in the evaluation for potential enterprise applications for interdepartmental data sharing through the GIS. The evaluation should also include a review of hard copy, static, historical, and Computer-Aided Design and Drafting atlases or maps to ensure that all data is reviewed for potential application to the enterprise GIS.

3) Eliminate Redundancies

The investigation into enterprise GIS most likely will find multiple redundancies in data storage, data maintenance (like addresses, parcels, zones, etc.), and other areas that exist in the current environment. These redundancies should be graded as: 1) necessary and required, 2) not necessary, and 3) potentially eliminate.

Some redundancies, such as in public safety information systems, may be required by local, state or federal statutes or they may be unable to eliminated with the current lack of integrated information systems within the agency. These redundancies that are required should not be viewed as an impediment for the implementation of enterprise GIS. They should be noted and the plan for implementation should be modified to include the dissemination of data into these redundant systems, databases, and applications as to support the enterprise nature of the GIS.

All other redundancies should be eliminated, where possible, to increase the enterprise focus and centralized administration of the data. As the representatives of the participating departments come together they should bring their data requirements and data maps with them to illustrate how elimination of the redundancy will impact their work plans, procedures, and systems.

An example of a redundant database would be having three address databases for the parcel data, public safety dispatch Master Street Address Guide (MSAG), and another for the utility billing system. The focus on creating one common parcel map, a single point address database, and serving updated information to and from the MSAG would be the goal of eliminating the three different databases. Since the MSAG needs to create a periodic report of all changes and the complete database in a certain form the database that is created must hold all the information and be able to format it as required for reporting to the applicable supporting companies and agencies.

4) Create GIS-Based Data Service Levels

As part of developing enterprise GIS the requirement of departments for providing data or products as part of the enterprise may include different requirements, accuracy, precision, layers, timelines, and may impact the critical path of other departments. Thus there is a need to develop a method to track and define these requirements and the related impacts as part of the enterprise GIS to ensure that all parties involved are working together as a group.

To satisfy this need the enterprise GIS and participating departments should create a rules-based service level agreement that defines the entity relationship of each particular service, personnel responsibilities, departmental responsibilities, signatures, legal implications, and the priority critical path of single and multi-threaded relationships. A multi-threaded relationship is a particular entity that starts in more than one place and must await approvals from multiple departments before progressing as single entity. The relationship between departments and divisions within departments must be defined with applicable working time periods, reasonable lag time, approval triggers, required waiting periods, and all other impeding factors to the automated processing of an activity.

GIS-based data service levels may be formal or informal agreements between departments, divisions, or external agencies where the enterprise GIS is the application system is the glue that holds the process together. These agreements can be used for maintenance, production, application development, data sharing, and other areas where the collaboration of one or more departments, or intergovernmental agreements, are part of the critical path for the data and products administered as part of the enterprise GIS.

5) Implement GIS Standards

Crucial to any area of sharing data the standards to which data will be held is central to the success of any information system implementation. It is highly recommended that the Federal Geographic Data Committee (<http://fgdc.er.usgs.gov/index.html>) and National Map Accuracy Standards (<http://rmmcweb.cr.usgs.gov/nmpstds/nmas.html>) are guidelines for standardizing data and approaches to managing GIS data layers. Another good source in the United States is the state Geographic Data Committee, or similar agency chartered with the task of standards development, or regional group that will enable data sharing. In the case of bi-state, multi-state, or multi-national implementations the national standards may be more applicable for enabling data sharing.

Whether a specific program of GIS Standards methodology is used a standard for all data, data accuracy, and precision should be set for the enterprise. This should take into account any database formats that must be applied to the GIS for compliance and use within the enterprise.

These standards are to be applied as part of the enterprise implementation and in addition to the GIS-based Data Service Levels.

6) Take Advantage of GIS Software

Within the GIS industry there is a trend to build the Mercedes of enterprise GIS where the investment is at a premium while the features are impressive and extensive. This trend can be a limiting factor to decision makers when they fail to realize that the immediate benefits do not match the investments. GIS Software vendors, like ESRI, have developed highly advanced enterprise GIS database engines and software applications that can leverage information and integrate systems throughout the entire enterprise for local governments. This approach for those smaller agencies that are beginning to move from the decentralized departmental GIS may be much more than they can realistically handle.

The caveat that should be employed here is to take advantage of the software for the agency to bring enterprise-like solutions to the users to build a report and core user group support for further expansion. This expansion leads directly into the implementation of the SDE and Geodatabase modeling concepts. The ESRI ArcGIS products include tools and extensions that can be used to the advantage and bring early results to the users. An example of this type of deployment would be to employ the ArcView version of ArcGIS 9 with ArcPublisher to bring targeted mapping to the users that is interactive, allows for data inquiries, limited searches, and answers a specific enterprise GIS need.

This approach again relies on existing personnel making some light investment in investigations into testing this approach. Another requirement is a need for exploitation of the existing GIS information and related databases to be published for this solution.

By taking advantage of the immediate cost savings and return on the investment (ROI) by using the ArcPublisher/ArcReader approach the agency can bring the advantage of enterprise GIS to the users earlier than the Cadillac approach.

After completing the evaluation for enterprise GIS the committee should then compile and document the findings, gap analysis, and needs analysis and report them back to the executive level group. This is the first step in beginning the planning for enterprise GIS however the costs are minimal if the agency completes the process without the assistance of a consultant. However it should be noted that the costs for this type of service from a consultant are normally much less than the investment in hardware, software, databases, applications, and data development which make up a much larger portion of the overall costs of enterprise GIS. In addition to keeping staff time to a minimum the consultant may be able to provide comparisons to other like agencies, systems analyses, and employ industry experience gathered from previous evaluations to guide this process.

Other keys to a successful evaluation are:

1. Communication to all participants and the executive group,
2. Keeping the project on a reasonable timeline,
3. Evaluation of the entire enterprise rather a small part (even if departments are not participating), and
4. Review inter-agency and regional data sharing potential.

Implementation Planning and Solutions

The program should proceed with the implementation planning following the completion of the findings and needs analysis as part of the evaluation.

A list compiled from the needs analysis and findings should identify the need for the development of prioritized focused phased projects using the existing enterprise GIS and IT resources. A focused phased project is one that meets the needs of a specific area of the enterprise GIS implementation, such as public safety mapping or integration of parcel mapping between a city and county. These projects are then prioritized for implementation based upon their impact to the enterprise GIS implementation goals and plan. They may be integrated and run successive or concurrently depending on their dependency to other the other focused projects. This enables the plan to eliminate redundancies by sharing the implementation of certain tasks, such as an address point database, that can be shared by various other projects like: public safety mapping, parcel mapping, and utility services mapping.

The primary goal is to build an attainable plan that can use existing agency resources to build an integrated rules-based GIS database design from the existing system. A rules-based GIS database design is derived in an initial implementation from the GIS-Based Data Service Levels outlined in the evaluation. These Service Levels will initially be completed manually but will enable the development and integration of the ESRI Geodatabase design. The plan should be built with the following criteria in mind:

1. Develop Prioritized Focused Phased Projects that bring quick returns based upon little investment.
2. Build an integrated rules-based GIS database design that yields the most from the existing departmental data for the good of the enterprise.
3. Eliminate redundancies of data and GIS services, where practical, with the intent on keeping the focus on continuing support for existing services while in transition.
4. Build upon the foundation of existing resources in data, systems, personnel, and knowledge.
5. Develop an interactive, open-minded relationship with everyone from staff, external agency, to customer.
6. Centralize the administration and coordination activities.
7. Create an enduring governance structure that includes integrated committees of management and technical staff from the participating departments.
8. Build rapport and communicate responsiveness with the Executive, Legislative, and client levels of the agency.

The Role of Software in Implementation

Deciding on using a single software product for the dissemination of GIS information through direct interaction, web portals, or distributed data is key to the development of a successful enterprise GIS implementation. The reduction of bottlenecks and translation requirements by

using a single source, single format software system that is scalable to the enterprise needs is the keystone to efficiency and growth potential. This system must also be able to have an open, interoperable transfer mechanism that is able to bring data from the CADD environment and work under open GIS standards. The final key is the implementation of a product that is able to meet the most basic needs at the lowest level for enterprise and public access while providing a tiered product can collaboratively present the most robust application of a completely integrated rules-based GIS technology.

Another high level goal would also be to leverage a quick return on the investment in enterprise GIS through the initial implementation. This quick return on the investment in a limited fiscal environment can be difficult, however using the efficiencies of software and exploiting acceptable quality existing data sets this can be accomplished.

Implementation of Low Investment/High Return Projects

An effective method of the initial implementation of enterprise GIS within a local government is to focus on the immediate return on the investment generated from the investigation and needs analysis. Through the process of expanding the view of how GIS can leverage the standard daily business processes many potential applications are brainstormed. Many of the needs and potential applications may seem to lofty to immediately take shape, but there is a benefit for streamlining and focusing on specific basic everyday needs of the organization. These applications need to be reviewed and altered so see if they are efficient and can be developed with minimal investments in staff time, software, and data development.

These projects have the same typical criteria:

1. Non-complex presentation and data layers for retrieval or archival information,
2. Focused on specific data or communication of a single theme,
3. Based upon the common enterprise base map, and
4. Need for low cost implementation.

What is needed to accomplish these projects?

1. Enterprise view and focus on the immediate needs commonly shared by more than one department or division,
2. Existing data that is moderately accurate and has a reasonable precision for production. After all the existing data was in use prior to the investigation of enterprise GIS, therefore the data may not be perfect but it can be used to meet some of the immediate needs of the enterprise.
3. A suite of software, such as ESRI's ArcGIS, that has a direct link between a professional GIS and a free distribution application software that keeps the formatting and symbology of the layers at a reasonable cost to the agency.

Will the existing data do the job or is outside information needed to initialize the application?

1. Following the evaluation of the GIS data this question should be easily answered.
 - a. The data should be reviewed to identify if the information is complete enough for inclusion.
 - b. Spatial and information accuracy should be reviewed to ensure that the information contained within the application will be viable for enterprise use.
2. The costs and accuracy levels of external data should be weighed before initialization of the application.

What benefits are gained from these projects?

1. The projects can be brought to the customers faster and more efficiently than by using other means of development.
2. A standardized development and maintenance model can be applied to increase the efficiency of the project updates.
3. The indirect costs of developing the projects through software license and distribution of user software is very low and reasonable based upon the product return.
4. The projects are focus on specific needs and use a common base map.
5. The end user software (ArcReader) is easy to use but also has enough sophistication for the more advanced customers to be satisfied.
6. The end user software (ArcReader) can also be printed from the layout screen to provide hard copies to the users.

How can these projects meet the enterprise needs and be true enterprise applications?

1. The projects can be set up to point to a central source that can be updated on a periodic basis allowing the users to hit the most current data.
2. Versioning is supported by saving different versions of published maps and distributing them to users.
3. The data that is contained can be a complete set of the foundational requirements that were identified in the evaluation and needs analysis. This allows the foundational data to be shared and used by the enterprise users in the same symbology and cartography.
4. The information presented through these projects can also come from external non-typical GIS databases that are joined with existing GIS data layers expanding the existing data to potentially distribute various data models, such as:
 - a. Water consumption by commercial customers,
 - b. Automobile Crashes by day of week and time of day,
 - c. Crime analysis incident mapping,
 - d. Polling places,
 - e. Trash Days, etc.

The role of these projects increases the effectiveness of the initial implementation of enterprise GIS in any agency. For those agencies that are in a limited fiscal environment these projects can build enterprise GIS and fulfill some of their data distribution needs for a minimal investment while leveraging their existing data for the benefit of the agency.

Measuring Success

Measuring the success or integration of an initial implementation of enterprise GIS can be debated as to their precision. The outcomes and the results are based upon the previously identified enterprise needs, accomplishments, and pitfalls of the enterprise GIS program. These factors must be balanced by the baseline of the previous decentralized departmental GIS. When reviewing all these factors the integrating impact brought by the enterprise GIS will be illustrated.

Periodic and annual reviews should be performed to realign the current status, goals, expected outcomes, and adjust the project schedule. These reviews should be shared with all members of the governance board, the GIS community, and the participating departments. A complete evaluation of the status for each phased-focused project, application, and work team should be performed to align tasks completed and not completed with those for the entire enterprise GIS system this will bring the overall picture of the status and create a critical path for the development.

Over the years of implementation the critical path will shift depending on the status of the phased-focused projects, the fiscal impact and availability, the dedication of participating departments, personnel, systems, applications, lags and delays unforeseen by the planning, and other factors that are unknown. A complete evaluation of this information will need to be reviewed to culminate into a final current measurement of the project status.

Another best practice is to complete a post-mortem analysis of each of the phased-focused projects to identify all the efficiencies gained and the pitfalls that were encountered during the implementation. Comparing these to the project baseline and following standard project management practices will identify.

Annual reviews are a standard practice in the IT industry as a review of any project.

When reviewing the measurement areas below the reviewing group must only address the goals attained and those that were not attained for the planned review period. Mitigating factors related to why goals were not attained should be tabled until all four measurements are completed. The goals may be something as non-GIS as setting a governance structure or building a communications plan, while others may be complex such as implementing an integrated building permit and zoning database. Yet both of those examples are part of a complete GIS implementation plan and should be measured during their appropriate periods.

The measurements should be based upon:

- 1) Previously identified enterprise GIS needs,
- 2) Accomplishments of the enterprise GIS program,
- 3) Pitfalls of the enterprise GIS program, and the
- 4) Baseline of the previous departmental GIS.

Identified Enterprise GIS Needs

During the evaluation of the project the enterprise GIS needs were found and reviewed for priority. This review process is critical when comparing the previously identified enterprise GIS needs with those that were scheduled for completion to those that were attained for the review period. The gaps and changes between the original needs, set as goals, and those tasks that were completed must be noted as part of this review.

Accomplishments

All accomplishments whether they are goals, tasks, milestones, or plans should be noted to illustrate the progress of the enterprise GIS implementation.

Pitfalls of the Enterprise GIS Implementation

Areas where the enterprise GIS implementation was not successful, or encountered difficulty in accomplishing tasks, need to be noted. This may include critical path delays, elimination of tasks, lack of inclusion of tasks in the project plan, or other factors that impact the implementation negatively.

Baseline of Previous Decentralized Departmental GIS

Identifying accomplishments as the departure from the decentralized departmental GIS that existed prior to the enterprise implementation is crucial to the periodic review. This will give a measurement of how far the enterprise GIS implementation has come during the evaluation period.

City of Yuma, Arizona Enterprise GIS Strategic Implementation Planning Year 1

The City of Yuma is one of three metropolitan areas (with Phoenix and Tucson being the others) within the State of Arizona with a year-round population of 80,000 and a winter population over 124,000 within approximately 109 square miles. Yuma is a border city located on the eastern border of California and the Mexican states of Sonora and Baja California along the Colorado River and the Interstate 8 corridor from San Diego, the Imperial Valley, Tucson, and Phoenix. Yuma is a high-growth city in the southwest quickly growing to serve the thriving agriculture market, new citizens, and the defense related and military based personnel at Yuma Marine Corps Air Station and the Yuma Proving Grounds.

Yuma GIS started as a decentralized departmental GIS in 1993 as a small division within the Department of Community Development. The system grew from a AutoCAD based environment into an ESRI based system managed by a small group of technicians. Their focus was based upon departmental service, building a planning optimized basemap, light applications, and project based work for external departments and divisions.

In June 2003 the Yuma embarked on an Enterprise GIS Strategic Plan with Psomas Consulting (an ESRI Business Partner in Costa Mesa, California). The goals were to identify the City's existing status of GIS, identify the future needs, evaluate the potential for enterprise GIS, and develop a strategic implementation plan. Much of the work was completed as a partnership with Psomas and the complete cooperation of all City Departments, Divisions, and related agencies guided by the GIS Steering Committee and executive oversight by the City's Executive Team (Directors and Administrators).

The City of Yuma in June 2004 completed the first year of planning and development and delivery of the final version of the "City of Yuma Enterprise Strategic Plan." In early June of

2004 the City of Yuma implemented the first in a series of “quick hit” projects, a public safety mapping application for mobile data computers, designed as an initial response to the “City of Yuma Enterprise Strategic Plan.”

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