A Strategic and Tactical Plan for the Development of an Enterprise Geographic Information System

Prepared for

Scott County, Iowa

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Strategic and Tactical Plan

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A. Introduction

1. Overview

Scott County has determined that there exist a number of opportunities to improve the County's management and use of geographic and land information systems. To that end, County Administration and key department heads with the support of the County Board have been engaged in a process to evaluate and plan for the development of a multi-purpose, enterprise geographic information system (GIS) for the County.

a. Foundation

This report is the culmination of several months' effort on the part of Scott County and GeoAnalytics toward the development of a comprehensive, carefully considered plan for the development of a countywide geographic information system. The process leading to this plan has had three dimensions. The first has been an educational process for staff and decision makers about GIS, its implications, and the methodology for system design and planning. The second step was to conduct a situation assessment. The situation assessment established a baseline of existing circumstances, including issues and opportunities. The third step was the development of a vision for what this system will be and how it will be organized. This vision, the conceptual design, took into account the business processes and needs of the County within the context of the circumstances, issues, and opportunities identified in the situation assessment. Both the situation assessment and the conceptual design were organized around a set of five system components: business process, data, technology, organization, and applications.

As a result, this Plan should be used in conjunction with the two previous reports produced during this project, the situation assessment and the conceptual design. The previous reports offer background on and clarification of the need and benefits of implementation tasks contained herein.

b. Purpose

The purpose of this report is to outline a strategic and tactical plan for an Enterprise GIS for Scott County. The strategies and tactics defined in this plan are intended to provide a blueprint for implementing the vision for an Enterprise GIS articulated in the conceptual design. The final step in this project will be to conduct an investment analysis based on the anticipated costs and benefits of the system over time.

2. Strategic Framework

This update is intended to be both strategic and tactical. This means that this Plan has been developed around consensus of an "end in mind." The end is supported by an approach to meet the end and a set of steps leading to the end. An important part of this strategic framework is that the vision it supports is driven by the missions and mandates of the County. In the end, this system must support and, hopefully, enhance the business processes of the County and other agencies that may join it in this endeavor.

The purposes of casting the plan in strategic terms are many. Of primary importance to the success of the plan will be the establishment of a rationale for each initiative and its associated action steps. As such, the strategic framework operates as a set of principles that can guide the development of the system. For example, an initiative will only be undertaken if it will advance the objectives of the system. In this way, the strategic framework focuses initiatives and actions on those efforts that will advance the overall system toward the vision defined in the conceptual design.

a. Strategic Themes

A strategic theme is a part of the vision of the system. Specifically, a strategic theme is an approach, which, if pursued, will make the initiative successful. There is a vision for GIS, specifically an Enterprise GIS, in Scott County. That vision contemplates a system that involves and includes other entities, especially municipalities within the County. In the conceptual design, a set of five strategic themes was identified.

1) Multi-Purpose, Multi-Participant

The system will be County-focused but multi-purposed; it must be designed and constructed to meet the varied business requirements of County agencies. The benefits are not confined to the County government and informal collaborations with other agencies and jurisdictions are encouraged.

2) Efficiency and Effectiveness

The principal purpose in pursuing an Enterprise GIS system is to improve governmental efficiency and effectiveness. In the development of the system, the County will seek to balance functionality and cost to maximize the value of the output of the system. One emphasis, therefore, is to focus on the creation of the information system dimension of the system rather than the mapping components of the system.

3) Centralized Enterprise System Administration and Management

It is the intent of the County to build a system that meets the needs of its various participants. This includes County agencies, participating municipalities, and others. Although business needs vary among agencies and jurisdictions, there are common needs for data, technology, and applications. To create a system that meets these varying business needs will require a level of centralized administration and management at the *enterprise* level. Enterprise GIS will provide coordination, standards, common procurements, and system level support.

4) Decentralized Systems Operations

Although there will be centralized enterprise system administration, it is the intent that operations of GIS and LIS will remain decentralized in a federated system. This will be accomplished through decentralized maintenance of GIS data and applications that serve specific department needs, with necessary coordination from a central GIS unit.

5) Cost Recovery for Value-Added Services

The County seeks, generally, to have an open access policy such that data will be provided at the cost of reproduction (i.e., at variable or marginal cost). However, the County will charge in excess of the direct variable costs for products and services that may be considered value-added. The products and services offered in this cost recovery strategy may take many forms, including offering specialized remote access, the publication of specific value-added products, development of specific applications, and services to meet individual requester needs. Charges for value-added services above marginal costs might apply to both public and private entities. If there is sufficient demand for these products and services, the County may entertain the development of a GIS Service Bureau. Revenue in excess of marginal costs derived from value-added services will be applied to enterprise system maintenance and update.

b. Strategies

Strategies constitute the "game plan." An example of a strategy for decentralized systems operations would be that data is maintained by custodians and is provided to the centralized data repository on some regularly scheduled basis. As it stands now with this plan, there is a "game plan" for Enterprise GIS in Scott County. This game plan is directed by a set of discrete strategies. These strategies have been established because, in the judgment of the County, their execution will lead to a prudent and successful GIS across the County. The strategies supporting the above strategic themes include the following:

1) Strategies in Support of Multi-Purpose/Multi-Participant GIS

a) Governance

The system's governance will support both policy and operational levels of GIS implementation. The governing charter (bylaws) will allow both formal and informal partnerships with other units of government and the private sector for the GIS Program.

b) Operations

Enterprise GIS will be constructed so as to have the broadest applicability and usefulness to the widest possible audience. This does not mean that the system will serve the lowest common denominator. Rather, the system will be built with the greatest resolution and accuracy as is practical and aggregated to meet less demanding needs.

2) Strategies in Support of Efficiency and Effectiveness

a) Information System Focus

The focus of Enterprise GIS will be to create an information system, not necessarily a mapping system. This means that the focus will be on the creation of functionality rather than pure map creation. Functionality includes not only the analytical capability of GIS but also integration of the GIS system into the business applications of the various departments and jurisdictions (e.g., computer aided mass appraisal, pavement management, document management, and asset management).

b) Business Process Improvement

Where possible, it is the intent that Enterprise GIS will seek to improve business processes. The most obvious example is the collection and maintenance of common spatial and related data. Other examples include using automation to eliminate needless steps in functions such as address assignment. One important example of business process improvement will be the transactional, or near transactional, update of parcel boundaries as plats and deeds are filed. This will eliminate any number of steps that many departments take in collecting parcel information for projects and processes.

3) Strategies in Support of Centralized System Administration

a) Enterprise Data Procurement and Maintenance

Base map and other key spatial data are most likely common to the participants in the Enterprise GIS. These data include geodetic and survey control, orthophotography, and street centerlines. Given the near universal need for these data, it is appropriate for Enterprise GIS to procure and, where appropriate, maintain these data. This will promote efficiency in the agencies and will improve their ability to complete their mandated tasks. In some cases, parcel boundaries for example, this may require some level of delegation of responsibility. If there is a delegation of responsibilities, it should be formalized via a memorandum of understanding or other agreement.

b) Enterprise System Administration

The common technological elements of an Enterprise GIS should be centralized. These will include servers, license management, and enterprise applications. Again, there will be efficiencies wrought from this structure as common costs can be spread across multiple agencies.

c) Enterprise GIS Coordination

There are any number of tasks that can be undertaken on a collective basis that will serve user needs across the County. Examples of coordination activities include standards development and implementation, procurement and project management, education, technical support, and system support.

4) Strategies in Support of Decentralized System Operations

a) Decentralized Business Functions

A key to the success of an Enterprise GIS is that it will not interfere with the business functions of the agencies. The purpose of Enterprise GIS will be to facilitate, not assume, business functions. Aside from enterprise-level applications (e.g., web-based browse and query tools and back-end server tools), individual agencies will be responsible for the development of their own tools and applications that will make use of the Enterprise GIS.

b) Outcome Orientation

Standards will be necessary to ensure those systems and data components that find their way into Enterprise GIS will be useful and accessible to enterprise system users. At the same time, the Enterprise GIS will not dictate the means or methods of agency operations. The only requirements that will be imposed from an enterprise level will be those data, technology and other standards essential to ensure a level of interoperability.

5) Strategies in Support of Cost Recovery for Value Added Services

a) Information Policy

This policy will define the terms and conditions of data sharing, information access, cost recovery, copyrights and licensing, express and implied warranties, and the terms upon which Scott County will partner with other organizations and the private sector on data issues.

b) GIS Services

This function needs to be defined as the range of services that will be provided both internally to the County, to the municipalities, and ultimately, to the public. At the startup, the services will be to develop GIS databases and applications for internal purposes. In time, those services may change to provide, for example, specific application development, maps, and data.

c. Tactics

Tactics are those specific activities and actions designed to advance the strategies and vision for GIS in Scott County. This plan details a number of different tactical projects and actions. They represent the specific tasks that make a specific initiative.

B. Approach

The creation of a County Enterprise GIS system represents a long-term investment in a key information infrastructure for the County. The conceptual design defines a system that goes beyond GIS. It proposes a system that will integrate a number of business processes and systems. Examples include:

- Address assignment;
- Centralized data publication and access;
- Integration of GIS with document management; and
- Integration of GIS with a portion of various assessment databases.

Notwithstanding, this plan lays out a number of interim steps that will allow the County to make use of GIS technology in the shorter term.

The plan is organized chronologically. It identifies both shorter- and longer-term tactics that will help the County realize its vision for Enterprise GIS. The shorter-term tactics are characterized as a set of specific actionable next steps. The longer-term tactics, for the most part, are somewhat less specific, higher level objectives that are dependent on intermediate research, planning, and design.

Each of the tactical measures includes:

- A problem statement;
- A brief activity description;
- Its relationship to overall strategies;
- Estimated financial or staff resources needed to complete the activity;
- Proposed measures of success; and
- A timetable for beginning and completing the activity.
    - 1st Quarter: July, August, September
    - 2nd Quarter: October, November, December
    - 3rd Quarter: January, February, March
    - 4th Quarter: April, May, June

The initial term of the plan is five years. It is expected that the plan will need to be updated from time to time during that term as circumstances warrant. It is GeoAnalytics' expectation that the County will use this plan to help guide initial actions taken and investments made as well to formulate future budget decisions. Given technical changes in the GIS industry, coupled with evolving County expectations for GIS implementation, the plan should be treated as a dynamic document. It is normally expected that a plan like this be updated (usually by staff) on an annual basis. Many plans are updated as part of an annual business planning/budgeting cycle.

Each task described in this section of the report contains a series of components or activities each with associated costs. Tasks are broken down into five stages:

- First-Year (Fiscal Year 2003 - July 1, 2002/June 30, 2003) GIS Implementation
- Second-Year (FY2004) GIS Implementation
- Third-Year (FY2005) GIS Implementation
- Fourth-Year (FY2006) GIS Implementation
- Five-Year (FY2007) GIS Implementation, and Discretionary Tasks.

A staged approach to implementation is recommended in order to spread activities and investments out over a period of time and to imply some level of prioritization for GIS implementation. Those recommended tasks that serve the majority of departmental and public good are identified as either first- or second-year investments. First-year tasks are recommended for implementation during the current budget year. Second-year tasks represent additional core GIS investments that be considered for implementation over the course of the following budget year and so on. The actual work years assigned to task activities are subject to change based on changing work priorities, funding availability, etc., over the course of the GIS implementation program.

The following is a summary description of recommended GIS activity investments by implementation year. Each activity has a "Problem Statement." Following these descriptions is a table that summarizes the estimated range of costs associated with each year. It is important to note that individual task costs are cursory and are based on extrapolations from other local government GIS implementation experiences and from cost estimates provided by various private vendors of services and products. Prior to it undertaking any implementation task, the County should explore a more specific cost estimate for that task. Furthermore, some of these estimates do not reflect any potential cost sharing that may be possible with external agencies such as municipalities, state agencies, or utility companies. It should also be noted that estimated costs emphasize the up-front capital costs for task implementation. In addition, cost estimates reflect some ongoing system maintenance.

Estimating costs over the long term is necessary for Scott County as they can use the essential bond system for financing the GIS development, as defined by code for essential county purposes. One essential County Purpose is: "The acquiring, developing, and improving of a geographic computer data base system suitable for automated mapping and facilities management. " This definition can be found in section 331.441.2.b.

The final phase of this project will be a cost-benefit analysis. This analysis will calculate the costs and resultant benefits of investing in a GIS over the longer term. Usually this investment analysis covers the next ten years. The type of investment proposed within the Plan involves a significant outlay or investment in the first few years. Conversely, benefits will not begin to accrue until some time later. As a result, the lifecycle of the investment becomes important. Because of the principles of the time-value of money, costs incurred today are more "expensive" than the value of benefits received in the future. Technology's lifecycle is relatively short, perhaps three to five years. Data, which represents about 80% or more of the cost of systems development, has an indefinite life.

C. Fiscal Year 2003 Activities

1. Establish GIS Program Governance Structure

a. Problem Statement

The County seeks to develop an "Enterprise GIS System." An Enterprise GIS can extend beyond County government and can include other participants, especially municipalities. Although the County is prepared to shoulder the costs of establishing its GIS, there are many reasons for formulating agreements with municipalities and other agencies, namely, cost sharing, data sharing, and elimination of redundant activities. At the highest level, an Enterprise GIS can spread the benefits and the costs of system over a larger number of participants. Establishing policy, agreements, directives, standards, and responsibilities requires a good governance structure as well as an operational structure.

b. Activity Description

The creation of an Enterprise GIS will be a long-term process. There are three basic initiatives that must be accomplished in order to establish a Program governance structure. These steps are to:

1) Cultivate and negotiate formal and informal collaborative relationships with municipalities and other potential partners;
2) Establish and implement an Enterprise GIS Program Governance structure and charter; and
3) Establish and implement an Enterprise GIS Program Operational structure.

Figure 1: Governance Model

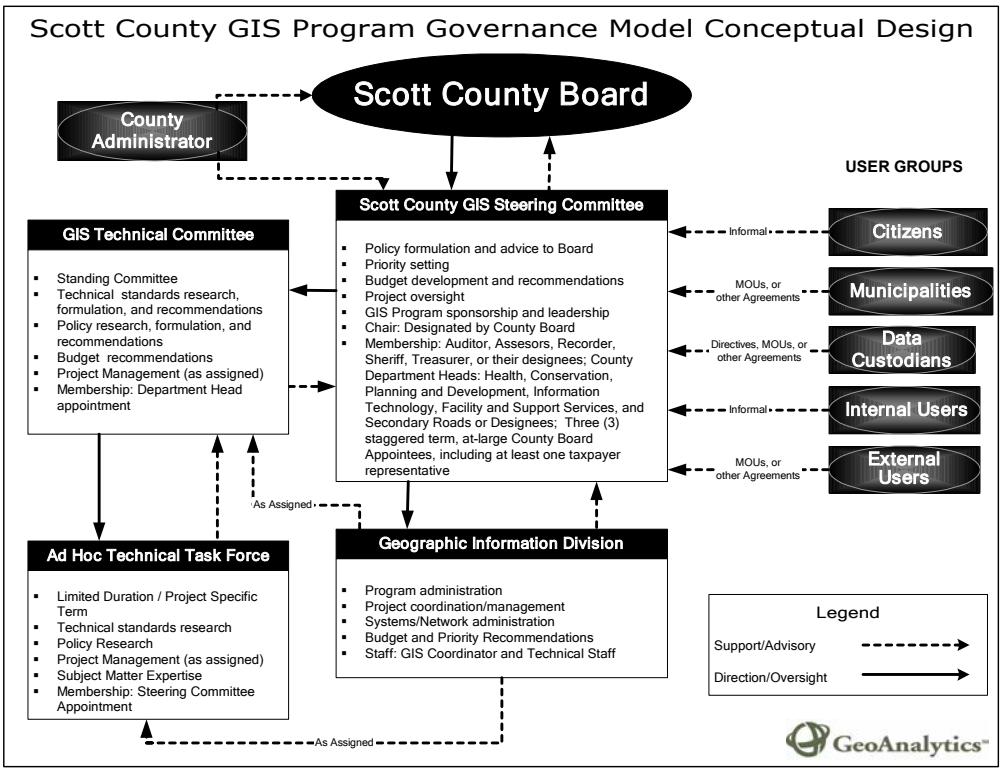
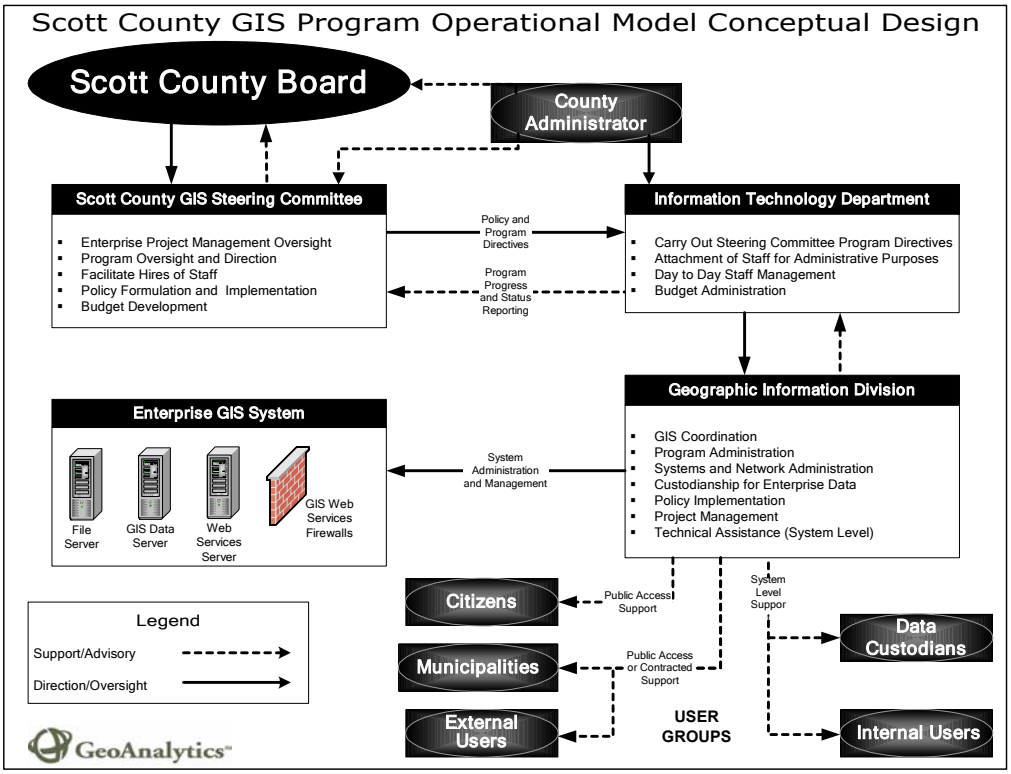


Figure 2: Operational Model



c. Strategies Effected

Strategic Themes:	Multi-Purpose/Multi-Participant, Efficiency and Effectiveness, Centralized System Administration
Strategies:	Governance, Operations, Business Process Improvement, Enterprise Data Procurement and Maintenance, Enterprise System Administration, and Enterprise GIS Coordination

d. Resource Needs

GIS Staff:	Leadership, project management, research, subject matter expertise
County Staff:	County Administrator, GIS Steering Committee; decision maker buy-in and approval
External Resources:	Consulting recommended - See **Error! Reference source not found.**, **Error! Reference source not found.**.
Costs:	Staff Time Consulting Fee Range: $10,000 to $20,000

e. Timetable

Phase	Project Start	Project Completion
Cultivation and negotiation with potential partners	April 2003	June 2003
Establish governance structure and consortium charter	April 2003	June 2003
Establish operational structure	April 2003	June 2003

f. Metrics

1) At a minimum, develop agreements with municipalities (especially City of Davenport and City of Bettendorf).
2) Establish agreements for cost sharing data acquisitions, data custodianship, and maintenance.
3) Develop and implement a functional internal operational model.

2. Create GIS Division and Recruit GIS Coordinator

a. Problem Statement

The conceptual design called for the creation of a geographic information system division (GIS Division). This division will guide the implementation and management of the Enterprise GIS program. The division will be administratively housed in the Information Technology Department. IT staff will provide system administration and web services.

b. Activity Description

As part of the establishment of this division, a dedicated position should be created as soon as possible as there is a need for a dedicated staff person to lead and coordinate all operational and technical aspects of GIS implementation within the County. Naturally, good communication skills and the ability to work with and direct teams are important traits for a successful candidate. Ideally, the individual selected for the Coordinator position should be well qualified in:

- GIS, including knowledge of and experience working with GIS data, technology, and applications in a local government setting.
- Organizational, managerial and communication skills and experience.
- Specific skills should include a thorough knowledge of GIS concepts, available technologies, applications, data models, and topological structures including projections and transformations.
- Knowledge of relational databases and web technology would be helpful.

c. Strategies Effected

Strategic Themes:	All
Strategies:	All

d. Resource Needs

GIS Staff:	Does not apply
County Staff:	Subject matter experts from affected agencies; decision maker buy-in and approval, Human Resources Dept.
External Resources:	Consulting recommended- - See **Error! Reference source not found.**, **Error! Reference source not found.**.
Costs:	Staff Time Consulting Fee Range: $6,000 Annual Salary: $50,000 to $60,000/year

e. Timetable

Phase	Project Start	Project Completion
Recruitment	April 2003	July 2003
Appointment	July 2003	Ongoing

f. Metrics

1) Completion of recruitment and appointment.
2) Advancement of the GIS program consistent with this plan.

D. Fiscal Year 2004 (July 2003-June 2004) Activities

1. Develop GIS Business Plan

a. Problem Statement

This document describes a series of steps or tactics that will generally direct Scott County in its development of a countywide GIS. A business plan, developed in conjunction with the budgeting process, provides the details of the implementation. This is important for establishing program goals, staff objectives, and for measuring levels of success and satisfaction.

b. Activity Description

This process should begin as soon as possible after the GIS Coordinator hire. Other staff who are key to the process are the GIS Steering Committee and the County Administrator.

c. Strategies Effected

Strategic Themes:	All
Strategies:	All

d. Resource Needs

GIS Staff:	GIS Coordinator, IT Director
County Staff:	GIS Steering Committee, County Administrator
External Resources:	None
Costs:	Staff Time

e. Timetable

Phase	Project Start	Project Completion
Plan Development	July 2003	July 2003 and every year

f. Metrics

1) Establishment of detailed goals and objectives for the planned fiscal year that are in line with this Strategic Plan.
2) Establishment of program metrics for the planned fiscal year.

2. Initial Technology Acquisition

a. Problem Statement

Although the overall data conversion process will take three to four years, there are a number of readily available public domain data sets that may be acquired more quickly and inexpensively[1]. In addition, depending on the outcome of the negotiations with the Cities of Davenport and Bettendorf, digital orthophotography and parcels may also be acquired.

These data may be leveraged for a variety of business purposes and, at the same, introduce staff to GIS technology and concepts.

In order to secure these benefits, it will be necessary to acquire and deploy an initial set of GIS technology. It will be necessary to ready the IT environment for the GIS data sets and thus, acquire and deploy an initial set of GIS technology. Any procurement should be approved and purchased through the IT Department.

b. Activity Description

This initial technology acquisition and installation should be coordinated by the County GIS Coordinator and the IT Department and include:

- Workstation for County GIS Coordinator.
- GIS Database Server and GIS Application Server computers to house and serve data and software applications, respectively.
- ESRI ArcGIS software. This would include floating licenses for both ArcInfo (1 license) and ArcView (4 licenses). In addition, the County should acquire ArcIMS server software to support web-based GIS access. Because ArcIMS is a core technology, not an out-of-the-box application, a browse and query application like Varion Systems' PV.Web should also be developed or acquired. An application like PV.Web will be useful so that the County will not have to develop its own application. The alternative is to internally develop an application based on the ESRI's ArcIMS starter applications. This will expose staff to development issues and offer experience.
- Consulting assistance for technology setup and outside training.

The GIS Database Server will house and serve published, countywide views of GIS data. Initially, this machine will act as a file server, data will be published as shapefiles, and access will be controlled by share permissions.

The Application Server will house the ESRI client software and licensing system and the ArcIMS GIS and related applications. Because this server will support two main functions, it should be a true server class computer. Most of the technology will be implemented at the countywide level, where the GIS Coordinator should assist the IT Department with the procurement, setup, and configuration of initial GIS technology components.

[1] Public domain (essentially free) data include National Aerial Photography Program Digital Orthophoto Quarter Quadrangles (DOQQ), hydrography, state roads, and Census geography.

A determination of how far to "push" GIS technology into County agencies will have to be made. Once initial data has been acquired (see section D.4, below), it will be possible to provide broad access via a web-based browse and query tool served on the County's intranet. How pervasive that access will be will not be determined solely by physical network connections. This will also be a matter of communication, marketing, and education of potential County users. Initially, it is recommended that the user set be limited to those staffers who will ultimately be more formal, rigorous GIS users. Other, typically ad hoc users can be cultivated once more complete data is available.

c. Strategies Effected

Strategic Themes:	Multi-Purpose/Multi-Participant, Efficiency and Effectiveness; Centralized Systems Administration and Management
Strategies:	Operations, Information Systems Focus, Enterprise System Administration, and Enterprise GIS Coordination

d. Resource Needs

GIS Staff:	Project management, procurement management, coordination, and training
County Staff:	Training
External Resources:	Limited consulting recommended for deployment and training. See D.12, Retain GIS Consulting Assistance.

Costs:

Staff Time

Consulting Fee Range: $2,500 to $7,500 for deployment, training and technical assistance. See D.12, Retain GIS Consulting Assistance.

Workstation: $2,500 to $3,500

Server Technology: $10,000 (Two file and application servers @ approximately $5,000 each)

Large format inkjet plotter: $6,000 to $10,000

Small color laser printers: $3,000 to $6,000

ESRI Software:

ArcInfo 8.x: $7,000 (Floating License)

ArcView 8.x (4 licenses, floating): $12,950 (1 license @$3,500, 3 licenses@ $3150; probably wouldn't need 4 licenses if floating)

ArcView 8.x (4 licenses, standalone): $5,550 (1 licenses @$1,500, 3 licenses@ $1,350)

ArcIMS: $7,500

ESRI Annual Maintenance after first year:

A/I 8.x: $3,000 year 1, $1,200/year thereafter

A/V floating: $2,200 (1 license @$700; 3@$500)

A/V standalone: $1,400 (1 license @$500; 3@$300)

ArcIMS: $1,500

Outside Training: $2,500 to $10,000 depending on number of staff trained.

e. Timetable

Phase	Project Start	Project Completion
Procurement	July 2003	September 2003
Training	October 2003	December 2003
Consulting Assistance	July 2003	December 2003

f. Metrics

1) Setup of central GIS architecture to support internal and web-based GIS layers.

2) Accessibility to GIS technology across County agencies by staff who will rely on GIS as part of their daily work within six months of deployment.

3) Ubiquitous access to GIS technology by all County agencies and staff within six months of when systems and data are largely available. This means that if City orthophotography, parcel, and related data become available prior to completion of the County data, ubiquitous access should follow within six months.

3. Parcel Management Re-Engineering

a. Problem Statement

As noted in the situation assessment and conceptual design, there are number of duplicative processes and other inefficiencies in parcel management and maintenance. These issues exist within County government and, as well, between the County and the Cities of Davenport and Bettendorf. A proposed, but very basic, parcel process re-engineering was described in the conceptual design.

Until the parcels are converted, however, there are still some process improvements that can be made. For example, at this time, two different Parcel Identification Number (PIN) schemas are being used by the County and the City of Davenport. It may be difficult to adopt a single numbering standard because of existing business processes and applications. Short of adopting a single standard, a cross-walk between the PINs can be implemented to support the business and application needs of the City and the County. All potential users of the system can take advantage of some portion of the assessment databases maintained by the County and the City of Davenport. Accordingly, the workflow redesign should also address key non-spatial data integration.

b. Activity Description

1) Establish Parcel Maintenance Agreements

A policy tactic that is a necessary precondition to improving parcel processes involves the establishment of explicit institutional arrangements between the County and municipalities as to the management of digital parcel layer and related non-spatial data. These agreements should be set up in advance of the actual parcel conversion process. Considering that the City of Davenport and Bettendorf are maintaining digital parcel representations, these agreements for data sharing and maintenance serve the public good.

As well, these agreements will make clear to whom the parcel maintenance will be assigned. The department or entity responsible will need time before the digital parcels are delivered to prepare (e.g., hire staff, train, acquire technology).

2) Parcel Workflow Redesign

Once the institutional arrangements have been made, a more formal process redesign effort will be undertaken. Although the Conceptual Design provided a basic proposed workflow, a more detailed redesign should be undertaken. This redesign should take into account the varying business needs of the County and the Cities of Davenport and Bettendorf. By way of example, both cities use parcels for business functions of no explicit concern to the County

such as infrastructure management. As a result, the methods of parcel construction and maintenance vary slightly. This effort will require additional fact investigation, workshops, and analysis to create the redesign.

This work and data flow redesign(s) must address both spatial and non-spatial data. For example, the City of Bettendorf makes use of the County's PIN. For new parcels and parcel splits, the workflow must address PIN assignment and communication. Improvements will also involve incorporation into the Enterprise GIS system of portions of non-spatial databases maintained by the Auditor, the Recorder, the Assessors, and Treasurer. Part of the effort will be to engage in a database design exercise to determine explicit business needs that must be supported by Enterprise GIS.

In summary, the entire processes of all parcel-related management need further investigation and redesign within and between departments and affected agencies.

3) Develop PIN Cross-Index or Standardization

A closely related, but distinct, need is for the development of mechanisms to support integration between the County and the City of Davenport PIN schemes. Unless a single standard can be developed, there will need to be a cross-walk between the two parcel numbers. This will permit the creation of a seamless parcel layer with supporting attribution on a countywide basis. This index should also reference any and all documents associated with the parcel. This database design exercise can be accomplished prior to, and will support, parcel boundary data development. This effort will improve a number of business processes, including enhancing public service.

c. Strategies Effected

Strategic Themes:	Multi-Purpose/Multi-Participant, Efficiency and Effectiveness; Centralized Systems Administration and Management
Strategies:	Governance, Operations, Information Systems Focus, Enterprise System Administration, and Enterprise GIS Coordination

d. Resource Needs

GIS Staff:	Project management, procurement, coordination, and technical work
County Staff:	GIS Steering Committee for agreements; Auditor, Treasurer, Recorder, City and County Assessor staff for cross-index tables; other subject matter experts as needed
External Resources:	Limited consulting recommended. See D.12, Retain GIS Consulting Assistance.

Costs:	Staff Time	
	Consulting Fee Ranges:	
	Parcel Maintenance Agreements	$0 to $5,000
	Parcel Flow Redesign:	$0 to $15,000
	PIN Cross-Index/Standardization:	$0 to $10,000

e. Timetable

Phase	Project Start	Project Completion
Agreements	October 2003	February 2004
PIN Cross-Index	October 2003	March 2004
Consulting Assistance	October 2003	March 2004

f. Metrics

1) Incorporation of relevant non-spatial data in the Enterprise GIS database.
2) Elimination of redundant parcel management and maintenance efforts within the County and between the County and the Cities.
3) Reduction of level of effort required for parcel maintenance by 50%.
4) Update, publish and provide access to parcel data within an average of one month from the time of recordation.

4. Initial Public Domain Data Acquisition

a. Problem Statement

Although the overall data conversion process will take three to four years, there are a number of readily available data sets that can be acquired more quickly. Public domain (essentially free) data include but not limited to: National Aerial Photography Program Digital Orthophoto Quarter Quadrangles (DOQQ), statewide DNR infrared orthophotography, NRCS soils, hydrography, state roads, and Census geography data. These data may be leveraged for a variety of business purposes and, at the same, introduce staff to GIS technology and concepts. There is a substantial amount of public domain data available, which should be organized into a mapping server or data repository for staff access.

b. Activity Description

Public data will be acquired from the various sources, including the NRCS, Bi-State Regional Commission, Iowa DNR/NRGIS, Iowa DOT, and Iowa State University Image Map Server. Some data may need to be re-projected into the County's coordinate system.

c. Strategies Effected

Strategic Themes:	Multi-Purpose/Multi-Participant, Efficiency and Effectiveness; Centralized Systems Administration and Management
Strategies:	Operations, Information Systems Focus, Enterprise System Administration, and Enterprise GIS Coordination

d. Resource Needs

GIS Staff:	Project management, procurement, coordination, and technical work
County Staff:	Limited
External Resources:	Limited consulting recommended. See D.12, Retain GIS Consulting Assistance.
Costs:	Staff Time
	Consulting Fee Range: $2,500 to $5,000
	Data Conversion: $0 to $5,000.

e. Timetable

Phase	Project Start	Project Completion
Procurement	September 2003	October 2003
Data Conversion	October 2003	December 2003
Consulting Assistance	September 2003	December 2003

f. Metrics

1) Completion of each phase of the project.
2) Creation of a base map that supports the development of a robust GIS system.
3) Accessibility to initial GIS data across County agencies by staff who will rely on GIS as part of their daily work within six months of deployment.

5. Develop/Acquire Web-Based Browser for Public Data

a. Problem Statement

One of the ways to promote the investment into GIS is to get the data out to potential users as soon as possible. It will be some three to four years before Scott County has nearly all of its GIS layers in place. In the meantime, providing easy access to public domain data provides good marketing exposure for Scott County's GIS plans. The tool needs to have more robust functionality than may be available with ESRI ArcIMS starter applications.

Because ArcIMS is core technology, not an out-of-the-box application, a browse and query application such as Varion Systems' PV.Web could also be acquired for internal use by staff. An application like PV.Web would be useful so that the County would not have to develop its own application. For external, public use, PV.Web has a related product, PV.WebPublic.

If an off-the-shelf application is not appropriate, the County could develop a custom application using internal or external resources.

b. Activity Description

This strategic task will involve compiling the public domain data, previously acquired in-house, into a web mapping service (e.g. ESRI ArcIMS) for visual display. Depending upon funds, attaching a front-end interface that provides some additional easy-to-use functionality for table generation, reports, maps downloads, and so on can be very helpful to County staff and external agencies.

Several subtasks could be investigated. One consideration would be whether the public should pay for access to this service as in the form of a subscription. Other considerations include what data will be displayed, in what format, what maps would be displayed, and so on. An user access model could also be developed that would scope out different levels of access to different levels of data richness with some cost recovery linked to certain levels of access.

As Scott County acquires its base map layers, these can be added easily to the web site.

c. Strategies Effected

Strategic Themes:	Multi-Purpose/Multi-Participant, Efficiency and Effectiveness; Centralized Systems Administration and Management
Strategies:	Operations, Information Systems Focus, Enterprise System Administration, and Enterprise GIS Coordination

d. Resource Needs

GIS Staff:	Coordination and technical work. Webmaster for implementation
County Staff:	User group for feedback
External Resources:	Limited consulting recommended. See D.12, Retain GIS Consulting Assistance.
Costs:	Staff Time Internal browse and query application: $10,000 to $20,000. External browse and query application: $10,000 to $20,000. Consulting Fee Range for Training: $2,500 to $10,000 depending on number of staff trained.

e. Timetable

Phase	Project Start	Project Completion
Design/Procurement	November 2003	December 2003
Implementation	December 2003	February 2004

f. Metrics

1) Functional web site providing internal (intranet/WAN) and external (Internet) browse and query functions to the public domain data.

2) Countywide (government) access to GIS data and technology resources within six months of the acquisition of public domain and/or City parcel data.

6. Develop Data Quality Standards

a. Problem Statement

The accuracy of digital land records maintained and used by the County and shared with external agencies needs to be sufficient to yield the most cost/effective benefits to the County and its taxpayers. Generally, cost increases with increased accuracy. Accuracy standards that direct all future GIS data collection should be drafted by the GIS Technical Committee, ratified by the GIS Steering Committee, and adopted by the County Board.

b. Activity Description

The following aspects of data standards will need to be taken up by the GIS Technical Committee and ad hoc Task Forces for consideration.

1) Positional Accuracy

Positional accuracy refers to the accuracy with which a location on a map can be tied to a discrete geographic coordinate, such as a latitude/longitude, or other x/y coordinate. By obtaining and referencing a reliable network of geodetic (survey) control points as part of orthophotography acquisition, the County can increase the accuracy of the GIS base layers and all derivative layers.

Minimum standards for positional accuracy should include:

- Plus-or-minus 3 feet for large-scale GIS layers that are captured from survey techniques (PLSS corners, subdivision plats, etc.) and any layers that are derived from these layers.
- Plus-or-minus 30 feet for maps with publication scales larger than 1:20,000, and plus-or-minus 50 feet for maps with publications scales smaller than 1:20,000. These may include GIS data layers compiled from aerial photography, such as wetland boundaries, soils, and vegetation

types. At a minimum, national map accuracy standards should be adopted as a standard.

- Project-specific GIS databases would not have to meet a specific accuracy standard as this should be left to the discretion of individual departments and users. If project GIS data were intended for eventual publication in the central data repository, then the accuracy level should be documented.

2) Referential Integrity

Related to positional accuracy is consistency in the compilation of digital land records. To ensure referential integrity, all map layers, existing and new, will need to be aligned in the same coordinate space and registered to some base (e.g. survey control network, base map, etc).

- Projection: Iowa State Plane South Zone, NAD83(99), in feet.
- All data layers should be registered to the base map and framework layers.

3) Comprehensiveness and Currency

Each centrally served GIS data layer should meet a minimum standard for comprehensiveness and currency. At a minimum, the following standards should apply:

- Each data layer should contain a key identifier (such as PIN or Zoning Designation, or Road Name) for each mapped feature, with no unidentified features.
- Data layers should cover the entire County geography or beyond, unless explicitly noted otherwise in metadata documentation.
- Regular update schedules should be adhered to, as determined in data custodianship policies.

4) Citation of Data Quality

Any printed or digital distribution of the information contained in the GIS will be annotated with references to the accuracy, comprehensiveness, and currency of each data layer that appears on the distribution. In addition, statements of appropriate use and disclaimers should appear on printed products.

5) Metadata

Metadata, or descriptive information about each data layer, should be clearly documented. By providing accompanying documentation with GIS data, the County will help to prevent inappropriate or misunderstood use of the data it publishes.

At a minimum, metadata should include the following information:

- Title
- Description of Data Layer
- Purpose of Data Layer

- Time Period of Content
- Maintenance and Update Frequency
- Source of Information/Data Collection Method
- Scale of Original Source/Data Collection
- Map Projection
- Positional Accuracy
- Attribute Accuracy
- Attribute Definitions
- Known Limitations
- Custodian/Point of Contact

c. Strategies Effected

Strategic Themes:	Multi-Purpose/Multi-Participant, Efficiency and Effectiveness, Centralized Systems Administration and Management
Strategies:	Governance, Operations, Information Systems Focus, Enterprise System Administration, and Enterprise GIS Coordination

d. Resource Needs

GIS Staff:	Coordination and technical work
County Staff:	GIS Technical Committee and Steering Committee participation
External Resources:	Consulting recommended. See D.12, Retain GIS Consulting Assistance.
Costs:	Staff Time Consulting- $10,000 to $15,0000

e. Timetable

Phase	Project Start	Project Completion
Development & Adoption	December 2003	March 2004

f. Metrics

1) Standards document supporting data exchange across County agencies and key strategic partners.

2) Elimination of redundant data collection and maintenance of enterprise data.

3) 50% cost reduction in the collection and maintenance of data.

7. Establish Data Custodianship

a. Problem Statement

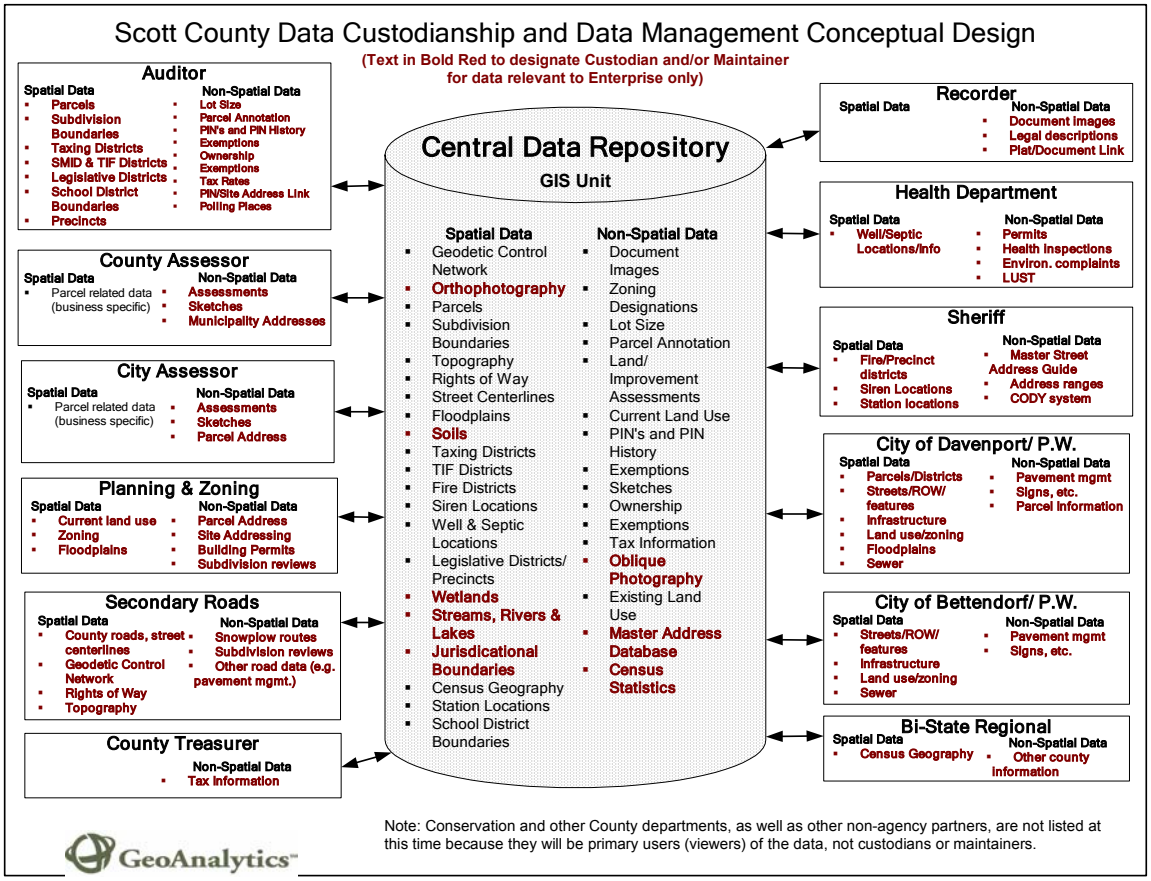
The County GIS will be made up of a defined set of GIS databases and custodians. As noted in both the situation assessment and the conceptual design reports, a data custodian has critical responsibility to a GIS because without data, and good data, the GIS is unusable.

b. Activity Description

Custodial responsibilities should be drafted by the GIS Technical Committee, submitted to the GIS Steering Committee, and adopted by the County Board as internal policy. Each department participating in the GIS program would then implement the policy.

Figure 3 illustrates these components, as they will exist for Scott County's GIS data. It provides a general illustration of departmental custodianship, with a central data repository stored on the GIS data server. For each GIS data layer, details need to be determined with regard to completion schedules, maintenance cycles, and metadata documentation. Where necessary, custodial responsibilities for data maintenance will address not only the needs of the custodian but also of the end users of the data.

Figure 3: Data Layers and Custodians



c. Strategies Effected

Strategic Themes: Multi-Purpose/Multi-Participant, Efficiency and Effectiveness, Centralized Systems Administration and Management

Strategies: Operations, Information Systems Focus, Enterprise System Administration, and Enterprise GIS Coordination

d. Resource Needs

GIS Staff: Coordination and technical work

County Staff: GIS Technical Committee and Steering Committee; subject matter experts as needed.

External Resources: None

Costs: Staff Time

e. Timetable

Phase	Project Start	Project Completion
Custodianship Assignments	November 2003	May 2004

f. Metrics

1) Agreements with departments on data custodianship responsibilities.
2) Elimination of redundant data collection and maintenance for enterprise data.
3) 50% cost reduction in the collection and maintenance of data.

8. Test and Validate Existing Base Map Data

a. Problem Statement

Part of this project was to identify what currently exists in Scott County, partly for data components. In order to build a GIS, economy of data compilation is in order and Scott County is wise to consider using existing digital data. However, it must be known whether any existing digital data is appropriate or meets County needs in the future countywide GIS. Therefore, it is recommended that as a separate task, any existing digital data be acquired and evaluated.

b. Activity Description

The GIS Coordinator and any other pertinent staff should acquire existing digital data sets, especially those parcels from Davenport and Bettendorf, for evaluation. This will also involve cooperation and knowledge transfer from those cities staff members to county staff. For instance, methods of parcel compilation at the public works department in Davenport, resolution of errors, accuracy, base mapping, etc. should be part of the evaluation/knowledge lists.

c. Strategies Effected

Strategic Themes:	All
Strategies:	All

d. Resource Needs

GIS Staff:	Coordination and technical work
County Staff:	GIS Technical Committee; subject matter experts as needed.
External Resources:	Consulting Recommended. See D.12, Retain GIS Consulting Assistance.
Costs:	Staff Time Consulting Fee Range: $10,000 to $20,000 depending on number of data layers and extent.

e. Timetable

Phase	Project Start	Project Completion
Procurement	August 2003	September 2003
Evaluation	September 2003	October 2004

f. Metrics

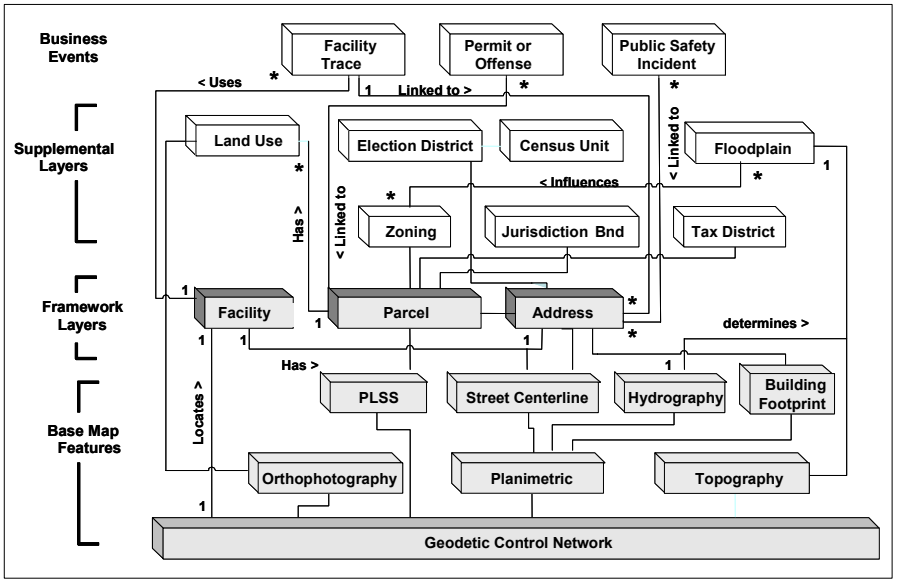
1) If successful, acquiring and using existing digital data could save about 3/4 of a million dollars in overall GIS costs for the county.
2) Better relationships with partners.

9. Procure Survey Control and Digital Orthophotography Services

a. Problem Statement

The first step in the automation of map information will be the creation of a base map for the County. This base map will be composed of survey control and digital orthophotography. These two base layers are essential building blocks for future GIS layers. The diagram below illustrates this concept.

Figure 4: Data Layers



b. Activity Description

This project will involve retaining a private survey and/or photogrammetric firm to establish survey control points and black and white aerial photography, followed by production of digital orthophotography. Once complete, the digital orthophotography and control network will be used in the conversion of parcel and other thematic maps into GIS. Although there are two discrete services to be

undertaken, only one procurement need be done. The work may be divided between two firms or completed by one firm.

There is a strong time dependency for the acquisition of base data, namely digital orthophotography. It must be undertaken in the spring to accommodate a leaf-off flight with appropriate sunlight angles. Fall flights may be pursued; however, the window for flights in the fall is very short and typically sun angles are less than optimal. Therefore, if a flight is not undertaken in the spring, the process will be delayed an entire year. This creates a critical-path time compression. In addition, the procurement process for digital orthophotography will ideally be initiated in late fall 2003 and completed no later than January 2004 to accommodate a spring flight.

It is likely that the specifications for digital orthophotography for municipal partners may be higher and more resolute than the County. While there may be some flexibility in flight height specifications given the uncertainty of possible municipal partners, there will be a need to find some level of compromise and collaboration before the spring flight. If potential municipal partners are going to be part of this effort, there is a need to begin the agreement process prior to the procurement process.

1) Geodetic and Survey Control

Establishing survey control involves setting a permanent series of monumented control points across the County area to supplement existing horizontal and vertical control. All new points should have horizontal and vertical measurements performed based on a prescribed level of accuracy[2] and expressed in State Plane Coordinates - Iowa South Zone 1402 - North American Datum of 1983 (NAD83) and North American Vertical Datum of 1987 (NAVD 87). The control measurements may be captured using airborne global positioning system (GPS) techniques and ground GPS (geodetic control) coupled with traditional survey techniques and may be adjusted against high accuracy control monuments maintained by the County, State, and/or Federal governments.

This geodetic and survey control, initially, will be used to support orthophotographic rectification. Later, these measurements and control points can be used for parcel boundary compilation and other mapping exercises. This work will provide a control network to support geodetic referencing of survey fieldwork through line-of-sight surveys, GPS data collection, and future photogrammetric mapping exercises. Publication of control point coordinates will also allow the County to promote the use of this investment with private land development and surveying firms doing business in the County.

At this point, it is not recommended to obtain a comprehensive elevation survey to support contour mapping, except in those areas where a potential partner may need that data. Base elevation data will be acquired as part of the

[2] At a minimum as defined by statute or administrative code. More rigorous standards may be adopted based on business needs that will be determined in the future and cost. Different standards may be required to ensure compatibility with the Cities of Davenport and Bettendorf efforts.

geodetic survey. In addition, approximate elevations may be derived from the digital terrain model (DTM) that is generated as part of the ortho-rectification process.

2) Digital Orthophotography

One of the essential base map components in a GIS system is digital aerial photography registered to real-world coordinates. Unlike existing hardcopy air photos, which are printed on multiple pages and require time-consuming indexing and cross-referencing, digital orthophotography will provide a seamless view across the entire County.

At the current time, the specifications for digital orthophotography are generally as follows. In developed and developing areas of the County, base mapping should meet National Map Accuracy Standards at 1 inch = 100 feet. Photo resolution in these areas should be at least 1-foot pixel size allowing for photo identification of features on the ground of 1 to 2 feet in actual size. Six-inch pixel size, if affordable, would be the preferable resolution.

In rural or undeveloped areas of the County, 2-foot pixel resolution would be appropriate. These respective resolutions will enable identification of any feature on the ground that is at least two to four feet in actual size and will support functions such as locating built structures, recognizing new buildings or additions to buildings, measuring general right-of-way width, and distinguishing where farming activities are occurring.

The orthophotography will be used as evidence of ground occupation in support of parcel mapping activities, wherever needed, but will not serve as a replacement for surveyed lot lines, rights-of-way, or other legal description.

The DTM that is developed for ortho-rectification will support the generation of 10-foot contour intervals that meet National Map Accuracy Standards. Smaller contour intervals may be generated, but they will not meet standards. It may be advisable to invest in the creation of a more detailed version of the DTM that is generated as part of the ortho-rectification process. This will require additional geodetic control, but will support the generation of five-foot contour intervals that meet National Map Accuracy Standards.

c. Strategies Effected

Strategic Themes: All

Strategies: All

d. Resource Needs

GIS Staff:	Project management, procurement management, subject matter expertise, and quality assurance and quality control (QA/QC)
County Staff:	Subject matter expertise, assistance with the procurement and project management, and QA/QC

External Resources: Consulting recommended for procurement and QA/QC. See D.12, Retain GIS Consulting Assistance.

Survey and data conversion professional services

Costs: Staff Time

Consulting Fee Range: $7,500 to $12,500 for procurement and QA/QC.

Geodetic Control and Survey Fee Range: $40,000 to $100,000 depending upon buy-in from Davenport and Bettendorf

Digital Orthophotography Fees (derived from other client projects of similar size and scale):

Rural Area: approx. $200 per square mile

Urban Areas: approx. $900 per square mile

Total: $110,000 to $360,000 depending upon buy-in from Davenport and Bettendorf

e. Timetable

Note: If the project cannot be started according to the following schedule, then conversion dates will shift by one year.

Phase	Project Start	Project Completion
Municipal agreements	August 2003	December 2003
Procurement	October 2003	January 2004
Geodetic/Survey Control (Initial)	March 2004	May 2004
Capture Aerial Photography	May 2004	June 2004
Digital Orthophoto Conversion	July 2004	December 2004

f. Metrics

1) Completion of each phase of the project.
2) Creation of a base map that supports the development of a robust GIS system.
3) Enhanced staff productivity by at least 10% in FY2005 (once other framework data conversion is complete).

10. Establish GIS Information Policy

a. Problem Statement

This policy would define the terms and conditions of data sharing, information access, cost recovery, copyrights and licensing, express and implied warranties, and the terms upon which Scott County would partner with other organizations and the private sector on data issues. This task would establish policy for all aspects of data sharing, public access, cost recovery, and strategic relationships.

b. Activity Description

This policy document could be initiated at any time, but it is recommended that these guidelines be in place prior to taking delivery on data products (orthophotography, GIS data layers) from the conversion vendor.

c. Strategies Effected

Strategic Themes:	Multi-Purpose/Multi-Participant, Efficiency and Effectiveness
Strategies:	Governance, Operations, Information Systems Focus, Enterprise GIS Coordination, Cost Recovery

d. Resource Needs

GIS Staff:	Project management, coordination, and technical work
County Staff:	GIS Technical Committee
External Resources:	Consulting recommended. See D.12, Retain GIS Consulting Assistance.
Costs:	Staff Time Consulting Fee Range: $5,000 to 10,000.

e. Timetable

Phase	Project Start	Project Completion
Policy Development	January 2004	June 2004

f. Metrics

1) Establishment of a policy structure that facilitates intergovernmental relations, private sector collaboration, and citizen access.
2) Creation of a costing mechanism for value-added services that will generate sufficient funds to cover base costs and provides additional revenue to support enterprise system development and maintenance.

11. Develop Countywide Master Address Database

a. Problem Statement

An address is one of the most critical pieces of information to the County. A large majority of business information used by staff on a daily basis is linked to addresses. In addition, many proposed GIS applications identified in this implementation plan are dependent upon site addresses and their relationship to property (e.g., tax parcels).

The County should recognize that it might take years to resolve all issues associated with site addressing. These issues include alias addresses, inconsistent numbering and spelling of street names, assignment of different addresses for the same building by multiple agencies, and a lack of standard formatting (such as "ST" or "St." as an abbreviation for Street). The first push should be toward adopting a countywide standard and encouraging all County municipalities and agencies to implement this standard in address tracking efforts.

Subsequently, the County should spearhead an effort to cultivate coordination among external agencies, in support of resolving other addressing issues. Agencies involved in address assignment, such as utility providers, should be brought together to discuss the need for a countywide standard. This effort should also include an educational element to increase awareness of the critical need for address standardization; namely, in support of emergency response operations.

b. Activity Description

This task involves the development and implementation of a consistent standard for property addressing throughout the County. A database is recommended to cross-index all of the different types of addresses being used within the County. Although this study did not evaluate addresses used in the County, it is typical to find addressing errors. The need for accurate address information is very important to County departments, municipalities, and external agencies such as utility companies.

c. Strategies Effected

Strategic Themes:	Multi-Purpose/Multi-Participant, Efficiency and Effectiveness, Centralized Systems Administration and Management
Strategies:	Information Systems Focus, Enterprise System Administration, and Enterprise GIS Coordination

d. Resource Needs

GIS Staff:	Project management, coordination, and technical work
County Staff:	Auditor, Planning & Development, and County Assessor staff; subject matter experts as needed.
External Resources:	Limited consulting recommended. See D.12, Retain GIS Consulting Assistance. Other municipality personnel, US Postal Service, utility providers.
Costs:	Staff Time Consulting Fee Range: $10,000 to $25,000.

e. Timetable

Phase	Project Start	Project Completion

Phase	Project Start	Project Completion
Countywide Database	April 2004	May 2004
Implementation/Testing	May 2004	August 2004
External Agencies	October 2004	March 2005

f. Metrics

1) Standards documentation
2) Elimination of redundant address databases within County government.
3) 75% municipal compliance with standards
4) 50% municipal use of address assignment tools that will ultimately be developed.

12. Retain GIS Consulting Assistance

a. Problem Statement

In many GIS startup implementations, staff quickly become overwhelmed with the complexity of tasks needing to be completed in a short period of time. If funding is not limited and time is of the essence, then hiring outside assistance is a good option.

b. Activity Description

Regardless of the skill level of existing staff, it is often necessary and beneficial to engage external consultants to add expertise in specific areas, add labor to critical projects, or offer technical support in planning and design. The County would be well served to budget some funds to allow the GIS Coordinator obtain technical and strategic assistance from a consultant in any year.

c. Strategies Effected

Strategic Themes: Multi-Purpose/Multi-Participant, Efficiency and Effectiveness; Centralized Systems Administration and Management

Strategies: Governance, Operations, Information Systems Focus, Enterprise System Administration, and Enterprise GIS Coordination

d. Resource Needs

GIS Staff: Project management and coordination.

County Staff: As needed for project input and coordination

External Resources:	Consulting recommended. See D.12, Retain GIS Consulting Assistance.	
Costs:	Staff Time	
	Consulting Fees (many are optional)	
	Parcel Management	
	Agreements	$0 to $5,000
	Parcel work flow redesign	$0 to $15,000
	PIN cross index	$0 to $10,000
	Initial technology acquisition	$0 to $7,500
	Public domain data acquisition	$0 to $5,000
	Data conversion	$0 to $5,000
	Web-based browser application – assistance	$0 to $10,000 depending on no. of staff to be trained.
	Develop data standards	$10,000 to $15,000
	Test and Validate Existing Base Map Data	$10,000 to $20,000
	Procure survey control and digital orthophotography	$0 to $12,500 for RFP and QA/QC
	GIS information policy	$0 to $10,000
	Master address database	$10,000 to $25,000
	General assistance outside the listed tasks	$5,000 to $15,000
	Total Range:	**$25,000 to $155,000**

e. Timetable

During the current fiscal year as needed.

f. Metrics

1) Successful execution of the implementation plan during the course of the year.
2) Timely completion of implementation plan elements (plus or minus two months).
3) Completion of implementation plan elements within budget (plus or minus 10%).
4) Solving ad hoc and anticipated technical issues.

13. Acquire GIS Training

a. Problem Statement

Training is always a necessary strategic task because it builds upon existing staff resources and prepares staff for new processes, data, and changes. Timing the training is a critical point. Training needs to be provided so that staff will be able to use their new knowledge immediately with the GIS. There are several levels of training from fundamental (a click and browse user) to a high-end user who will manipulate/maintain/create data.

b. Activity Description

During the first year, training needs should be focused on the GIS Coordinator and IT staff who will be supporting the GIS. Regardless of the skill level of the GIS Coordinator and existing staff, it is important to add to and improve skills in GIS and other technologies, including web-based mapping. This training can involve self-paced online courses, purchasing technical books, courses off site at a vendor's training center, or attendance at GIS conferences.

During the second year, training should be expanded to data custodial staff, especially for parcels, addresses, and other base layers. This type of training could be very extensive.

c. Strategies Effected

Strategic Themes:	Multi-Purpose/Multi-Participant, Efficiency and Effectiveness; Centralized Systems Administration and Management
Strategies:	Governance, Operations, Information Systems Focus, Enterprise System Administration, and Enterprise GIS Coordination

d. Resource Needs

GIS Staff:	Participation.
County Staff:	Participation
External Resources:	Limited consulting recommended.
Costs:	Staff Time
	Advanced training for GIS staff: $5,000 -10,000
	Fundamental training: $500 - $1000 each.

e. Timetable

Phase	Project Start	Project Completion
Advanced Training	August 2004	December 2004 - ongoing

Phase	Project Start	Project Completion
Fundamental Training	January 2005	June 2005 - ongoing

f. Metrics

1) Improved skill levels measured by performance reviews.
2) Increase number of trained staff by at least 2 persons.

E. Fiscal Year 2005 (July 2005-June 2006) Implementation

1. Create and Recruit GIS Technician Position

a. Problem Statement

Once the base layers of the GIS are delivered, the focus will switch to data maintenance. This kind of work will require at least one full-time staff person, especially for the parcels. Other departments may not need a full-time person for their data layers. The first GIS Technician hired will be for parcel maintenance. Other staff hires may be needed by other departments (or they will train existing staff).

b. Activity Description

In order to support the transition from external contractor to internal parcel map and other GIS data layer maintenance, the Auditor's Office or its designee should add an experienced GIS Technician to current staff. Minimum qualifications for this position should include:

- A Bachelor's degree in geography, GIS, computer science, or a related field and two years, or an Associate's degree and three years, of progressively responsible experience in the operation of geographic information systems, preferably using ESRI products.

- Demonstrated knowledge of cartographic principles and spatial coordinate systems, legal description interpretation, and Coordinate Geometry (COGO) data entry.

c. Strategies Effected

Strategic Themes:	Multi-Purpose/Multi-Participant, Efficiency and Effectiveness; Centralized Systems Administration and Management
Strategies:	Governance, Operations, Information Systems Focus, Enterprise System Administration, and Enterprise GIS Coordination

d. Resource Needs

GIS Staff:	Position announcement, interviews
County Staff:	Auditor staff for interviews
External Resources:	Limited consulting recommended. See E.5, Retain GIS Consulting Assistance.

Costs:	Staff Time
	Consulting Fee Range: $2,500 for hiring assistance
	Salary Range: $40,000 to $55,000 excluding benefits

e. Timetable

Phase	Project Start	Project Completion
Recruitment	May 2005	July/August 2005
Appointment	September 2005	September 2005

f. Metrics

1) Completion of recruitment and appointment.
2) Advancement of the GIS program consistent with this plan.

2. Map Creation and Plotting Application

a. Problem Statement

A universal task of any operational GIS is to satisfy the increasing demand for printed maps needed to support customers and internal County business functions. Maps can be used for presentations, education, in reports, or as standard documents for public consumption. Map creation can grow into a major sink of labor resources.

b. Activity Description

As an extension to the staff browse and query application, the County would be well served to invest in the acquisition or development of a custom interface that will automate many of the steps involved in hardcopy map creation. In addition, it may be necessary to purchase more color laser printers. The GIS map creation application should be user-friendly enough that it gives non-technical staff the ability to create their own maps and send them to a local printer or plotter. The focus of this application should be on standard maps that are needed by multiple departments across the County.

c. Strategies Effected

Strategic Themes:	Multi-Purpose/Multi-Participant, Efficiency and Effectiveness; Centralized Systems Administration and Management
Strategies:	Operations, Information Systems Focus, Enterprise System Administration, and Enterprise GIS Coordination

d. Resource Needs

GIS Staff:	Project management, technical work.
County Staff:	User group for project design inputs
External Resources:	Limited consulting recommended. See E.5, Retain GIS Consulting Assistance.
Costs:	Staff Time
	Consulting Fee Range: $7,500 - $10,000 for application development
	Hardware Costs :
	Color Laser Printers: $3,000 each

e. Timetable

Phase	Project Start	Project Completion
Design	July 2005	October 2005
Implementation	October 2005	December 2005

f. Metrics

1) Map creation application created and implemented.
2) Staff training.

3. Develop Street Centerline Layer with Address Ranges

a. Problem Statement

In order to support GIS functions that are based on roads rather than parcels, such as highway management, address range geo-coding, routing, and dispatching, the County should create or procure an accurate, topologically correct street centerline layer.

b. Activity Description

The first task is to create a complete and topologically correct street centerline layer. There are a few sources for compiling this layer and some issues. First, it needs to match the base layers, both the digital orthophotos and the parcels. Second, it can be acquired from potential partners such as Davenport, Bettendorf, and Iowa DOT. It can then be modified into a whole, and shaped to the digital orthophotos. Another method, especially for the rural parts of the County, is to procure this layer in conjunction with the digital orthophoto acquisition as a derived planimetric layer. Regardless of the source, the street centerline layer usually needs to be modified for accuracy.

The second task would then "attach" street address ranges to the centerline file. This can be derived from the master address database and the parcel layer by GIS overlay methods.

c. Strategies Effected

Strategic Themes:	Multi-Purpose/Multi-Participant, Efficiency and Effectiveness; Centralized Systems Administration and Management
Strategies:	Governance, Operations, Information Systems Focus, Enterprise System Administration, and Enterprise GIS Coordination

d. Resource Needs

GIS Staff:	Requirements gathering, technical work
County Staff:	Secondary Roads staff; other domain expert staff as needed.
External Resources:	None to optional limited consulting. See E.5, Retain GIS Consulting Assistance.
Costs:	Staff Time
	Consulting Fee Range: $10,000 to $15,000

e. Timetable

Phase	Project Start	Project Completion
Requirements / Design	September 2005	December 2005
Implementation	December 2005	March 2006

f. Metrics

1) Creation of Street Centerline data layer.
2) Attached address ranges for enterprise usage.

4. Procure Parcel Map Conversion Services

a. Problem Statement

Since none of the County's rural parcels are in digital format, the most effective means for conversion is to procure the services of a qualified vendor. Since the parcels are digitally represented in Davenport and Bettendorf, every effort should be made to incorporate them into the County layer. This can also be done using vendor services.

b. Activity Description

A Request for Proposal will need to be crafted to the County's specifications. This activity cannot begin until a base map of orthophotography is compiled.

The IT Department and more specifically, the GIS Coordinator, will need to supervise the procurement, facilitate the data exchanges, and perform QA/QC. As well, staff from the Auditor and Assessor Offices will need to be involved in the process.

c. Strategies Effected

Strategic Themes:	Multi-Purpose/Multi-Participant, Efficiency and Effectiveness, Centralized Systems Administration and Management
Strategies:	Information Systems Focus, Enterprise System Administration, and Enterprise GIS Coordination

d. Resource Needs

GIS Staff:	Project management, procurement, coordination, and technical work
County Staff:	Auditor and County Assessor staff
External Resources:	Limited consulting recommended. See E.5, Retain GIS Consulting Assistance.
Costs:	Staff Time Consulting Fee Range: $5,000 to $7,500 for RFP creation and assistance with vendor selection. Parcel Conversion Cost Estimates: Per Parcel Cost Range: $7.50 to $15 Cost with Davenport parcels in house: $206,250 to $412,500 Cost without Davenport parcels: $506,250 to $1,012,500

e. Timetable

Phase	Project Start	Project Completion
Procurement	June 2006	August 2006
Parcel Conversion	September 2006	June 2007

f. Metrics

1) Completion of each phase of the project.

2) Creation of a base map layer supports the development of a robust GIS system.

3) Enhanced staff productivity by at least 20% in FY2005.

5. Retain GIS Consulting Assistance

a. Problem Statement

In many GIS startup implementations, staff quickly become overwhelmed with the complexity of tasks needing to be completed in a short period of time. If funding is not limited and time is of the essence, then hiring outside assistance is a good option.

b. Activity Description

Regardless of the skill level of existing staff, it is often necessary and beneficial to engage external consultants to add expertise in specific areas, add labor to critical projects, or offer technical support in planning and design. The County would be well served to budget some funds to allow the GIS Coordinator obtain technical and strategic assistance from a consultant in any year.

c. Strategies Effected

Strategic Themes:	Multi-Purpose/Multi-Participant, Efficiency and Effectiveness; Centralized Systems Administration and Management
Strategies:	Governance, Operations, Information Systems Focus, Enterprise System Administration, and Enterprise GIS Coordination

d. Resource Needs

GIS Staff:	Project management and coordination.	
County Staff:	As needed for project input and coordination	
External Resources:	Consulting recommended	
Costs:	Staff Time	
	<u>Consulting Fee Ranges:</u>	
	Recruit GIS Technician	$0 to $2,500
	Address ranges in street centerline	$10,000 to $15,000
	Procurement of parcel conversion services	$5,000 to $7,500
	General consulting services	$5,000 to $15,000
	Total Fee Range:	**$20,000 to $40,000**

e. Timetable

During the current fiscal year.

f. Metrics

1) Successful execution of implementation plan during the course of the year.
2) Timely completion of implementation plan elements (plus or minus two months).
3) Completion of implementation plan elements within budget (plus or minus 10%).
4) Solving ad hoc and anticipated technical issues.

6. Acquire GIS Training

a. Problem Statement

Regardless of the skill level of the IT/GIS Coordinator and existing staff, it is important to continually add to and improve skills in GIS and other technologies. This training can involve self-paced online courses, purchasing technical books, courses off site at a vendor's training center, or attendance at GIS conferences.

b. Activity Description

Training for the IT/GIS Coordinator would continue into FY2005, to coincide with the rollout of the staff GIS browse and query application. In addition, the GIS Technician in the Auditor's Office will require specialized training in the use of the specific COGO parcel editing product that is procured and other departmental staff may require or desire training in GIS functions that extend beyond that of the browse and query tool served over the internal web.

c. Strategies Effected

Strategic Themes:	Multi-Purpose/Multi-Participant, Efficiency and Effectiveness; Centralized Systems Administration and Management
Strategies:	Governance, Operations, Information Systems Focus, Enterprise System Administration, and Enterprise GIS Coordination

d. Resource Needs

GIS Staff:	Participation.
County Staff:	Participation
External Resources:	Limited consulting recommended.
Costs:	Staff Time
	Advanced training for GIS Coordinator: $5,000 -10,000
	ArcGIS training for Dept. Advanced Users: $5,000 - 10,000 each
	COGO Parcel Editing training: $2,000 each.

e. Timetable

Throughout FY2005.

f. Metrics

1) Improved skill levels measured by performance reviews.
2) Increase number of trained staff by 10-15 percent.

F. Fiscal Year 2006 Implementation

As an introduction to FY2006 and FY2007, there will probably be significant changes in the selection of software applications, tools for integration, mapping, and so forth. This has been the trend in the past four years so it is logical to assume it will continue into the next four years from the date of this plan. So, as a preliminary task, the County should re-evaluate whether or not the following tasks still fit. An example would be any web-based browse and query and/or mapping application. There could very well be an out-of-the-box solution that would fit the County's needs.

1. Integrate GIS with Tax and Assessment Systems

a. Problem Statement

In order to have a fully functioning tax-parcel system, the digital parcel layer should be integrated with the County and City tax and assessment systems. At the time of this writing, the County Assessor will utilize Vanguard and the City will use their customized application until sometime in 2006. For planning purposes, it is hoped that one, any new assessment system will be the same between the County and the City; two, that this system will permit links to a GIS; and three, that the system will be in place before the digital parcel delivery. As well, the tax system(s) should have the same requirements.

b. Activity Description

This task will first involve gathering integration requirements of the tax and assessment systems and planning how each will integrate with the parcel base layer. Generally, either an interface module will need to be purchased or some modification to the parcel layer will be necessary (e.g., adding specific tables or attributes of information).

c. Strategies Effected

Strategic Themes:	Multi-Purpose/Multi-Participant, Efficiency and Effectiveness; Centralized Systems Administration and Management
Strategies:	Operations, Information Systems Focus, Enterprise System Administration, and Enterprise GIS Coordination

d. Resource Needs

GIS Staff:	Requirements gathering, project management, technical work
County Staff:	Auditor, County and City Assessor, Treasurer staff for input
External Resources:	Limited consulting recommended. See F.8, Retain GIS Consulting Assistance.

Costs: Staff Time

Consulting Fee Range: $10,000 to $15,000 for assessment and integration.

e. Timetable

Phase	Project Start	Project Completion
Requirements / Design	July 2006	September 2006
Implementation	October 2006	March 2007

f. Metrics

1) Successful integration of tax assessment system.
2) Ubiquitous County government access to a predetermined set of assessment data.
3) Elimination of redundant databases.

2. Integrate GIS with Emergency Dispatching System

a. Problem Statement

The Sheriff's Office has a dispatch center that recently invested in the CODY computer-aided dispatch system. The highest need is for digital map data, particularly streets, addresses, and parcels. Once the parcels are delivered, this integration should be implemented.

b. Activity Description

This task will integrate the new base map layers with the CODY system. The CODY system relies upon an Oracle database in a Windows environment. Part of the activity of this task will be an assessment of the CODY system requirements and comparison to GIS requirements. Some additional modules or programming may be necessary for integration. Yet, by 2006, CODY will no doubt have significant upgrades to their product.

c. Strategies Effected

Strategic Themes: Multi-Purpose/Multi-Participant, Efficiency and Effectiveness; Centralized Systems Administration and Management

Strategies: Operations, Information Systems Focus, Enterprise System Administration, and Enterprise GIS Coordination

d. Resource Needs

GIS Staff:	Project management, technical work.
County Staff:	EMS staff for input
External Resources:	Limited consulting recommended. See F.8, Retain GIS Consulting Assistance.
Costs:	Staff Time
	Consulting Fee Range: $10,000 - $25,000 for evaluating CODY system and integration design.

e. Timetable

Phase	Project Start	Project Completion
Design	August 2006	October 2006
Implementation	November 2006	March 2007 - ongoing

f. Metrics

1) Successful mapping application that integrates CODY tabular records.

3. Create Other Secondary GIS Layers

a. Problem Statement

Taxing District Boundaries, Zoning, Existing Land Use —these digital layers are deemed secondary in priority to the base map and parcel framework layers but will be needed immediately afterward to support common queries to the GIS system.

b. Activity Description

The task will involve development of data structure specifications and then data compilation into the County GIS. In all likelihood, these data layers will be created and maintained as both attributes of parcels as well as separate stand-alone GIS map layers.

County staff (the Auditor's Office GIS Technician, in particular) could complete this work internally. As proposed, the custodian for Zoning and Existing Land Use layers is the Planning and Development Department.

c. Strategies Effected

Strategic Themes:	Multi-Purpose/Multi-Participant, Efficiency and Effectiveness; Centralized Systems Administration and Management

Strategies: Information Systems Focus, Enterprise System Administration, and Enterprise GIS Coordination

d. Resource Needs

GIS Staff:	Project management, technical advice
County Staff:	Auditor's GIS Technician; Planning and Development Director and staff.
External Resources:	None
Costs:	Staff Time

e. Timeline

Phase	Project Start	Project Completion
Design	July 2006	December 2006
Compilation	January 2007	July 2007

f. Metrics

1) New GIS layers completed for Taxing Districts, Zoning, and Existing Land Use.

4. Upgrade Staff GIS Data Access and Web-Based Application

a. Problem Statement

Now that specific GIS layers have been compiled that are useful across County departments, they need to be made accessible to many staff members. Using an Intranet setup would permit most staff to utilize a "thin" client application that accesses a server application.

b. Activity Description

At this time, any existing web based systems for staff access to the GIS will need evaluation and probable upgrades or even, a migration to new platforms or versions.

The components will need to be determined prior to any new construction or acquisition of the application. Acquisition of necessary hardware and software was identified under a previous task has to be completed or upgraded prior to the this task.

c. Strategies Effected

Strategic Themes:	Multi-Purpose/Multi-Participant, Efficiency and Effectiveness; Centralized Systems Administration and Management
Strategies:	Governance, Operations, Information Systems Focus, Enterprise System Administration, and Enterprise GIS Coordination

d. Resource Needs

GIS Staff:	Project management, technical work.
County Staff:	User group for project design inputs
External Resources:	Limited consulting recommended. See F.8, Retain GIS Consulting Assistance.
Costs:	Staff Time Consulting Fee Range: $12,000 to $15,000

e. Timetable

Phase	Project Start	Project Completion
Design	January 2007	April 2007
Implementation	April 2007	June 2007

f. Metrics

1) It is expected that staff needs will be at a higher level at this junction of time so that application enhancements will improve staff efficiencies by some percent.

5. Acquire GPS Technology and Integrate with GIS

a. Problem Statement

Global Positioning System (GPS) units are very useful for capturing locational attributes of ground features and can vary widely in capabilities. The types of data the County Secondary Roads Department is interested in collecting will determine the required GPS accuracy level. Sign locations, for example, would require map-level accuracy, rather than the more accurate centimeter accuracy required for utility infrastructure. Considerations regarding the purchase of a base station and real time surveying or post-processing solutions, will need to be explored as part of this implementation task.

b. Activity Description

GPS technology may be acquired earlier as part of the survey control network collection efforts. The GPS technology acquired should support a very high accuracy level to satisfy ground engineering efforts.

c. Strategies Effected

Strategic Themes:	Multi-Purpose/Multi-Participant, Efficiency and Effectiveness; Centralized Systems Administration and Management
Strategies:	Information Systems Focus, Enterprise System Administration, and Enterprise GIS Coordination

d. Resource Needs

GIS Staff:	Project management, technical work.
County Staff:	Secondary Roads staff; County Engineer
External Resources:	Limited consulting recommended. See F.8, Retain GIS Consulting Assistance.
Costs:	Staff Time
	Acquire GPS technology: $12,000 - $15,000 (could be upwards to $45,000 with highly accurate systems)
	Consulting Fee Range: $2,500 - $5,000 for integration

e. Timetable

Phase	Project Start	Project Completion
Procurement	January 2007	April 2007
Implementation	April 2007	June 2007

f. Metrics

1) GPS collection unit purchased.
2) Collection of feature locations (e.g., bridges, signs, etc.).

6. Create/Acquire Supplemental GIS Databases

a. Problem Statement

This task involves the creation of supplemental GIS databases that are not framework layers and are needed by a limited number of County Departments. A priority list of these supplemental GIS databases should be created by the

Technical Advisory Committee and data automation should proceed based on highest need.

b. Activity Description

Potential GIS data layers to be acquired or created may include:

- Floodplains
- Trails
- Cemeteries
- Parking
- Easements
- Cell Tower Locations & Sectors
- Parks/Natural Areas
- General Topography

It should be possible for internal County staff to acquire or create most of these layers without the assistance of outside contractors. Some of the data layers may exist within other government agencies and may be imported into the County GIS.

c. Strategies Effected

Strategic Themes:	Multi-Purpose/Multi-Participant, Efficiency and Effectiveness; Centralized Systems Administration and Management
Strategies:	Information Systems Focus, Enterprise System Administration, and Enterprise GIS Coordination

d. Resource Needs

GIS Staff:	Project management, technical advice
County Staff:	Other domain expert staff as needed
External Resources:	None
Costs:	Staff Time

e. Timetable

Phase	Project Start	Project Completion
Procurement	December 2006	March 2007
Implementation	March 2007	June 2007

f. Metrics

1) Creation of additional GIS layers.

2) Incorporation into GIS central database and web sites.

7. Integrate GIS with Highway Asset Management System

a. Problem Statement

During the Situation Assessment, staff indicated that existing software from CarteGraph was not up to their expectations and they would like to migrate away from it. Therefore, a new system should be sought, especially one that is web-based, for cataloging information on bridges, signs, and pavement.

b. Activity Description

This task involves scoping out current highway asset management systems for use with GIS. This integration will improve access, analysis, and management of highway assets by adding a visual component.

Data automation will include initial creation and structuring of GIS highway databases (bridges, culverts and signs), building upon the road centerline database created earlier. The initial emphasis will be on building the spatial side of the GIS highway database. The GIS data will then be integrated with an asset management system to enable ongoing records entry and analysis tied to the maps.

County staff could complete this work internally with supplemental assistance provided by outside contractors if needed, or, the work can be contracted out to a consultant. For budgeting purposes, costs will be based on the assumption that most work will be outsourced.

c. Strategies Effected

Strategic Themes:	Multi-Purpose/Multi-Participant, Efficiency and Effectiveness; Centralized Systems Administration and Management
Strategies:	Information Systems Focus, Enterprise System Administration, and Enterprise GIS Coordination

d. Resource Needs

GIS Staff:	Project management, technical work.
County Staff:	Secondary Roads staff
External Resources:	Limited consulting recommended. See F.8, Retain GIS Consulting Assistance.

Costs: Staff Time

Acquire asset management software: Unknown cost due to rapidly changing conditions currently (2003).

Consulting Fee Range: $10,000 - $15,000 for integration

e. Timetable

Phase	Project Start	Project Completion
Procurement	December 2006	February 2007
Implementation	February 2007	June 2007

f. Metrics

1) Asset management software procured.
2) Integration with GIS achieved.

8. Retain GIS Consulting Assistance

a. Problem Statement

In many GIS startup implementations, staff quickly become overwhelmed with the complexity of tasks needing to be completed in a short period of time. If funding is not limited and time is of the essence, then hiring outside assistance is a good option.

b. Activity Description

Regardless of the skill level of existing staff, it is often necessary and beneficial to engage external consultants to add expertise in specific areas, add labor to critical projects, or offer technical support in planning and design. The County would be well served to budget some funds to allow the GIS Coordinator obtain technical and strategic assistance from a consultant in any year.

c. Strategies Effected

Strategic Themes: Multi-Purpose/Multi-Participant, Efficiency and Effectiveness; Centralized Systems Administration and Management

Strategies: Governance, Operations, Information Systems Focus, Enterprise System Administration, and Enterprise GIS Coordination

d. Resource Needs

GIS Staff: Project management and coordination.

County Staff:	As needed for project input and coordination	
External Resources:	Consulting recommended	
Costs:	Staff Time	
	Consulting Fee Range:	
	Mapping application	$7,500 to $10,000
	Integrate tax and assessment systems with GIS	$10,000 to $15,000
	Integrate GIS with EMS	$10,000-$25,000
	Upgrade staff GIS access application	$12,000 to $15,000
	Integrate GPS technology	$2,500 to $5,000
	Integrate GIS with Highway asset management system	$10,000 to $15,000
	General Consulting services	$5,000 to $15,000
	Total Range:	$57,000 to $100,000

e. Timetable

During the current fiscal year.

f. Metrics

1) Improve implementation of GIS by 5-10% with timing.

9. Acquire GIS Training

a. Problem Statement

Regardless of the skill level of the IT/GIS Coordinator and existing staff, it is important to continually add to and improve skills in GIS and other technologies. This training can involve self-paced online courses, purchasing technical books, courses off site at a vendor's training center, or attendance at GIS conferences.

b. Activity Description

Highway Department personnel will require training in the use of the GIS package for asset management integration and other departmental staff may require or desire training in GIS functions that extend beyond that of the browse and query tool served over the internal web. Training for GIS staff may be needed as new software and technologies become available.

c. Strategies Effected

Strategic Themes:	Multi-Purpose/Multi-Participant, Efficiency and Effectiveness; Centralized Systems Administration and Management

Strategies:	Governance, Operations, Information Systems Focus, Enterprise System Administration, and Enterprise GIS Coordination

d. Resource Needs

GIS Staff:	Participation.
County Staff:	Participation
External Resources:	Limited consulting recommended
Costs:	Staff Time
	Advanced training for GIS Coordinator: $5,000 -10,000
	ArcGIS training for Dept. Advanced Users: $5,000 - 10,000 each

e. Timetable

Throughout the current Fiscal Year.

f. Metrics

1) Improved skill levels measured by performance reviews.

G. Fiscal Year 2007 (July 2007 – June 2008) GIS Implementation and Discretionary Tasks

1. Upgrade Web-Based Public GIS Data Access System

a. Problem Statement

This task involves the evaluation and upgrade of the existing web-based application for read-only access and browsing of digital GIS data by the general public. This upgrade could require the acquisition of additional web-based serving licenses or new software. There will be staff and likely consultant time involved with setup and customization of the software. Additional Internet connection technology may be needed, depending upon the usage, such as an additional server, a firewall, and security software.

b. Activity Description

The cost items listed below assume that the County will internally handle development and hosting of a public GIS data access system and not outsource to a local firm..

c. Strategies Effected

Strategic Themes:	Multi-Purpose/Multi-Participant, Efficiency and Effectiveness; Centralized Systems Administration and Management
Strategies:	Governance, Operations, Information Systems Focus, Enterprise System Administration, Enterprise GIS Coordination, Cost Recovery

d. Resource Needs

GIS Staff:	Project management and coordination, technical work.
County Staff:	IT staff as needed.
External Resources:	Consulting recommended. See G.4, Retain GIS Consulting Assistance.
Costs:	Staff Time Consulting Fee Range: $5,000 to $15,000 depending upon scope of support.

e. Timetable

Phase	Project Start	Project Completion
Design	July 2007	September 2007
Implementation	October 2007	December 2007

f. Metrics

1) Enhancement of information on public web site.
2) Better public service.

2. Develop and Implement Supplemental Custom GIS Applications

a. Problem Statement

The County will undoubtedly need additional applications and tools developed specifically for various business activities. There are a number of these that were identified in the Conceptual Design Report but not mentioned as priority tasks under the previous implementation years.

b. Activity Description

As the GIS is used, grows, and becomes more popular, it is inevitable that demands for tools and applications to aid in everyday data usage will also increase. The following can be considered as a "laundry list" of possible applications that the County may want to consider developing in the future.

- Specific economic development tools/applications that would query, display, and map areas that would be suitable for a particular type of economic development. This would have to include several layers of information including land use, zoning, parcels, census information, etc.
- Mapping applications for a large multitude of uses such as development maps for meetings, brochures, etc., work detail maps for maintenance crews, service maps, various map compilations for permitting uses, and so on.
- Analysis applications such as for land use planning. Analysis needs may include "what if" scenarios for land use change, the quantity and geographic distribution of building vacancies and available home sites, traffic impacts, fiscal impacts, and the relationship between environmentally sensitive areas and developable land.
- Crime incident analysis application, using a GIS database of all incidents, service calls, and pertinent premises characteristics for use by Public Safety personnel, enabling mapping, analysis and reporting of crime data.
- Redistricting application that allows assignment of areas to a district or precinct, then automatically redraw the boundaries and summarize selected attributes to reflect the district's characteristics. Such applications can be

applied to County Board districts, voting precinct boundaries, school and fire districts, and numerous other boundaries.

c. Strategies Effected

Strategic Themes:	Multi-Purpose/Multi-Participant, Efficiency and Effectiveness; Centralized Systems Administration and Management
Strategies:	Governance, Operations, Information Systems Focus, Enterprise System Administration, and Enterprise GIS Coordination

d. Resource Needs

GIS Staff:	Project management and coordination, technical support.
County Staff:	As needed for project input and coordination, technical work.
External Resources:	Consulting recommended. See G.4, Retain GIS Consulting Assistance.
Costs:	Staff Time Consulting Fee Range: $5,000 to $15,000 depending upon scope of support.

e. Timetable

Phase	Project Start	Project Completion
Design	July 2007	September 2007
Implementation	October 2007	June 2008

f. Metrics

1) Furthering the completion of the countywide GIS as part of the Plan.

3. Update Orthophotography in Developed and Developing Areas

a. Problem Statement

Digital orthophotography will need to be updated, especially in the developed and developing areas in Scott County. It is recommended that those areas be re-flowen every three to five years. Rural areas of the County may only need to be re-flown every seven to ten years.

There is another consideration with updating orthophotography and that is to coordinate acquisition with Davenport, Bettendorf, and other municipalities. This cost sharing with partners saves taxpayers a good deal of money. As well, there is a time synchrony and data coordinates specifications within the County. It is recommended to work out these arrangements.

b. Activity Description

Agreements to coordinate and cost share for updated orthophotography should be pursued. The task will entail consensus meetings, coordinated procurement, staffing for project management and quality control.

c. Strategies Effected

Strategic Themes:	Multi-Purpose/Multi-Participant, Efficiency and Effectiveness; Centralized Systems Administration and Management
Strategies:	Governance, Operations, Information Systems Focus, Enterprise System Administration, and Enterprise GIS Coordination

d. Resource Needs

GIS Staff:	Project management and coordination, technical work.
County Staff:	Other staff as needed.
External Resources:	Consulting recommended. See G.4, Retain GIS Consulting Assistance.
Costs:	Staff Time
	Consulting Fee Range: $5,000 to $15,000 depending upon scope of support.
	Costs for upgrades: Not available; too far into the future.

e. Timetable

Whether this task occurs in fiscal year 2007 or fiscal year 2008 depends upon coordination efforts with Davenport and Bettendorf.

f. Metrics

1) Completion of each phase of the project.
2) Maintenance of the base map that supports a robust GIS system.

4. Retain GIS Consulting Assistance

a. Problem Statement

In many GIS startup implementations, staff quickly become overwhelmed with the complexity of tasks needing to be completed in a short period of time. If funding is not limited and time is of the essence, then hiring outside assistance is a good option.

b. Activity Description

Regardless of the skill level of existing staff, it is often necessary and beneficial to engage external consultants to add expertise in specific areas, add labor to critical projects, or offer technical support in planning and design. The County would be well served to budget some funds to allow the GIS Coordinator obtain technical and strategic assistance from a consultant in any year.

c. Strategies Effected

Strategic Themes:	Multi-Purpose/Multi-Participant, Efficiency and Effectiveness; Centralized Systems Administration and Management
Strategies:	Governance, Operations, Information Systems Focus, Enterprise System Administration, and Enterprise GIS Coordination

d. Resource Needs

GIS Staff:	Project management and coordination.	
County Staff:	As needed for project input and coordination	
External Resources:	Consulting recommended	
Costs:	Staff Time	
	Consulting Fee Range:	
	Upgrade public web-based data access	$5,000 to $15,000
	Supplemental application development	$5,000 to $15,000
	Update orthophotography	$5,000 to $15,000
	General consulting services	$5,000 to $15,000
	Total Range:	**$20,000 to $60,000**

e. Timetable

During the current fiscal year.

f. Metrics

1) Improve implementation of GIS by 5-10% with timing.

5. Acquire GIS Training

a. Problem Statement

Regardless of the skill level of the IT/GIS Coordinator and existing staff, it is important to continually add to and improve skills in GIS and other technologies. This training can involve self-paced online courses, purchasing technical books, courses off site at a vendor's training center, or attendance at GIS conferences.

b. Activity Description

Other departmental staff may require or desire training in GIS functions that extend beyond that of the browse and query tool served over the internal web. Training for GIS staff may be needed as new software and technologies become available.

c. Strategies Effected

Strategic Themes:	Multi-Purpose/Multi-Participant, Efficiency and Effectiveness; Centralized Systems Administration and Management
Strategies:	Governance, Operations, Information Systems Focus, Enterprise System Administration, and Enterprise GIS Coordination

d. Resource Needs

GIS Staff:	Participation.
County Staff:	Participation
External Resources:	Limited consulting recommended
Costs:	Staff Time
	Advanced training for GIS Coordinator: $5,000 -10,000
	ArcGIS training for Dept. Advanced Users: $5,000 - 10,000 each

e. Timetable

Throughout the current Fiscal Year.

f. Metrics

1) Improved skill levels measured by performance reviews

H. Summary GIS Implementation Costs

The table below presents a summary of cost estimates for all GIS implementation tasks outlined in this 5-year plan.

Table 1: Summary GIS Implementation Costs

TASK	CONSULTING FEE RANGES (OPTIONAL)		COUNTY BUDGET COSTS
FY 2003			
1. Establish GIS Program Governance Structure	$10,000	20,000	
2. Create Division and recruit GIS Coordinator	$0	$6,000	
TOTAL FY 2003 Costs	**$10,000**	**$26,000**	
FY 2004			
1. Develop GIS Business Plan (annually)			
2. Initial Technology Acquisition	$2,500	$7,500	$48,000 - $80,500
3. Parcel Management Re-engineering	$0	$35,000	
4. Initial Public Domain Data Acquisition	$2,500	$10,000	
5. Develop/Acquire Web-based Browser for Public Data	$2,500	$10,000	$10,000-$20,000
6. Develop Data Quality Standards	$10,000	$15,000	
7. Establish Data Custodianship			
8. Test and Validate Existing Base Map Data	$10,000	$20,000	
9. Procure Survey Control and Digital Orthophotography Services	$7,500	$12,500	$110,000 - $360,000
10.Establish GIS Information Policy	$5,000	$ 10,000	
11.Develop Countywide Master Address Database	$10,000	$25,000	
12.General Consulting	$5,000	$15,000	
13.Acquire GIS Training			$6,000 - $12,000
Annual Salary for GIS Coordinator			$50,000 - $60,000
TOTAL FY 2004 Costs	**$55,000**	**$ 159,750**	**$ 224,000 -$532,500**
FY 2005			
1. Create and Recruit GIS Technician	$0	$2,500	$40,000-55,000
2. Map Creation and Plotting Application	$7,500	$10,000	$3,000 - $12,000
3. Develop Street Centerline Layer with Address Ranges	$10,000	$15,000	

TASK	CONSULTING FEE RANGES (OPTIONAL)		COUNTY BUDGET COSTS
4. Procure Parcel Map Conversion Services	$5,000	$7,500	$206,250 - 1,012,500
5. General GIS Consulting			
6. Acquire GIS Training			$12,000 -$22,000
Annual Salary for GIS Coordinator			$50,000 - $60,000
TOTAL FY 2005 Costs	**$22,500**	**$35,000**	**$261,250 - $1,161,500**
FY 2006			
1. Integrate GIS with Assessment System	$10,000	$15,000	
2. Integrate GIS with Emergency Dispatching System	$10,000	$25,000	
3. Create Other Secondary GIS Layers			
4. Upgrade Staff GIS Data Access and Web-based Application	$12,000	$15,000	Software costs
5. Acquire GPS Technology and Integrate with GIS	$2,500	$5,000	$12,000-$15,000
6. Create/acquire Supplemental GIS Databases			
7. Integrate GIS with Highway Asset Management System	$10,000	$15,000	
8. General GIS Consulting	$5,000	$15,000	
9. Acquire GIS Training			$10,000 - 20,000
Annual Salary for Coordinator and Technician			$90,000 - $ 115,000
TOTAL FY 2006 Costs	**$ 49,500**	**$90,000**	**$112,000 - $150,000**
FY2007 TASKS (Discretionary)			
1. Upgrade Web-based Public GIS Data Access System	$5,000	$15,000	Software costs
2. Develop and Implement Supplemental Custom GIS Applications	$5,000	$15,000	Staff time
3. Update Orthophotography in Developed Areas	$5,000	$15,000	Unknown
4. General GIS Consulting	$5,000	$15,000	
5. Acquire GIS Training			$20,000
Annual Salaries			$90,000 - $ 115,000
Discretionary Costs	**$ 20,000**	**$60,000**	**$110,000 - $135,000 plus unknowns**

I. Conclusion

In summary, this document has attempted to define an actionable plan for the implementation of an Enterprise GIS for Scott County. The design is based on a model identified by County staff and GeoAnalytics that leverages the strengths of both centralized and decentralized approaches.

As part of the overall process of modernization, the County will find that the time is ripe for the adoption of these technologies and processes. Indeed, it is inevitable that the County will adopt these technologies, but it will find that the exact staging and deployment will need to be phased according to changing needs and availability of resources at the County.

The execution of this plan will give the County a solid investment in technologies that will better utilize existing staff and processes. Each task in this plan will net better utilization of existing County resources and improve staff productivity and service to the constituencies. With the evolution of GIS over the next few years, the citizens of Scott County will find that their County government is more efficient and that they themselves are more informed about the place in which they live.