

A Cost/Benefit Investment Analysis of an Enterprise Geographic Information System for Scott County, Iowa

Prepared for

SCOTT COUNTY, IOWA

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COST BENEFIT ANALYSIS

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A. Overview

Scott County has created a conceptual design and a strategic plan for the development of an enterprise geographic information system that sweeps across County government. Engaging in the modernization process and the development of an enterprise GIS for the County will represent a significant investment. It is an investment in an information and technology infrastructure that is intended to enhance service delivery and productivity. To aid in the decision of whether to pursue modernization, the following is an analysis of the costs and benefits of this investment. As more fully developed below, it is important to note that there are some limitations to an investment analysis involving information technology. Notwithstanding, these kinds of analyses are useful indicators of the wisdom of making the investment.

1. Validity and Limitations of Cost-Benefit Analyses

Justifications of public investments are best made when accompanied by some level of analysis of the costs and benefits of the investment (“investment analysis”). To best capture the full dimension of the investment, an analysis should include the quantification of cost and benefits over some relevant time frame. In addition to providing a framework for planning, an investment analysis provides some assurance of the prudence of the expenditures. Unfortunately, these analyses are often imprecise because they do not account for the many subtleties and complexities that affect economic endeavors, particularly in a governmental situation. For example, many significant benefits¹ cannot be quantified neatly in economic terms. Other complexities include what kinds and how benefits are measured, at what time the benefits are realized, and whether to include the value of external benefits² or only those that relate to the governmental enterprise. Unfortunately, there is little in the way of solid empirical evidence of the benefits of implementation of information technology – particularly in the GIS industry. The costs of information technology implementation, on the other hand, are easier to measure, because there is a viable economic market providing goods and services for GIS development. These costs can, therefore, be anticipated and accounted for.

2. The Time-Value of Money

In addition to the vagaries identified above, there is a time dimension to the recognition of costs and benefits. Generally speaking, a dollar’s worth of cost incurred or benefit received today is more valuable than a dollar’s worth of cost incurred or benefit received five years from now. This is because there are alternatives for cash on hand today. These alternatives represent what economists characterize as “opportunity costs” (the opportunity cost

¹ Examples of difficult to measure benefits are the value of better information for decision making or the value of enhanced service to citizens.

² External beneficiaries may include citizens, engineering firms, surveyors, developers, attorneys, and financial institutions.

concept is more fully developed below). For example, a \$100 invested in an interest bearing account at a bank today will be worth about \$104.00 one year from now assuming an interest rate of 4%. Similarly, \$100 received in a year is worth \$96.14 today assuming the same 4% interest rate. The higher the interest, the more extreme the result is. For example, assuming a 10% interest rate, \$100 invested for one year will return \$110 versus a current value of \$90.94 for \$100 received in one year.

3. Planning Horizon / Payback Term

The type of investment proposed here 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. For the purposes of this analysis, a ten-year planning horizon or “payback term” is used as a reasonable time period on which to base the investment analysis. It is also reasonable taking into consideration the time it will take to bring the system on line.

B. Analysis

Within the constraints of conducting a cost/benefit investment analysis for information technology and with government as the investor, the following is an attempt to financially quantify and analyze the proposed investment in GIS/LIS technology and data.

1. Assumptions

The design of this analysis is intended to be conservative. That is to say that costs are estimated at the upper end of their possible ranges. Benefits, on the other hand, are measured narrowly and at the lower possible ranges. The purpose of this approach is not to overstate the possible outcome and to ensure that expectations about the results are reasonable.

To clarify and simplify this analysis, the following set of assumptions has been applied to this investigation.

a. Time Frames

- 1) Planning Horizon/Payback Period. Ten years.
- 2) Initial Investment Period. Three years (i.e., all base line investments will be made over three years, falling into four fiscal years).
- 3) Benefit Accrual. Benefits are modeled so that they do not begin until fiscal year 2007, more than three years into the project. It will be at this point that the bulk of the data and technology investments will come on line. In the interest of being conservative, it should be noted that some tools and data will be brought to bear by the end of the first full year of the project. Even though benefits will begin to accrue at that time, recognition of them is delayed until the full investments are brought to bear.

Benefits are measured on a quarterly basis, aggregated at the end of fiscal year quarter in which they fall. Benefits are calculated only on the basis of productivity gains. For the purposes of this analysis, a 1% increase in salary and benefits are calculated for each year.

b. Costs

Cost figures are based on estimates those developed as part of the *Strategic and Tactical Plan*. Where there is a range of costs provided, the higher estimate has been used. Wages and benefits for identified staff are included in the cost calculations to support Enterprise GIS operations – these costs extend out for the full ten-year term. As a result, this investment analysis includes both fixed (capital) costs as well as variable (operational) costs. As with benefits, costs are calculated on a quarterly basis and are aggregated at the end of each fiscal year quarter.

In addition, one cost item, described in the Plan, was added. This was an orthophotography update for the entire County, to be undertaken in fiscal year 2009. The cost of this product, \$180,000, assumes the digital terrain model (developed as part of the first orthophotography project) will be reused.

c. Benefits

To simplify and quantify benefits, the only benefits that are included in the analysis are productivity gain scenarios based on existing staff at the County, County Assessor's Office, and the City of Davenport Assessor's Office. Staff personnel included in the analysis, as identified by the County, are those that would be directly affected by GIS and the modernization process. Each County staff member was weighted by the presumed impact of GIS on their productivity. For example, staff in the Auditor's office, whose jobs deal heavily with land records (such as the plat drafts person), was weighted at 100%. Others, such as truck drivers who may not directly interact with the system but who will be subject to better dispatch particularly during snow removal, were weighted at 50%. Other positions were weighted as low as 25%. The average weighting was 59%. This analysis specifically does not consider benefits that may accrue to municipalities or other partners. For a complete listing of affected positions and impacts, please see: Table 5: County Staff Salary, Benefits and Percentage of Impact of GIS, page 12 below and Table 6: Assessors Office Salary and Benefits page 14 below.

Generally, productivity is the measure of value created (or what is accomplished) by a particular activity. Efficiency is a measure of value created within a given set of inputs or resources.

- 1) **Measure.** The baseline value assigned to productivity of applicable County staff. Productivity is derived from current salary and direct benefits (approximately 38% for County employees). Productivity is based on the assumption that what a staff person is paid reflects what they produce³. Using salary and direct benefit contributions as a measure of value provides a useful approximation mechanism for quantification of increases in productivity. By way of example, where existing salary and County retirement contributions are \$100, an increase of productivity of 10% will result in \$10 in benefit derived.

³ In most organizations the assumption is that the value of services exceed, at some level, salary, benefits, and overhead.

- 2) **Productivity**. Because it is difficult to quantify the benefits derived from information technology investments, some other measures may be applied. Empirical research suggests that the simple act of automation will result in a 10% gain in improved performance. When automation is coupled with process improvements, as is proposed by the Plan, expected productivity gains can be as much as 90%. There are documented cases of productivity increases in excess of 700%⁴. While the County has some level of automation, very little of that operational automation relates to GIS, integration, and modernization. As a result, Scott County stands to benefit significantly through the automation and modernization processes⁵. One type of productivity enhancement comes in the form of allowing staff to focus on their core functions, versus chasing information or maintaining paper records. In order to provide a fair understanding of the potential range of benefits, this investment analysis uses fifteen productivity gain scenarios, ranging from 1% to 15%. Given the status of automation and modernization within Scott County, these are modest attainable rates of productivity gains.
- 3) **Other Forms of Benefits**. Perhaps what is most significant about this investment analysis is not what is included in potential benefits, but what has been left out. These non-recognized benefits include the following:
 - (a) **External Benefits**. Although potentially very significant, this analysis does not take into consideration the value of this automation and modernization process to the general public or the private sector. For example, speeding up and improving the plat process could result in savings to developers in the range of tens of thousands of dollars on a single project.

Notably, this analysis does not consider potential benefits for municipalities and other units of government within the County. This limitation is made notwithstanding the plan and expectation that these jurisdictions will, ultimately, participate in the development and maintenance of the system. Exclusion of these jurisdictions from the analysis makes it very conservative for two reasons. First, the proposed system has been designed and is intended to meet the needs of municipalities and others. As a result, the costs of the system would not be appreciably higher if those entities were involved. Second, the productivity benefits would extend to many more public employees. Both factors make the results of the analysis less positive than they would be otherwise. This is intentional so as not to over sell the net benefits of the system.

- (b) **Enhanced Public Safety and Homeland Security**. The availability of GIS data and technology can be employed for emergency government purposes. Across the country, local governments are using GIS to dispatch police, fire, and other first responders. Many governments are using the technology to inventory critical infrastructure and sensitive facilities. Law enforcement and other agencies use GIS technology and data to support tactical planning and crime reporting and monitoring. GIS technology is used to plan for and manage natural disasters. In the case of flooding, GIS

⁴ Hammer and Champ, *Reengineering the Corporation - A Manifesto for Business Revolution*, 1993.

⁵ Examples of productivity improvement may include the ability to: process development applications more quickly; manage and maintain infrastructure at higher levels without additional staff; and be able to more quickly identify problems and create solutions for operations.

has been used predict flood levels and timing. Given that significant parts of Scott County are prone and vulnerable to flooding, GIS offers tools that can help save life and property. The important point is that this technology can provide many benefits that are not easily quantified.

- (c) Internal Benefits. Having better, more complete, and timely information will facilitate the public decision making process. This analysis does not take into consideration either the reduction in time or in the quality of decisions that may be made by elected officials. Another significant, yet unaccounted for, benefit is the surge in staff effectiveness as systems mature and specific applications are developed.
- (d) Potential Revenue. Although not explicitly part of the current implementation plan, it is possible to capture revenue streams associated with enterprise GIS. First, GIS databases are exempt from Iowa's Open Records laws⁶. This means that the County could, if it so desired, charge above the cost of providing the service for public and commercial access to GIS data. In addition, the County may provide these data and applications on a value-added service basis and charge a fee for the service. For example, the County may provide web-based subscription access to attorneys, title companies, developers, and survey and engineering firms. The County could publish information either in map-book or web forms and charge for the service.
- (e) Economic Development. One of the most valuable applications of enterprise GIS is for economic development. The ability to quickly compile, analyze, and present information to prospective businesses and employers is invaluable. GIS is used to site businesses, public and educational institutions based on a set of selection criteria. Example criteria include: soil suitability, depth to bedrock, access to rail, truck, and mass, transportation, educational attainment rates, employment statistics, proximity to water and waste water, zoning, and available parcels for building or rehabilitation.
- (f) Asset Management. More than a matter of productivity, GIS helps organizations management their physical assets. These include physical assets such as building, road pavement, and technology. Increasingly, mobile asset management, tracking and dispatching vehicles, manpower, etc., has become a high impact use of GIS. Examples include snowplow command, dispatch of inspectors, and service delivery routing.
- (g) Enhanced Service. Although it does not show up as a matter of productivity, the use of enterprise GIS can contribute mightily in improving customer service. Examples include quicker, more convenient access to governmental information, better code inspection and enforcement, and quicker processing of plans, plats, and various permit requests.

⁶ Ch. 22 § 22.2 3. a. and § 22.3 of the Iowa Code provides:

§ 22.2 Right to examine public records—exceptions.

3. However, notwithstanding subsections 1 and 2, a government body is not required to permit access to or use of the following:

- a. A geographic computer data base by any person except upon terms and conditions acceptable to the governing body. The governing body shall establish reasonable rates and procedures for the retrieval of specified records, which are not confidential records, stored in the data base upon the request of any person.

These and many other potential benefits are not explicitly included in this investment analysis calculation. In part it is because their values are not easily quantified or provisional. As well, they are excluded because this analysis is intended to not overstate likely benefits. Finally, the multitude of potential benefits is kept out of the calculations to keep the analysis straightforward and reliable. Notwithstanding, these and other benefits are genuine and potentially significant. Scott County can realize on these benefits if it pursues its strategy of automation and modernization via an enterprise GIS program.

d. Discount Rate

In order to reduce future costs and benefits to the present time, a discount rate is applied. For the purposes of this kind of analysis, the discount rate is something like inverse interest, specifically the opportunity cost. In this case, the opportunity cost can be approximated by the return that the County could receive if they were to simply invest money⁷. One reasonable estimate of rate of return is 3.95%. The discount rate of 3.95% estimate was taken from the December 26, 2002 edition of *The Wall Street Journal* published rate for ten year U.S. Treasury Bonds. This discount rate represents the rate of return that governments may expect from their investments based on a low risk portfolio.

It should be noted that the lower the discount rate, the less the impact, both positively (benefits) and negatively (costs) on the value of money over time. Because we are enjoying historically low interest rates, the time value of money dimension has less overall impact than in previous times. To be certain, that does not invalidate the analysis, because low interest rates simply mean the opportunity cost is lower.

2. Calculations

This investment analysis takes annual benefits less annual costs related to GIS. In years one through three, there are significant outlays related to the initial investment. In the outer years, the principal costs are those related to data maintenance and the operations of enterprise GIS to provide systems, applications, and coordination. These costs are offset by increases in productivity over a ten-year time frame. These benefits flows are subjected to three types of analyses: discounted net present value and sum of benefits flows.

- 1) Net Present Value. Known as a “discounted net present value”⁸, this calculation takes the sum of future payments (negative values) and income/benefits (positive values) over a 10-year period and reduces them to present value using a discount rate of 3.95%. The results are summarized in Table 4 below.
- 2) Sum of Flow of Net Benefit. This calculation is simply a sum of all the payments and income/benefits over this period. The results are summarized in Table 3: Sum of Flow of Net Benefits by Year Based on Productivity Gains.

⁷ Because government holds funds in trust for the public, any investment it pursues most often is in very low risk financial instruments such as U.S. Government Bonds.

⁸ If n is the number of years in the list of values (benefits flows) and i is the discount rate, the formula for net present value is:

$$NPV = \sum_{i=1}^n \frac{value}{(1 + rate)^i}$$

- 3) Payback Period. This is the time at which the sum of the payments is equal to the sum of the income/benefits.

C. Results

The following is an overview of the cost benefit analysis. The reader is cautioned that the results of this analysis are only estimates based on a set of assumptions. Although specific dollar amounts have been calculated, actual results may vary. These results should be interpreted as strong indicators of the prudence of the proposed benefits.

The results of this analysis demonstrate the need for real productivity increases to rationalize this investment. At the same time, those productivity increases needed to justify the investment only fall in the lower ranges of what empirical research suggests may be expected.

Table 1: Total Capital Investment and Operating Costs by Year

FY 2003 ⁹	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008
\$10,000	\$618,000	\$932,800	\$583,654	\$182,214	\$125,880
FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	TOTAL
\$309,656	\$133,546	\$137,553	\$141,679	\$145,929	\$3,320,911

Table 1 illustrates the magnitude of the investment to be made in an enterprise GIS system. These expenditures include both capital costs¹⁰ and operating costs in the form of wages and benefits for staff dedicated to enterprise GIS management. These costs represent, as much as possible, a full and complete estimate of the potential expenditures. Where estimates have been made in the form of ranges, costs were based on the high end of the ranges.

At the same time, there are significant opportunities to recoup these costs in the form of enhanced productivity. Table 2 depicts the dollar value of benefits that may be realized at various levels of productivity increases.¹¹ Of note to this analysis is that no benefits are recognized until FY 2007, three and a half years into the implementation project after the system is essentially fully functional. Many productivity gains may be realized prior to that time based on incremental implementation. What Table 2 demonstrates is that only modest gains in productivity offer significant returns to the County.

Table 2: Dollar Value of Potential Benefits by Year by Percent of Productivity Gain

% Productivity Gain	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008
1%	\$0	\$0	\$0	\$0	\$284,794	\$287,641
3%	\$0	\$0	\$0	\$0	\$854,381	\$862,924
5%	\$0	\$0	\$0	\$0	\$1,423,968	\$1,438,207
10%	\$0	\$0	\$0	\$0	\$2,847,935	\$2,876,414
15%	\$0	\$0	\$0	\$0	\$4,271,903	\$4,314,622

⁹ Year 1 is a half of a year, i.e., Quarters 3 and 4 (January through June) of Fiscal Year 2003

¹⁰ Capital costs include data conversion, hardware, software, and related training.

¹¹ Appendix A provides tables that depict these potential benefits for productivity gains ranging from 1% to 15%

% Productivity Gain	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	Total Benefit
1%	\$290,518	\$293,423	\$296,357	\$299,321	\$305,607	\$2,057,660
3%	\$871,554	\$880,269	\$889,072	\$897,962	\$916,820	\$6,172,981
5%	\$1,452,589	\$1,467,115	\$1,481,786	\$1,496,604	\$1,528,033	\$10,288,302
10%	\$2,905,178	\$2,934,230	\$2,963,573	\$2,993,208	\$3,056,066	\$20,576,605
15%	\$4,357,768	\$4,401,345	\$4,445,359	\$4,489,812	\$4,584,099	\$30,864,907

Like any other capital investment, benefits flow (dollars of benefits realized less direct capital and operating expenses) will be negative in the early years. The largest share of the cost of this initiative comes in the form of data acquisition. The first ortho-imagery to be acquired will take roughly 18 months. Second, parcel mapping will be developed and based on the ortho-imagery. Because these activities are sequential, it will take approximately three and a half years from inception to completion. Many other facets of implementation will occur over that time as well.

Table 3 illustrates annual benefits flows based on investments and anticipated returns based on anticipated productivity gains. What this table demonstrates is that with a productivity increase between 1% and 2%, total benefits flows are positive.

Table 3: Sum of Flow of Net Benefits by Year Based on Productivity Gains¹²

% Productivity Gain	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008
1%	-\$10,000	-\$618,000	-\$932,800	-\$583,654	\$102,580	\$161,761
2%	-\$10,000	-\$618,000	-\$932,800	-\$583,654	\$387,373	\$449,403
3%	-\$10,000	-\$618,000	-\$932,800	-\$583,654	\$672,167	\$737,044
5%	-\$10,000	-\$618,000	-\$932,800	-\$583,654	\$1,241,754	\$1,312,327
10%	-\$10,000	-\$618,000	-\$932,800	-\$583,654	\$2,665,721	\$2,750,534
15%	-\$10,000	-\$618,000	-\$932,800	-\$583,654	\$4,089,689	\$4,188,742
% Productivity Gain	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	Sum of Benefits flows
1%	-\$19,139	\$159,877	\$158,805	\$157,642	\$159,677	-\$1,263,251
2%	\$271,379	\$453,300	\$455,162	\$456,963	\$465,284	\$794,410
3%	\$561,897	\$746,723	\$751,519	\$756,283	\$770,890	\$2,852,070
5%	\$1,142,933	\$1,333,569	\$1,344,234	\$1,354,925	\$1,382,103	\$6,967,391
10%	\$2,595,522	\$2,800,684	\$2,826,020	\$2,851,529	\$2,910,136	\$17,255,693
15%	\$4,048,111	\$4,267,799	\$4,307,806	\$4,348,133	\$4,438,169	\$27,543,996

¹² Benefits flow is calculated by subtracting direct operating and capital expenses, from benefits derived through potential increased productivity.

Table 4: Discounted Net Present Value of Costs and Benefits and Payback Period Based on Productivity Gains

Percent Productivity Gain	Net Present Value	Payback Period ¹³
1%	-\$1,321,386	Negative Payback
2%	\$235,859	9 Years
3%	\$1,793,103	6.75 years
4%	\$3,350,347	5.75 Years
5%	\$4,907,591	5.25 Years
6%	\$6,464,836	5 Years
7%	\$8,022,080	4.75 Years
8%	\$9,579,324	4.75 Years
9%	\$11,136,568	4.5 Years
10%	\$12,693,813	4.25 Years ¹⁴
11%	\$14,251,057	4.25 Years
12%	\$15,808,301	4.25 Years
13%	\$17,365,545	4.25 Years
14%	\$18,922,790	4.25 Years
15%	\$20,480,034	4.25 Years

The bottom “line” from looking at these results, with their assumptions and limitations, is that this investment in a enterprise GIS will realize a positive return. Using a modest 5% productivity gain¹⁵, the investment will yield a net present value of \$4,907,591. For this investment to make sense, only an approximately 2% productivity increase must be realized. Keeping in mind that this investment analysis focuses only on productivity and not the many other possible benefits, the economic choice is straightforward.

Based on a the sum of benefits flows, it will take roughly 5 years for this investment to pay itself back based on a productivity increase of 5%¹⁶. At a 5% productivity gain, the payback period is roughly 5.25 years. This includes fully 3.75 years with no explicit benefits being realized because no productivity gains are recognized until fifteen quarters into the project.

The underlying approach to this analysis is to minimize potential benefits and maximize costs. While some may debate the level of potential productivity gains, it is clear that the modernization process will result in palpable benefits. Just the automation, process redesign, and system implementation in spatial and non-spatial data maintenance for parcels alone justify the investment.

As with any investment, there is an element of risk. The principal risk is that the productivity gains may not be realized. This risk is minimized somewhat by the fact that not all benefits were quantified for this analysis. Another risk is that once the initial investments have been made that all dimensions of the modernization process will not be pursued. A level of commitment and follow through by the County will negate this risk factor.

¹³ The payback period begins as of the third quarter of Fiscal Year 2003, i.e., January 2003.

¹⁴ Given the time to bring the system online, the shortest possible payback period for this system development initiative is 4.25 years

¹⁵ Hammer and Champ, *Reengineering the Corporation - A Manifesto for Business Revolution*, 1993.

¹⁶ At 2% productivity gain, the break even point, the payback period is roughly 6.5 years

D. Conclusion

An investment analysis is predictive and therefore imperfect. The purpose of this exercise has been to provide a level confidence in the decision making process. The precise numbers included in this analysis should not be taken literally. Rather they form the basis of an indicator of the prudence of this potential investment by Scott County. Taken in from that perspective, the results of this investment analysis strongly support the proposed investment.

Considering all the limitations of such an analysis, the expected productivity increases alone more than justifies the expenditure of public funds on an enterprise GIS program. Given that there are many more non-quantifiable benefits expected, such as improved decision-making, enhanced products and services, and more timely response, an enterprise GIS program for Scott County is sensible, prudent, and advised.

APPENDIX 1: COMPLETE TABLES

Table 5: County Staff Salary, Benefits and Percentage of Impact of GIS

Position Name	% Impact	# of post.	Annual Salary	FICA	IPERS	Med Ins.	Life Ins	Total/ Position	Total/Job Class
Network Sys Adm	20%	3.00	\$44,915	\$3,436	\$2,583	\$9,837	\$110	\$60,880	\$36,528
Help Desk Spec	20%	1.00	\$29,355	\$2,246	\$1,688	\$9,837	\$110	\$43,235	\$8,647
Prog/Analyst II	20%	2.00	\$47,683	\$3,648	\$2,742	\$9,837	\$110	\$64,019	\$25,608
Webmaster	20%	1.00	\$48,400	\$3,703	\$2,783	\$9,837	\$110	\$64,832	\$12,966
Sr. Prog/Analyst	20%	1.00	\$52,370	\$4,006	\$3,011	\$9,837	\$110	\$69,334	\$13,867
IT Director	50%	1.00	\$67,583	\$5,170	\$3,886	\$9,837	\$110	\$86,586	\$43,293
Clerk II - Auditor	100%	1.00	\$24,378	\$1,865	\$1,402	\$9,837	\$110	\$37,591	\$37,591
Sr. Elect Clerk - Aud	100%	1.00	\$27,539	\$2,107	\$1,583	\$9,837	\$110	\$41,176	\$41,176
Platroom Specialist	100%	3.00	\$26,686	\$2,041	\$1,534	\$9,837	\$110	\$40,209	\$120,626
Plat Draftsperson	100%	1.00	\$27,706	\$2,120	\$1,593	\$9,837	\$110	\$41,365	\$41,365
Election Supervisor	100%	1.00	\$33,696	\$2,578	\$1,938	\$9,837	\$110	\$48,158	\$48,158
Auditor/Deputy Elect.	100%	1.00	\$46,275	\$3,540	\$2,661	\$9,837	\$110	\$62,423	\$62,423
Auditor/Deputy Tax	100%	1.00	\$46,275	\$3,540	\$2,661	\$9,837	\$110	\$62,423	\$62,423
Case Aide Superv	50%	1.00	\$46,615	\$3,566	\$2,680	\$9,837	\$110	\$62,808	\$31,404
Resource Ass't Health	100%	2.00	\$26,087	\$1,996	\$1,500	\$9,837	\$110	\$39,529	\$79,059
Resource Ass't Health	100%	0.60	\$26,087	\$1,996	\$1,500	\$9,837	\$110	\$39,529	\$23,718
Resource Specialist	100%	2.00	\$27,579	\$2,110	\$1,586	\$9,837	\$110	\$41,221	\$82,443
Environ Hlth Spec	75%	7.00	\$41,292	\$3,159	\$2,374	\$9,837	\$110	\$56,772	\$298,052
Disease Prev Spec	75%	4.00	\$41,292	\$3,159	\$2,374	\$9,837	\$110	\$56,772	\$170,315
Environ Hlth Coordina	75%	1.00	\$45,693	\$3,496	\$2,627	\$9,837	\$110	\$61,763	\$46,322
Comm Health Coord	100%	1.00	\$45,693	\$3,496	\$2,627	\$9,837	\$110	\$61,763	\$61,763
Publ Hlth Serv Coord	100%	1.00	\$45,693	\$3,496	\$2,627	\$9,837	\$110	\$61,763	\$61,763
Prog Develop Coord	50%	1.00	\$46,615	\$3,566	\$2,680	\$9,837	\$110	\$62,808	\$31,404
Deputy Health Direct	50%	1.00	\$56,635	\$4,333	\$3,257	\$9,837	\$110	\$74,171	\$37,085
Office Leader	0%	1.00	\$30,559	\$2,338	\$1,757	\$9,837	\$110	\$44,601	\$0
Engineering Aide II	100%	3.00	\$37,380	\$2,860	\$2,149	\$9,837	\$110	\$52,336	\$157,007
Super Second Roads	100%	1.00	\$46,615	\$3,566	\$2,680	\$9,837	\$110	\$62,808	\$62,808
Asst. County Engineer	100%	1.00	\$61,110	\$4,675	\$3,514	\$9,837	\$110	\$79,245	\$79,245
County Engineer	100%	1.00	\$77,445	\$5,925	\$4,453	\$9,837	\$110	\$97,769	\$97,769
Truck Driver	50%	9.00	\$31,387	\$2,401	\$1,805	\$9,837	\$110	\$45,540	\$204,928
Truck Driver	50%	1.00	\$34,798	\$2,662	\$2,001	\$9,837	\$110	\$49,408	\$24,704
Shop Control Clerk	25%	1.00	\$27,477	\$2,102	\$1,580	\$9,837	\$110	\$41,106	\$10,276
Truck Crew Coord	50%	1.00	\$32,406	\$2,479	\$1,863	\$9,837	\$110	\$46,695	\$23,348
Heavy Eq. Oper III	50%	5.00	\$33,446	\$2,559	\$1,923	\$9,837	\$110	\$47,874	\$119,686
Heavy Eq. Oper III	50%	2.00	\$34,798	\$2,662	\$2,001	\$9,837	\$110	\$49,408	\$49,408
Sign Crew Leader	75%	1.00	\$35,984	\$2,753	\$2,069	\$9,837	\$110	\$50,753	\$38,064
Crew Leader - Hvy Eq.	50%	3.00	\$37,378	\$2,859	\$2,149	\$9,837	\$110	\$52,333	\$78,500
Operations Mgr	100%	1.00	\$51,305	\$3,925	\$2,950	\$9,837	\$110	\$68,127	\$68,127
Clerk II	100%	7.00	\$24,378	\$1,865	\$1,402	\$9,837	\$110	\$37,591	\$263,139
Real Estate Specialist	100%	1.00	\$27,539	\$2,107	\$1,583	\$9,837	\$110	\$41,176	\$41,176
Recorder	100%	1.00	\$61,700	\$4,720	\$3,548	\$9,837	\$110	\$79,915	\$79,915
Second Deputy	100%	1.00	\$46,275	\$3,540	\$2,661	\$9,837	\$110	\$62,423	\$62,423
Telecommunicator	100%	8.00	\$32,268	\$2,469	\$1,855	\$9,837	\$110	\$46,539	\$372,309
Office Supervisor	50%	1.00	\$32,268	\$2,469	\$1,855	\$9,837	\$110	\$46,539	\$23,269
Lead Telecommun	100%	3.00	\$33,475	\$2,561	\$1,925	\$9,837	\$110	\$47,907	\$143,722

Table 5: County Staff Salary, Benefits and Percentage of Impact of GIS

Position Name	% Impact	# of post.	Annual Salary	FICA	IPERS	Med Ins.	Life Ins	Total/ Position	Total/Job Class
Chief Telecommun	100%	1.00	\$37,380	\$2,860	\$2,149	\$9,837	\$110	\$52,336	\$52,336
Support Programs Lt.	25%	1.00	\$44,490	\$3,403	\$2,558	\$9,837	\$110	\$60,398	\$15,100
Corrections Captain	25%	1.00	\$47,973	\$3,670	\$2,758	\$9,837	\$110	\$64,348	\$16,087
Support Prog Director	25%	1.00	\$45,693	\$3,496	\$2,627	\$9,837	\$110	\$61,763	\$15,441
Lieutenant Patrol	100%	4.00	\$49,035	\$3,751	\$2,820	\$9,837	\$110	\$65,552	\$262,210
Captain Patrol/Invest	100%	2.00	\$52,938	\$4,050	\$3,044	\$9,837	\$110	\$69,978	\$139,957
Clerk II	0%	0.50	\$24,378	\$1,865	\$1,402	\$9,837	\$110	\$37,591	\$0
Clerk II	0%	1.00	\$24,378	\$1,865	\$1,402	\$9,837	\$110	\$37,591	\$0
Clerk III	0%	2.00	\$25,771	\$1,971	\$1,482	\$9,837	\$110	\$39,171	\$0
Sr. Acct Clerk	0%	1.00	\$27,539	\$2,107	\$1,583	\$9,837	\$110	\$41,176	\$0
Deputy	50%	30.00	\$41,808	\$3,198	\$2,404	\$9,837	\$110	\$57,357	\$860,355
Sergeant	50%	6.00	\$50,170	\$3,838	\$2,885	\$9,837	\$110	\$66,839	\$200,518
Tax Acct Specialist	100%	1.00	\$39,653	\$3,033	\$2,280	\$9,837	\$110	\$54,913	\$54,913
Operations Mgr	40%	1.00	\$55,573	\$4,251	\$3,195	\$9,837	\$110	\$72,966	\$29,187
Financial Mgt Supv	50%	1.00	\$59,483	\$4,550	\$3,420	\$9,837	\$110	\$77,400	\$38,700
Clerk - Multi Service	30%	17.00	\$25,085	\$1,919	\$1,442	\$9,837	\$110	\$38,393	\$195,805
Clerk - Multi Service	30%	0.60	\$25,085	\$1,919	\$1,442	\$9,837	\$110	\$38,393	\$6,911
Clerk III	30%	1.00	\$25,771	\$1,971	\$1,482	\$9,837	\$110	\$39,171	\$11,751
Treasurer	30%	1.00	\$61,700	\$4,720	\$3,548	\$9,837	\$110	\$79,915	\$23,974
Clerk II	0%	1.00	\$26,087	\$1,996	\$1,500	\$9,837	\$110	\$39,529	\$0
Asst. Golf Superintend	40%	1.00	\$29,355	\$2,246	\$1,688	\$9,837	\$110	\$43,235	\$17,294
Asst. Ranger	25%	1.00	\$31,700	\$2,425	\$1,823	\$9,837	\$110	\$45,895	\$11,474
Conservation Asst.	25%	1.00	\$31,700	\$2,425	\$1,823	\$9,837	\$110	\$45,895	\$11,474
Naturalist	75%	1.00	\$35,322	\$2,702	\$2,031	\$9,837	\$110	\$50,002	\$37,501
Park Ranger	75%	2.00	\$37,879	\$2,898	\$2,178	\$9,837	\$110	\$52,901	\$79,352
Park Maint Supv.	25%	2.00	\$41,518	\$3,176	\$2,387	\$9,837	\$110	\$57,028	\$28,514
Naturalist Director	50%	1.00	\$43,209	\$3,305	\$2,485	\$9,837	\$110	\$58,946	\$29,473
Operations Mgr	50%	1.00	\$47,683	\$3,648	\$2,742	\$9,837	\$110	\$64,019	\$32,010
Golf Course Superint	25%	1.00	\$48,885	\$3,740	\$2,811	\$9,837	\$110	\$65,382	\$16,346
Director	25%	1.00	\$71,119	\$5,441	\$4,089	\$9,837	\$110	\$90,596	\$22,649
Paralegal	25%	2.00	\$36,106	\$2,762	\$2,076	\$9,837	\$110	\$50,891	\$25,445
Office Administrator	25%	1.00	\$52,370	\$4,006	\$3,011	\$9,837	\$110	\$69,334	\$17,334
Totals		181.7						\$4,280,127	\$5,729,929

Table 6: Assessors Office Salary and Benefits¹⁷

City of Davenport Assessors Office		Scott County Assessors Office	
Position	Salary	Position	Salary
1	\$69,871	Assessor	\$74,229
2	\$66,712	Chief Deputy	\$66,172
3	\$53,929	Deputy	\$53,476
4	\$48,262	Appraiser	\$47,309
5	\$44,819	Office Admin	\$35,847
6	\$42,657	Chief Clerk	\$35,072
7	\$41,106	Clerk	\$34,296
8	\$37,333		
9	\$36,787		
10	\$31,013		
11	\$30,863		
12	\$30,863		
13	\$28,113		
Health & Life Benefits	\$117,500	Health & Life Benefits	\$71,140
FICA	\$47,515	FICA	\$26,593
IPERS	\$34,234	IPERS	\$19,988
Totals	\$761,577		\$464,122

¹⁷ For the purposes of this analysis, it is assumed that all assessor staff that impact of GIS will affect 100% of their position and, therefore, productivity.

Table 7: Annual Cash Benefits Based on % Productivity Increase

% Productivity Gain	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	Total Benefits flows
1%	\$0	\$0	\$0	\$0	\$284,794	\$287,641	\$290,518	\$293,423	\$296,357	\$299,321	\$305,607	\$2,057,660
2%	\$0	\$0	\$0	\$0	\$569,587	\$575,283	\$581,036	\$586,846	\$592,715	\$598,642	\$611,213	\$4,115,321
3%	\$0	\$0	\$0	\$0	\$854,381	\$862,924	\$871,554	\$880,269	\$889,072	\$897,962	\$916,820	\$6,172,981
4%	\$0	\$0	\$0	\$0	\$1,139,174	\$1,150,566	\$1,162,071	\$1,173,692	\$1,185,429	\$1,197,283	\$1,222,426	\$8,230,642
5%	\$0	\$0	\$0	\$0	\$1,423,968	\$1,438,207	\$1,452,589	\$1,467,115	\$1,481,786	\$1,496,604	\$1,528,033	\$10,288,302
6%	\$0	\$0	\$0	\$0	\$1,708,761	\$1,725,849	\$1,743,107	\$1,760,538	\$1,778,144	\$1,795,925	\$1,833,639	\$12,345,963
7%	\$0	\$0	\$0	\$0	\$1,993,555	\$2,013,490	\$2,033,625	\$2,053,961	\$2,074,501	\$2,095,246	\$2,139,246	\$14,403,623
8%	\$0	\$0	\$0	\$0	\$2,278,348	\$2,301,131	\$2,324,143	\$2,347,384	\$2,370,858	\$2,394,567	\$2,444,853	\$16,461,284
9%	\$0	\$0	\$0	\$0	\$2,563,142	\$2,588,773	\$2,614,661	\$2,640,807	\$2,667,215	\$2,693,887	\$2,750,459	\$18,518,944
10%	\$0	\$0	\$0	\$2,847,935	\$2,876,414	\$2,905,178	\$2,934,230	\$2,963,573	\$2,993,208	\$3,056,066	\$20,576,605	\$20,576,605
11%	\$0	\$0	\$0	\$3,132,729	\$3,164,056	\$3,195,696	\$3,227,653	\$3,259,930	\$3,292,529	\$3,361,672	\$22,634,265	\$22,634,265
12%	\$0	\$0	\$0	\$3,417,522	\$3,451,697	\$3,486,214	\$3,521,076	\$3,556,287	\$3,591,850	\$3,667,279	\$24,691,926	\$24,691,926
13%	\$0	\$0	\$0	\$3,702,316	\$3,739,339	\$3,776,732	\$3,814,499	\$3,852,644	\$3,891,171	\$3,972,885	\$26,749,586	\$26,749,586
14%	\$0	\$0	\$0	\$3,987,109	\$4,026,980	\$4,067,250	\$4,107,922	\$4,149,002	\$4,190,492	\$4,278,492	\$28,807,247	\$28,807,247
15%	\$0	\$0	\$0	\$4,271,903	\$4,314,622	\$4,357,768	\$4,401,345	\$4,445,359	\$4,489,812	\$4,584,099	\$30,864,907	\$30,864,907

Table 8: Annual Benefits flows Based on % Productivity Increases

% Productivity Gain	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	Total Benefits flows
1%	-\$10,000	-\$618,000	-\$932,800	-\$583,654	\$102,580	\$161,761	-\$19,139	\$159,877	\$158,805	\$157,642	\$159,677	-\$1,263,251
2%	-\$10,000	-\$618,000	-\$932,800	-\$583,654	\$387,373	\$449,403	\$271,379	\$453,300	\$455,162	\$456,963	\$465,284	\$794,410
3%	-\$10,000	-\$618,000	-\$932,800	-\$583,654	\$672,167	\$737,044	\$561,897	\$746,723	\$751,519	\$756,283	\$770,890	\$2,852,070
4%	-\$10,000	-\$618,000	-\$932,800	-\$583,654	\$956,960	\$1,024,686	\$852,415	\$1,040,146	\$1,047,877	\$1,055,604	\$1,076,497	\$4,909,731
5%	-\$10,000	-\$618,000	-\$932,800	-\$583,654	\$1,241,754	\$1,312,327	\$1,142,933	\$1,333,569	\$1,344,234	\$1,354,925	\$1,382,103	\$6,967,391
6%	-\$10,000	-\$618,000	-\$932,800	-\$583,654	\$1,526,547	\$1,599,969	\$1,433,451	\$1,626,992	\$1,640,591	\$1,654,246	\$1,687,710	\$9,025,052
7%	-\$10,000	-\$618,000	-\$932,800	-\$583,654	\$1,811,341	\$1,887,610	\$1,723,969	\$1,920,415	\$1,936,948	\$1,953,567	\$1,993,317	\$11,082,712
8%	-\$10,000	-\$618,000	-\$932,800	-\$583,654	\$2,096,134	\$2,175,251	\$2,014,486	\$2,213,838	\$2,233,306	\$2,252,888	\$2,298,923	\$13,140,373
9%	-\$10,000	-\$618,000	-\$932,800	-\$583,654	\$2,380,928	\$2,462,893	\$2,305,004	\$2,507,261	\$2,529,663	\$2,552,208	\$2,604,530	\$15,198,033
10%	-\$10,000	-\$618,000	-\$932,800	-\$583,654	\$2,665,721	\$2,750,534	\$2,595,522	\$2,800,684	\$2,826,020	\$2,851,529	\$2,910,136	\$17,255,693
11%	-\$10,000	-\$618,000	-\$932,800	-\$583,654	\$2,950,515	\$3,038,176	\$2,886,040	\$3,094,107	\$3,122,377	\$3,150,850	\$3,215,743	\$19,313,354
12%	-\$10,000	-\$618,000	-\$932,800	-\$583,654	\$3,235,308	\$3,325,817	\$3,176,558	\$3,387,530	\$3,418,735	\$3,450,171	\$3,521,349	\$21,371,014
13%	-\$10,000	-\$618,000	-\$932,800	-\$583,654	\$3,520,102	\$3,613,459	\$3,467,076	\$3,680,953	\$3,715,092	\$3,749,492	\$3,826,956	\$23,428,675
14%	-\$10,000	-\$618,000	-\$932,800	-\$583,654	\$3,804,895	\$3,901,100	\$3,757,593	\$3,974,376	\$4,011,449	\$4,048,813	\$4,132,563	\$25,486,335
15%	-\$10,000	-\$618,000	-\$932,800	-\$583,654	\$4,089,689	\$4,188,742	\$4,048,111	\$4,267,799	\$4,307,806	\$4,348,133	\$4,438,169	\$27,543,996