

City of Boulder Information Technology Strategic Plan



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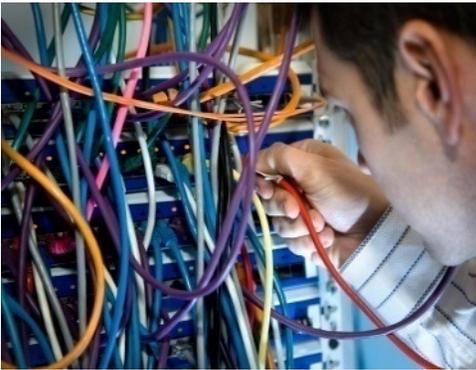


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Chapter 1: **Executive Summary**

This plan provides a “blueprint” for improving the City’s use of technology and employing IT to support future financial sustainability.

Introduction

The City of Boulder is known for its natural beauty, outdoor recreation, diverse businesses, and technological and academic resources. Boulder is home to the University of Colorado and is recognized as having one of the most well-educated and technology-focused citizenries in the nation. Due in part to its large population of knowledge workers, many of Boulder’s citizens routinely use technology and expect it as part of “doing business” with government.

Providing effective, efficient, high quality service represents a core value for the City. To help ensure that it appropriately directs its resources, Boulder has established four core strategic priorities to guide capital investments and ongoing city activities. They are:

- ◆ Service Excellence
- ◆ Leadership
- ◆ Transparency
- ◆ Community Sustainability:
 - Economic
 - Social
 - Environmental

Boulder provides both traditional municipal services (e.g., police, fire, and libraries) and enhanced services (e.g., human services, environmental affairs, open spaces and mountain parks). The City’s current revenue stream is characterized by heavy dependence upon sales tax and earmarking as a result of a population partial to ballot initiatives. The economic downturn has significantly reduced these revenues. In addition, more than one-third of City’s sales taxes are due to expire within the next nine years. Clearly, the City faces ongoing fiscal challenges.

Within this context, the City of Boulder engaged Pacific Technologies, Inc. (PTI) to facilitate the development of an information technology (IT) strategic plan and to perform an IT efficiency and effectiveness analysis, as recommended by the Blue Ribbon Commission 1 (BRC1) on Revenue Stabilization.

Beginning in January 2009, Boulder and PTI worked in close partnership to examine the City’s current IT environment, establish strategic direction for IT, and develop an implementation plan that effectively deploys IT solutions in support of the City’s budget priorities. This plan provides a “blueprint” for improving the City’s use of technology and employing IT to support future financial sustainability. A project steering committee comprised of senior city executives and information technology representatives provided leadership and critical guidance to the effort. Additionally, over 200 city stakeholders – including city executives, managers, IT professionals, and end users – contributed through interviews, focus groups, and other data collection efforts.

The following table summarizes the major findings, key recommendations, and resulting benefits detailed later in this plan.

City of Boulder IT Strategic Plan Summary

Summary Findings	Key Recommendations	Major Benefits
1. Boulder does not employ a consistent, citywide IT decision making process	Create a formal IT governance process – including roles, responsibilities, tools, timelines, and criteria – to support IT investment decisions	<ul style="list-style-type: none"> • Ensures IT investments align with City strategic priorities and fit within budget constraints • Offers a citywide view of IT spending and use • Provides an efficient, transparent, and informed method of making critical IT decisions
2. The City does not utilize capital funding for major IT investments	Create a capital improvement project (CIP) fund for IT investments	<ul style="list-style-type: none"> • Improves availability of funding for large IT projects • Encourages long-term solutions where appropriate • Eliminates the use of O&M dollars and labor for capital projects
3. The City's distributed approach to IT staffing is inefficient and not consistent with best practices	Consolidate commodity IT functions and reallocate IT labor effort to increase business application support	<ul style="list-style-type: none"> • Enables central IT to provide improved, cost-effective IT support to business users • Facilitates business unit productivity by improving the use of the City's applications
4. Several major software solutions are at the end of their useful lives	Invest in key applications areas – including maintenance management, financial/human resources management, and permit management	<ul style="list-style-type: none"> • Increases operational efficiency and effectiveness through the use of workflow and best practices capabilities inherent in modern software packages • Reduces dependence on institutional knowledge and custom applications

1

City of Boulder IT Strategic Plan Summary (continued)

Summary Findings	Key Recommendations	Major Benefits
5. Boulder's server environment is geographically dispersed and not utilized to capacity	Optimize servers and consolidate hardware into no more than two data centers	<ul style="list-style-type: none"> Minimizes data center operations and support costs Improves server performance

Note that this IT strategic plan represents a point-in-time analysis and may not reflect changes after August 2009. As circumstances evolve, IT priorities must adjust accordingly. *Consequently, this plan should be treated as a living document, reviewed annually, and revised as necessary.*

The remainder of this executive summary documents key assessment findings, establishes a strategic direction for IT at the City, and identifies an implementation plan – with attendant timelines and costs – for moving forward.

Key Findings

Increasingly, the City relies on information technology to support its budget priorities and facilitate communication with citizens, businesses, visitors, and city employees. No longer deployed simply to support back-office functions, IT represents a mission-critical enabler for efficiently and effectively supporting service to Boulder's constituents.

Areas of Strength

Planning engagements of this nature necessarily focus on weaknesses – but it is important to recognize the following IT strengths that the City can leverage and build upon:

- **City leadership recognizes the need for strategic IT investments.** Key decision makers throughout the City express a desire to leverage technology for meeting current and future service demands. The BRC1 emphasized the ability of information technology to increase the City's efficiency and effectiveness. Development of this IT strategic plan can help realize this goal, even in a difficult budget climate.
- **Boulder has benefitted from participation in regional infrastructure partnerships.** The City's robust fiber network is largely attributable to its past leadership in the Boulder Research and Administration Network (BRAN) initiative in the late 1990s, involving area federal agencies as well as the University of Colorado. Boulder recently executed an infrastructure agreement with the Boulder Valley School District (BVSD). The City will also utilize space in Boulder County's newly designed data center. These partnerships provide and enhance the extensive geographic reach and bandwidth needed to support City operations.

City leadership recognizes the need for strategic IT investments.

- **City operations benefit from the use of some market-leading software products.** Some of Boulder's major business areas are supported by new, upgraded, and/or modern applications, including library management (Millennium), police records management (Tiburon), fire records management (FireHouse), and parks and recreation registration and scheduling (CLASS).
- **Boulder's personal computers and servers are largely current.** The City's computer replacement fund (CRF) upgrades desktop PCs every five years and laptops every three years, ensuring that business users have up-to-date operating systems and sufficient processing power to run modern applications. In addition, central IT has consistently upgraded server hardware to support larger software packages and increased user access.

Opportunities for Improvement

Although the above strengths provide a firm foundation for the City's technology environment, PTI's assessment surfaced a variety of areas in which Boulder's technology position can further improve. This section highlights the most significant challenges. Chapter 2 describes these opportunities for improvement in more detail.

- **Boulder does not utilize a consistent, citywide IT decision-making process.** Although the City has adopted clear budget priorities and the BRC1 provided some planning guidelines, Boulder does not have a citywide vision for information technology. Additionally, Boulder lacks an IT governance body, structured processes, roles, responsibilities, and tools for making IT decisions. As a result, the City may not be realizing the greatest return on IT investments – in terms of both service improvements and operational efficiencies.
- **The City does not have a formal capital improvement project (CIP) process for major IT initiatives.** Contrary to best practices, Boulder relies heavily on voluntary department donations to fund IT projects. This encourages departmental budget increases intended to support one-time purchase of IT hardware and services, obscuring the true cost of annual IT operations and maintenance. It also limits funding opportunities for IT capital projects and can encourage investments that are penny-wise and pound foolish.
- **IT support resources are not well allocated.** Boulder dedicates too much labor to PC support, IT administration, and IT planning – and insufficient labor to application support. Often a result of decentralized IT environments, this labor distribution expends unnecessary resources on commodity IT functions and constrains support for core business applications. In addition, 11% of the City's IT effort comes from non IT-titled staff – an indicator of unmet needs.
- **Boulder lacks a formal IT service management methodology.** On a citywide basis, IT services are not guided by a standard set of procedures common to similarly-sized organizations. Accordingly, lacks structured service delivery processes, and customer support is often reactive rather than proactive.

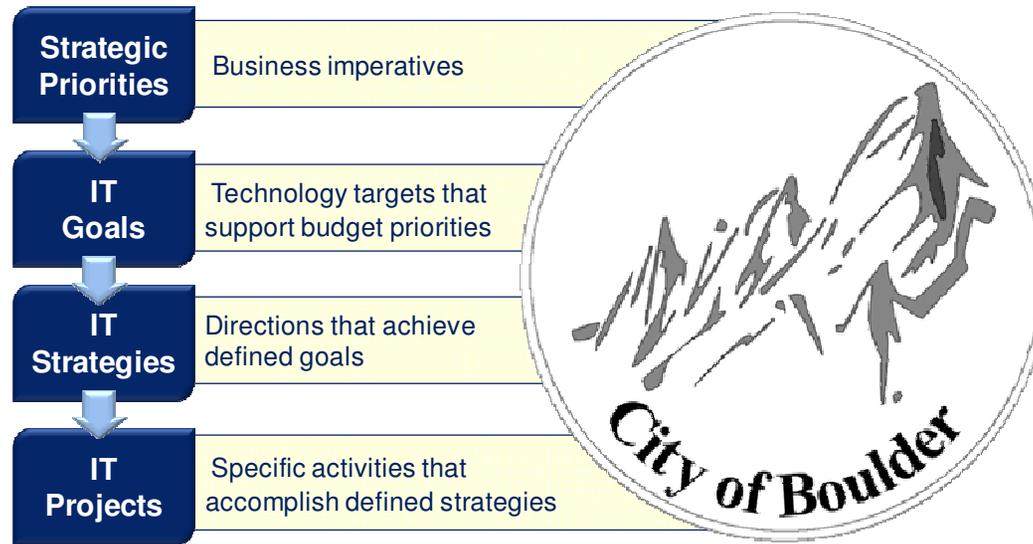
Boulder dedicates too much labor to PC support, IT administration, and IT planning – and insufficient labor to application support

- **The City relies heavily on custom application development and supplemental systems.** Boulder frequently uses custom programming to enhance and/or modify existing software packages. Business users also create individual spreadsheets and databases to support specific operations. This fosters a significant reliance on institutional knowledge. It also segregates data, leads to redundant data entry, complicates software upgrades and results in missed opportunities to incorporate best practices inherent in many commercial software applications.
- **Core finance and HR automation is beyond end-of-life.** BFS and Vista (the finance and human resources software packages, respectively) are heavily customized, more than 10 years old, and have uncertain product futures. As a result, the City risks the loss of vendor support for two critical systems and could potentially incur a major, unplanned replacement expense. Both of these applications will require significant investment over the course of this plan.
- **The City does not fully utilize available, well-designed data centers.** Boulder's server environment has a wide geographical footprint and some hardware is housed in less than ideal conditions (e.g., Muni data center)¹. This increases IT support labor requirements as well as the risk of system failure.

¹ This finding reflects a point-in-time assessment of Boulder's position when this project began in January 2009. Boulder has moved aggressively to consolidate its server and network infrastructure and anticipates completing this process by the end of 2009.

Strategic Direction

City leaders, senior management, and other city stakeholders came together in a series of focus groups and workshops to develop a clear citywide IT strategic direction – driven by Boulder’s strategic priorities. This roadmap includes specific IT goals, strategies, and implementation projects (as indicated by the graphic below). Chapters 3 and 4 describe each of these components in more detail.



The following pages outline five IT goals that support Boulder’s strategic technology direction.

Goal 1: Service Quality and Accessibility

Technology improves access to city information and services and the quality of our customers' experience.



IT has moved out of the back office and become a critical component of every public organization's ability to brand itself, do business with customers, provide public information, and facilitate internal communication. This goal positions Boulder to take better advantage of these opportunities.

Strategies

- ❖ Enhance eGovernment capabilities
- ❖ Improve the City's creation, access and retention of information

Implementation Projects

- 1.1 Develop eGovernment strategic plan
- 1.2 Redesign the City's website
- 1.3 Complete document management implementation

Benefits

- Provides "anywhere, anytime" online access to city services and information
- Enhances citizen's sense of community and connection
- Makes government more accessible and accountable
- Increases service efficiency
- Reduces environmental impact

Goal 2: IT Service and Decision Making Alignment

Technology services and decision making align with citywide priorities, customer needs and support sustainability



Effective IT governance and service delivery ensure that the City has the right technology, in the right place, and the right cost – in support of Boulder's business imperatives.

Strategies

- ❖ **Establish a citywide IT governance structure**
- ❖ **Define, monitor and communicate specific IT performance objectives**
- ❖ **Optimize IT service delivery across the City**
- ❖ **Improve IT funding approach**
- ❖ **Implement a formal IT service methodology**
- ❖ **Support business user training**
- ❖ **Develop comprehensive plans to support major implementations**
- ❖ **Adopt a portfolio approach to managing IT assets**

Implementation Projects

- 2.1 Implement formal citywide IT governance
- 2.2 Establish IT performance measures
- 2.3 Create IT CIP fund
- 2.4 Align IT charges with services
- 2.5 Conduct financial management/ERP needs assessment
- 2.6 Develop a document management implementation plan
- 2.7 Adopt IT portfolio management
- 2.8 Create a customer account representative position
- 2.9 Centralize infrastructure and customer services functions
- 2.10 Implement central IT service model enhancements

Benefits

- Ensures reliable and consistent IT decision making
- Enhances customer service
- Improves staff productivity
- Expands funding for IT capital projects
- Increases business units' confidence in IT support
- Aligns IT investments with City strategic priorities

Goal 3: Efficiency and Effectiveness

Technology maximizes the efficiency and effectiveness of city operations



Perhaps more than any other IT investment area, business software directly and visibly supports the City's ability to perform daily operations. This strategic IT goal implements software automation to streamline business processes and enhance city operations.

Strategies

- ❖ **Improve business automation**
- ❖ **Emphasize use of commercial software**
- ❖ **Reduce reliance on supplemental systems**

Implementation Projects

- 3.1 Implement an integrated finance/HR system
- 3.2 Implement citywide maintenance management automation
- 3.3 Implement permit management software

Benefits

- Improves worker productivity
- Streamlines business processes
- Informs decision making
- Enhances asset maintenance and infrastructure
- Reduces IT support requirements
- Expands software and data integration
- Simplifies application architecture

Goal 4: Innovation

Technology is used as a catalyst for innovation



Continuing advancements in technology provide Boulder with opportunities to provide better services at lower costs. Taking into account the City's structural budget deficit, this strategic goal emphasizes the benefits of intergovernmental IT partnerships and self-service software functionality, and leverages the power of emerging technologies.

Strategies

- ❖ Empower decision makers with meaningful management information
- ❖ Leverage shared IT services and regional cooperation
- ❖ Utilize automated workflow capabilities when available

Implementation Projects

- 4.1 Create a plan for establishing a county/city GIS services group
- 4.2 Pilot a business intelligence system²

Benefits

- Provides meaningful, real-time operational data
- Informs decision making
- Increases transparency and accountability
- Improves operational efficiency
- Lowers IT support costs
- Enhances service capabilities

² Business intelligence (also referred to as decision support) is a category of applications and technologies that collects, stores, analyzes, and reports on data – presenting a management-level view (e.g., dashboard) of the results. It is an approach to organizing complex data relationships and trends that results in new, actionable information to help decision makers make better, more informed, and more timely decisions.

Goal 5: Quality, Sustainable IT Infrastructure

Technology is a key element of citywide infrastructure and is current, secure and reliable – ensuring customer confidence.



The City's technology infrastructure provides a foundation for the software that automates and streamlines critical business functions. This strategic IT goal implements infrastructure improvements that increase efficiency, reduce costs, and enhance security.

Strategies

- ❖ Consolidate core infrastructure
- ❖ Enhance communications via digital convergence
- ❖ Ensure appropriate security for IT systems

Implementation Projects

- 5.1 Migrate and optimize servers
- 5.2 Complete replacing telephone system with VoIP
- 5.3 Conduct IT security audits/assessments

Benefits

- Enhances business operations and improves city worker productivity
- Protects the City's IT and information assets
- Reduces environmental impacts

To help manage its revenue-constrained environment, Boulder currently employs three distinct budget categories: *fiscally constrained*, *action*, and *vision*. PTI reviewed the associated budget prioritization criteria, including immediacy of need, relation to basic IT services, cost, funding availability, implementation resources, City staff interest, and peer success. We then classified each recommended IT project into an appropriate budget category, as indicated in the table below.

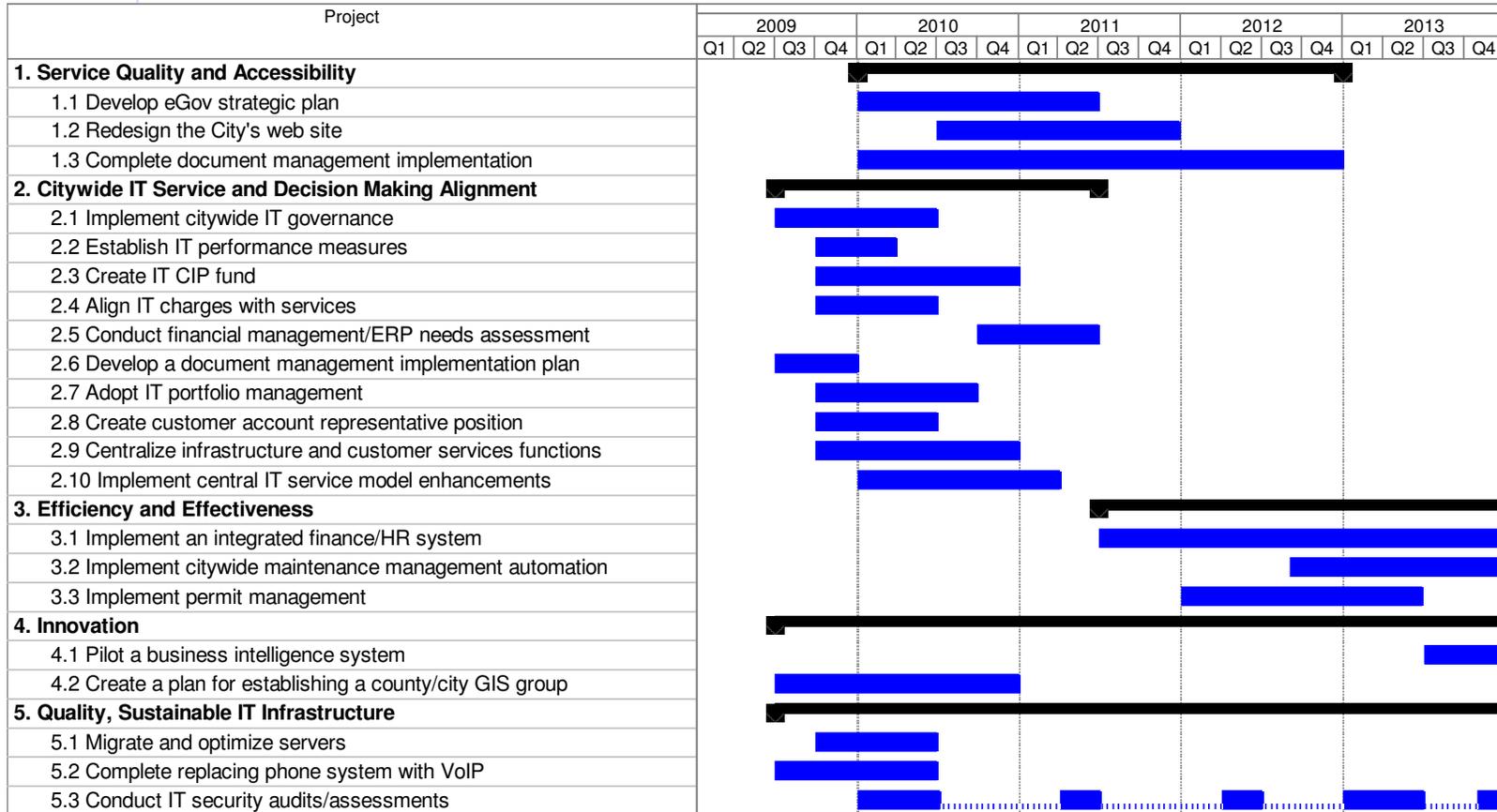
Project/Budget Alignment

	Fiscally Constrained			Action			Vision		
	Essential	Desirable	Discretionary	Essential	Desirable	Discretionary	Essential	Desirable	Discretionary
IT Projects									
1. Service Quality and Accessibility									
1.1		✓							
1.2				✓					
1.3				✓					
2. IT Service and Decision Making Alignment									
2.1	✓								
2.2	✓								
2.3	✓								
2.4	✓								
2.5					✓				
2.6		✓							
2.7						✓			
2.8					✓				
2.9	✓								
2.10				✓					
3. Efficiency and Effectiveness									
3.1				✓					
3.2				✓					
3.3				✓					
4. Innovation									
4.1					✓				
4.2		✓							
5. Quality, Sustainable IT Infrastructure									
5.1	✓								
5.2	✓								
5.3					✓				

Implementation Timeline

The Gantt chart below presents a projected timeline for the strategic implementation projects, developed in concert with Boulder's IT Director. The City will need to periodically review and adjust this implementation timeline – based on resource constraints, changing business needs and priorities.

Proposed Implementation Timeline



1

Implementation Project Costs

This section examines total expenditures by IT goal and presents one-time, recurring, and annualized project costs. The cost estimates provide Boulder with budget guidance for the plan's implementation projects. PTI developed these cost estimates based on industry knowledge, best practices, market research, and information provided by the City. Costs are in 2009 dollars and not adjusted for inflation.

One-time and Recurring Costs

The table on the following page presents one-time and recurring cost estimates for each strategic implementation project. The subsequent page highlights annualized costs. In some instances, significant differences exist between the low-end and high-end estimates. In general, low-end estimates tend to reflect reduced scope, lower-cost materials (e.g., software, hardware), and a greater reliance on internal labor. High-end estimates reflect a broader scope, higher-cost components and software, larger labor requirements, and generally include external consulting for all or some of a project's implementation. Costs do not include current city expenditures or already budgeted dollars, unless noted otherwise.

1

One-Time and Recurring Project Cost Estimates

Cost Summary		One-Time		Recurring	
Project ID		Low	High	Low	High
1. Service Quality and Accessibility					
1.1	Develop eGovernment strategic plan	\$ 74,000	\$ 118,000	\$ -	\$ -
1.2	Redesign the City's website	\$ 139,000	\$ 338,000	\$ -	\$ -
1.3	Complete document management implementation	\$ 395,000	\$ 793,000	\$ 10,000	\$ 26,000
	Subtotal	\$ 608,000	\$ 1,249,000	\$ 10,000	\$ 26,000
2. Citywide IT Service and Decision Making Alignment					
2.1	Implement citywide IT governance	\$ 11,000	\$ 46,000	\$ -	\$ -
2.2	Establish IT performance measures	\$ 13,000	\$ 28,000	\$ -	\$ -
2.3	Create IT CIP fund	\$ 17,000	\$ 50,000	\$ -	\$ -
2.4	Align IT charges with services	\$ 22,000	\$ 58,000	\$ -	\$ -
2.5	Conduct financial management/ERP needs assessment	\$ 25,000	\$ 84,000	\$ -	\$ -
2.6	Develop a document management implementation plan	\$ 24,000	\$ 63,000	\$ -	\$ -
2.7	Adopt IT portfolio management	\$ 162,000	\$ 686,000	\$ 10,000	\$ 44,000
2.8	Create customer account representative position	\$ 9,000	\$ 37,000	\$ 80,000	\$ 97,000
2.9	Centralize infrastructure and customer services functions	\$ 24,000	\$ 78,000	\$ -	\$ -
2.10	Implement central IT service model enhancements	\$ 83,000	\$ 172,000	\$ -	\$ -
	Subtotal	\$ 390,000	\$ 1,302,000	\$ 90,000	\$ 141,000
3. Efficiency and Effectiveness					
3.1	Implement an integrated finance/HR system*	\$ 2,278,000	\$ 3,680,000	\$ 96,000	\$ 176,000
3.2	Implement citywide maintenance management automation	\$ 698,000	\$ 1,798,000	\$ 35,000	\$ 92,000
3.3	Implement permit management	\$ 957,000	\$ 2,062,000	\$ 43,000	\$ 130,000
	Subtotal	\$ 3,933,000	\$ 7,540,000	\$ 174,000	\$ 398,000
4. Innovation					
4.1	Pilot a business intelligence system	\$ 95,000	\$ 242,000	\$ 3,000	\$ 19,000
4.2	Create a plan for establishing a county/city GIS group	\$ 65,000	\$ 151,000	\$ -	\$ -
	Subtotal	\$ 160,000	\$ 393,000	\$ 3,000	\$ 19,000
5. Quality, Sustainable IT Infrastructure					
5.1	Migrate and optimize servers**	\$ 325,000	\$ 489,000	\$ 38,000	\$ 56,000
5.2	Complete replacing telephone system with VoIP***	\$ 1,545,000	\$ 2,823,000	\$ 126,000	\$ 201,000
5.3	Conduct IT security audits/assessments	\$ 46,000	\$ 92,000	\$ 12,000	\$ 54,000
	Subtotal	\$ 1,916,000	\$ 3,404,000	\$ 176,000	\$ 311,000
	Total Cost	\$ 7,007,000	\$ 13,888,000	\$ 453,000	\$ 895,000

Note: Costs are rounded to nearest thousand dollars

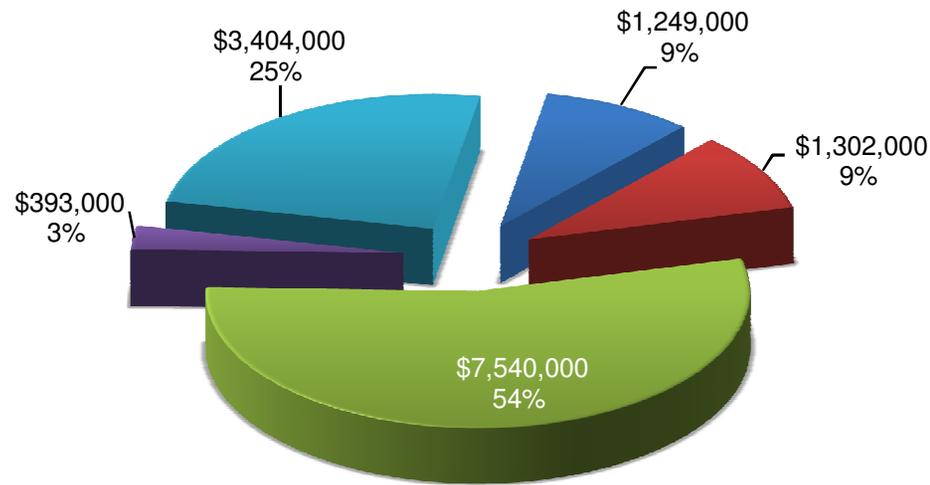
- * The City currently pays approximately \$120,000 in annual maintenance fees for BFS and Vista which could transition to the replacement system(s). Boulder has also budgeted approximately \$40,000 for replacing BFS and Vista servers in 2010
- ** The City has already budgeted for the hardware, software, and professional services related to this server optimization project
- *** The City has already budgeted for the hardware, software, professional services and ongoing labor effort associated with this telephony project

1

Expenditures by IT Goal

It can be helpful to look at total project expenditures by IT goal to ensure that planned implementation efforts align with overall strategic direction. The following chart – portraying high-end one-time cost estimates – makes clear that recommended projects align with the City’s IT goals. Note that the *efficiency and effectiveness* and *sustainable IT infrastructure* goals receive the lion’s share of the investment.

Recommended Expenditures by IT Goal



- 1. Service Quality and Accessibility
- 2. Citywide IT Service and Decision Making Alignment
- 3. Efficiency and Effectiveness
- 4. Innovation
- 5. Quality, Sustainable IT Infrastructure

Information technology has moved out of the back seat and now drives service quality, operational efficiency, and innovation in the public sector. It represents the only way to, practically speaking, “do more with less.”

Conclusion

Without doubt, these are difficult financial times for the City – and revenue pressures are unlikely to abate over the course of this plan. Across the City, departments face staff reductions and decreased goods and services budgets. Nevertheless, this document asks Boulder to maintain current IT staffing levels and increase other areas of IT investment. The reason for this is clear: information technology has moved out of the back seat and now drives service quality, operational efficiency, and innovation in the public sector. It represents the only way to, practically speaking, “do more with less.” Cutting IT budgets will impair City operations, ultimately costing Boulder more than could be saved – both tangibly (as more staff are needed to accomplish the same work) and intangibly (as City services degrade).

Of course, achieving the benefits of the plan will require more than financial investment. Effective implementation relies, in large part, upon the City’s ability to organize its IT labor more efficiently. Positive change will also depend upon a close partnership between central IT and business units, a clear understanding of citywide business needs and drivers, a commitment to rigorous IT decision making, and a willingness to redesign business processes to fully leverage available technology. Accordingly, this IT strategic plan can deliver significant benefits – aligned with the City’s strategic priorities:

Strategic Priority	This IT Strategic Plan:
Community Sustainability	<ul style="list-style-type: none"> ◆ Improves operational efficiency and effectiveness to support sustainable business practices ◆ Supports City operations in a budget constrained environment ◆ Emphasizes “green” investments
Service Excellence	<ul style="list-style-type: none"> ◆ Expands online services and functionality ◆ Upgrades critical enterprise and business area applications that will enhance service quality ◆ Leverages capabilities of existing software to improve service delivery
Leadership	<ul style="list-style-type: none"> ◆ Encourages participation in regional technology partnerships to capitalize on potential economies of scale and to improve information sharing ◆ Directs Boulder toward enhanced communications by leveraging digital convergence
Transparency	<ul style="list-style-type: none"> ◆ Improves public access to City records and information ◆ Invests in automated decision support to facilitate improved accountability to performance measures



Chapter 2: Assessment

A viable IT strategic planning effort must take into account the City's current business and political environments as well as its current technology environment. This chapter explores the environmental trends driving the demand for information technology and presents PTI's assessment of the major IT strengths and challenges at the City of Boulder. It serves as a basis for the City's strategic directions presented in Chapter 3.

Business Context

With input from the City's steering committee³ and close to 200 city stakeholders, PTI assessed the environmental trends driving the demand for information technology in Boulder. A sophisticated and participatory community, increasing service demands, and long-term revenue issues require that the City employ technologies that more effectively and efficiently deliver essential city services. The following expands upon each of these factors.

Long-term revenue issues

While the cost of service delivery increases, Boulder has seen a marked decline in sales tax revenue – a substantial component of the City's operating funds. Projections indicate that this is not a short-term problem – city costs will continue to grow at a rate that exceeds the revenue growth rate. As a result, Boulder must cut spending and pursue additional revenue sources capable of sustaining the operations city stakeholders expect. Boulder cannot rely on a high growth rate to offset costs because it is surrounded by protected areas. Development effort is largely constrained to redevelopment of existing properties rather than growth. Boulder's long-term revenue shortfalls – a structural deficit – demand change. Short-term solutions offer no more than temporary respite.

Sophisticated and participatory community

A significant portion of Boulder's population is highly educated, young and correspondingly proficient with technology. Boulder's stakeholders also involve themselves heavily in City affairs. They tend to have high expectations for City services although, like most taxpayers, they want those services provided without higher taxes. In addition, the City must accommodate politically active special interest groups who have shaped – and continue to shape – Boulder's forward-looking policies on issues such as open space, sustainable city operations, and equal housing opportunities.

³ The steering committee consisted of Larry Donner (Fire Chief), Bob Eichem (Finance Director), Paul Fetherston (Deputy City Manager and Project Sponsor), Eileen Gomez (Human Resources Director), Dave Hayes (Deputy Police Chief), Don Ingle (IT Director and Project Manager), Mike Patton (Open Spaces and Mountain Parks Director), Maureen Rait (Executive Director of Public Works), Tony Tallent (Library and Arts Director)

Boulder must cut spending and pursue additional revenue sources capable of sustaining the operations city stakeholders expect.

Increasing service demands

Given the technological proficiency of its citizens, the City faces increasing demands for online services, information and interaction. At the same time, Boulder cannot ignore the subset of its population that – largely due to economic circumstances – is unable to utilize technology for receiving services or information. Balancing the expanding needs of diverse constituencies against the imperative to minimize expenditures places a high reliance on the efficiency and communication capabilities offered by information technology. Boulder must also contend with increasing stakeholder demands for greater operational transparency and accountability – areas that IT can also help facilitate.

Boulder Strategic Priorities

In response to the drivers above – as well as other environmental trends – the City established four core business imperatives to guide capital investments and ongoing city activities. They are:

- ◆ Service Excellence
- ◆ Leadership
- ◆ Transparency
- ◆ Community Sustainability:
 - Economic
 - Social
 - Environmental

This plan aligns the key recommendations described in the subsequent chapter with the City's major strategic priorities outlined above. The remainder of this chapter provides the results of our assessment work.

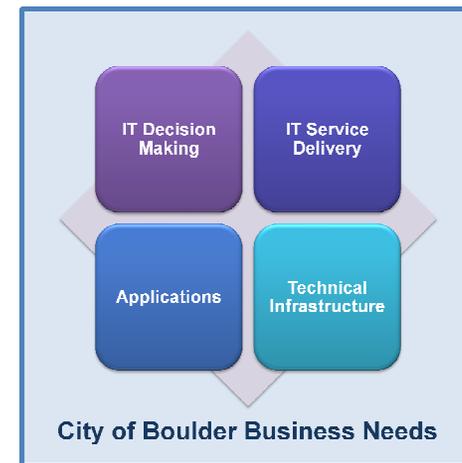
Assessment Summary

Pacific Technologies, Inc. (PTI) collected and analyzed data provided by the City pertaining to its IT spending, labor, applications, and infrastructure. PTI used this information to assess the City's technology position against industry standards, best practices, and PTI's database of local government technology metrics. PTI gathered additional information through one-on-one interviews and focus groups with Boulder's managers and staff – providing broad opportunities for participation.

PTI validated findings and recommendations through direct feedback and planning workshops with the project's IT steering committee.

PTI organized this analysis around four strategic IT focus areas and within Boulder's overall business context:

- **IT Decision Making** – processes, roles, and tools that support IT planning and investment decisions
- **IT Service Delivery** – organizational structure and staffing approaches that support applications and infrastructure
- **Applications** – software that supports the City's business functions
- **Technical Infrastructure** – hardware, systems software, databases, and network components that support the City's applications



PTI utilizes a proprietary tool to summarize an organization's baseline IT position. Applying quantitative rankings to nearly 100 key indicators; PTI plots the position of each IT focus area in one of the following four quadrants:

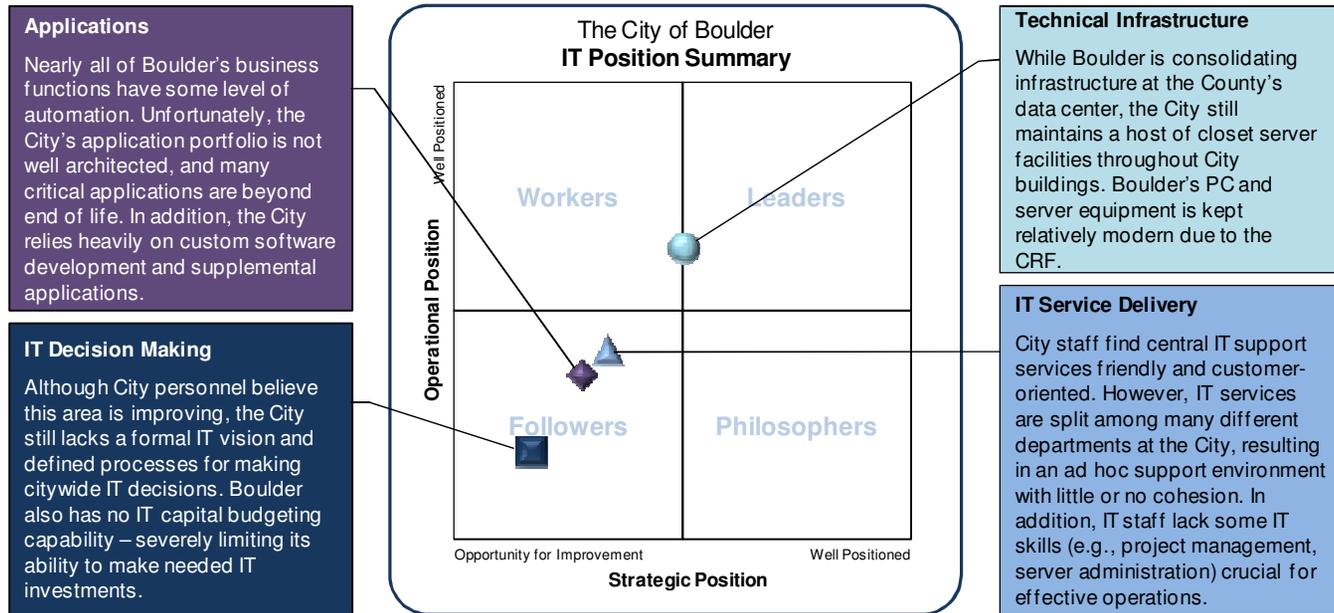
1. **Leaders:** Focus areas in this quadrant indicate a combination of effective operations, appropriate strategic investment and positioning. This quadrant represents the ideal position for each IT focus area.
2. **Followers:** A position in this quadrant indicates a focus area that largely functions in an ad hoc manner. Correspondingly, these areas need both strategic guidance and tactical attention.
3. **Workers:** Focus areas in this quadrant conduct current operations very efficiently, but lack a strategic outlook for the next three to five years. An effective planning effort can move these areas into the "Leaders" quadrant, often with relatively small investments.
4. **Philosophers:** Focus areas in this quadrant often have well laid out plans, but conduct current operations inefficiently. Generally speaking, these areas require attention to bridge the gap between current operations and their desired IT position.



The X and Y axes indicate "opportunity for improvement" at the bottom to "well positioned" at the top. The X axis (horizontal) charts the City's strategic position for all four IT focus areas; the Y axis (vertical) charts the City's operational position for the same four areas.

As most organizations tend to improve operational efficiency as they conduct better planning processes, their IT position typically progresses along a linear trend line that starts at the bottom-left and moves to the top-right.

The figure on the following page illustrates the City of Boulder's current IT position, evaluated within this framework. This assessment is based on information gleaned from interviews and focus groups with city staff, and data collected on the City's IT spending, staffing, and infrastructure.



Assessment Findings

This section expands upon PTI's findings surrounding the City of Boulder's current IT position. It includes a quantitative baseline for IT spending and staffing, as well as areas of strength and major opportunities for improvement in each of the four strategic IT focus areas.

Quantitative Baseline

This quantitative profile provides a foundation from which the City can measure its progress. It also informs the findings presented later in this chapter.

Boulder spends \$7.5⁴ million – approximately 4.45% of its total operation and maintenance (O&M) expenditure – on technology O&M, inclusive of fully-burdened staff salaries, hardware and software maintenance, and other recurring technology-related expenditures.

⁴ Based on unaudited 2008 actuals provided by the City.

City of Boulder IT O&M⁵ Spending (2008)

\$7.5m

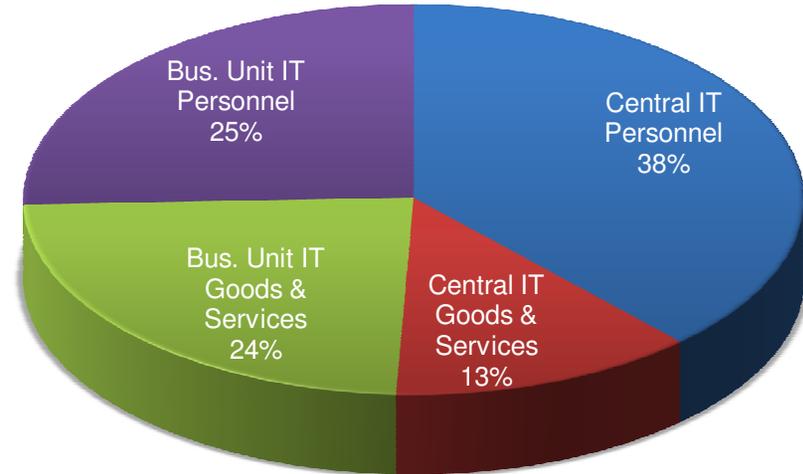
Citywide spending on IT operations and maintenance in 2008

\$81.83

Citywide IT O&M spending per citizen in 2008⁶

\$5,761

Citywide IT O&M spending per city FTE in 2008



	Expenditures	% of Total Operating Budget
Total City Operating Budget	\$168,635,847	
IT Operating Budget	\$7,502,886	4.45%
IT Goods & Services	\$2,727,085	1.62%
Central IT	\$946,048	
All other business units	\$1,781,037	
IT Personnel	\$4,775,801	2.83%
Central IT	\$2,859,779	
All other business units	\$1,916,022	

⁵ Operations and Maintenance (non capital)

⁶ Based on a 2006 population estimate of 91,685.

31.64

FTEs in central IT

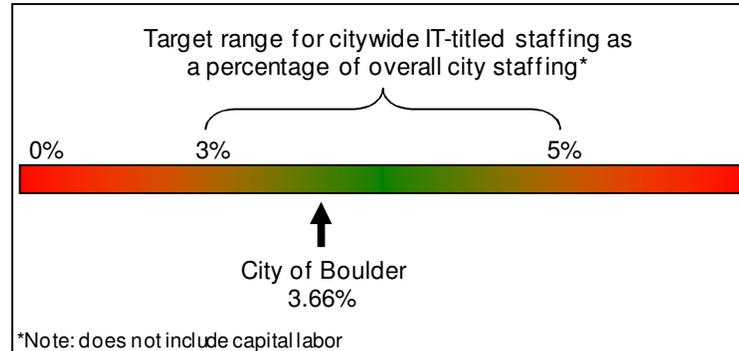
16.06

IT FTE in other city departments

\$247,498

Approximate spending on IT O&M contract labor in 2008 across all city departments

With a staff of 31.64 full-time equivalents (FTEs), central IT provides application services, infrastructure services, customer services, IT planning and IT administration (see definitions below) for over 1,000 city staff. Additionally, the Library, Open Space and Mountain Parks, Parks and Recreation, Police, Planning & Development Services, Public Works, HR and Finance departments have IT staff supporting these same disciplines.



At 47.70 total IT FTE (including departmental and vacant positions), Boulder is staffed in the lower-middle of PTI's target range

	Central IT FTEs	Other Department IT FTEs	Total IT FTEs
Application Services	8.10	5.53	13.63
Infrastructure Services	7.84	3.00	10.84
Customer Services	8.46	4.23	12.69
IT Planning	2.40	1.47	3.87
IT Administration	4.84	1.83	6.67
Total	31.64	16.06	47.70

IT Function	Definition
Application services	Labor related to developing, installing, configuring, and otherwise maintaining the software needed to meet the operational, management and reporting requirements of the City
Infrastructure services	Labor related to implementing and maintaining the organization's computers, systems software and connectivity (e.g., servers, networks)
Customer Services	Labor related to directly helping end users utilize IT systems and services (e.g., help desk, tier 2 support)
IT Planning	Labor related to technology planning and governance
IT Administration	Labor related to the oversight and administration of technology

The following sections expand on findings derived from the above data as well as from interviews and focus groups with city staff, application reviews, additional quantitative information, and a technology infrastructure walkthrough – organized around the four strategic IT focus areas:

- IT decision making
- IT service delivery
- Applications
- Technical infrastructure

IT Decision Making

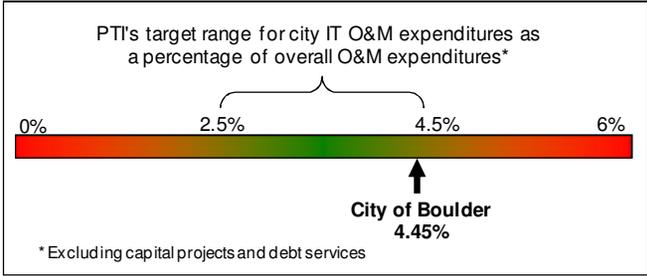
IT decision making encompasses an organization’s ability to make knowledgeable technology investment decisions aligned with its business needs. From a strategic perspective, IT decision making (including governance processes and tools) represents a critical area, as it determines how the City plans for, allocates, and manages its IT resources. Without appropriate leadership and direction, ad hoc decisions and sub-optimal investments may easily occur.

Strengths

The following table describes areas of strength and associated impacts of the City’s IT decision-making.

Finding	Impacts
<p>Management recognizes the need for strategic investments in IT</p> <p><i>Coping with the City’s difficult budget climate while ensuring stakeholders continue to receive high quality services requires carefully planned and executed investments. City management views technology as a conduit for operating more efficiently and effectively.</i></p>	<ul style="list-style-type: none"> • Aligns IT investments with citizen and budget priorities • Assures city staff that IT is a priority
<p>The City participates in IT regional partnerships</p> <p><i>Boulder is in the process of consolidating servers at Boulder County’s new data center. Both entities also share a common fiber communication backbone, and may seek shared communication technologies in the future. In addition, Boulder has initiated discussions with Boulder County and the City of Longmont regarding the establishment of a shared enterprise GIS services group.</i></p>	<ul style="list-style-type: none"> • Achieves economies of scale – reducing infrastructure and services costs for partners • Encourages a coordinated, regional approach to selected government services • Serves the land-based needs of all participating organizations • Provides a regional, land-based view of government boundaries, associated services, and other potential zones of interest

City management recognizes the need for strategic investments in IT, but Boulder lacks a formal IT decision-making process and must also utilize O&M funds to pay for capital technology investments.

Finding	Impacts
<p>Boulder spends approximately 4.45% of its total operation and maintenance (O&M) expenditure on technology O&M, in line with PTI's target range for local government⁷</p>  <p>PTI's target range for city IT O&M expenditures as a percentage of overall O&M expenditures*</p> <p>0% 2.5% 4.5% 6%</p> <p>City of Boulder 4.45%</p> <p>* Excluding capital projects and debt services</p> <p><i>Boulder's IT expenditures are within PTI's target range for municipalities, and occur at the upper end of that range. Cities at the high end (and above) of this range typically utilize more expensive, leading-edge technologies – or may be investing in redundant, unnecessary IT hardware and services.</i></p>	<ul style="list-style-type: none"> • At an overall level, Boulder adequately funds IT O&M activities
<p>Some perceive central IT leadership and collaboration has improved</p> <p><i>Changes in the IT Department's structure, services and leadership have been recognized by business unit staff.</i></p>	<ul style="list-style-type: none"> • Inspires confidence in IT Department direction and services
<p>Boulder has a PC replacement schedule and fund</p> <p><i>The computer replacement fund (CRF) helps ensure the City regularly replaces its desktops and laptops.</i></p>	<ul style="list-style-type: none"> • Ensures hardware stays current • Enables the City to accurately forecast and budget for the majority of IT hardware replacement costs • Avoids large, unplanned expenditures to replace obsolete technology

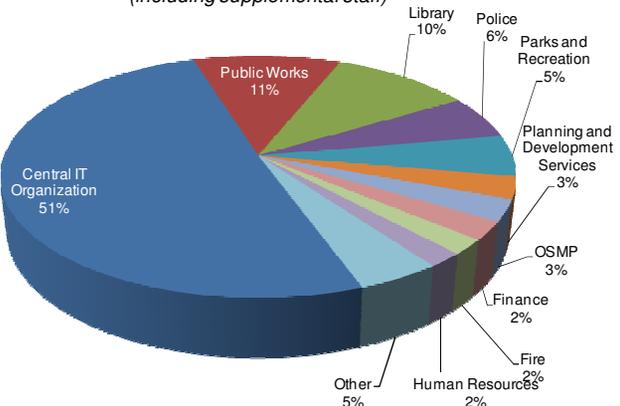
Boulder lacks a citywide approach to IT decision making. The City has no enterprise IT governance model. Current decision making processes rely on limited financial analyses and lack key decision criteria (e.g., build or buy).

Opportunities for Improvement

The following table identifies the City's IT decision-making challenges and associated impacts.

Finding	Impacts
<p>Boulder lacks a citywide approach to IT decision making <i>The City has no enterprise IT governance model. Current decision making processes rely on limited financial analyses and lack key decision criteria (e.g., build or buy). In addition, technology needs and solutions are not well communicated between the IT Department and business units.</i></p>	<ul style="list-style-type: none"> • Subjects IT investment decisions to varying criteria • Results in missed opportunities to achieve economies of scale or to leverage similar project efforts • Delays or stalls technology investments as staff resources are reallocated to shifting priorities
<p>The City has no formal IT vision <i>Although an assortment of IT visions have been proposed and utilized in various planning documents, the City has not yet formally adopted one.</i></p>	<ul style="list-style-type: none"> • Risks IT investments not aligning with the desired direction for IT • Increases the likelihood IT processes will remain unguided for the future
<p>The City does not have a formal capital improvement project (CIP) process for new IT initiatives <i>Boulder currently relies on the CRF and voluntary department donations to fund new IT projects.</i></p>	<ul style="list-style-type: none"> • Limits funding opportunities for capital projects • Encourages business units to inflate operating budgets to purchase capital IT hardware or services.

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Finding	Impacts																								
<p>IT O&M spending authority is widely distributed <i>IT Department spending accounts for only 51% (\$3,805,827) of total City IT expenditures (\$7,502,886).</i></p> <p style="text-align: center;">City O&M Spending by Department <i>(including supplemental staff)</i></p>  <table border="1" data-bbox="577 381 1197 787"> <caption>City O&M Spending by Department</caption> <thead> <tr> <th>Department</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Central IT Organization</td> <td>51%</td> </tr> <tr> <td>Public Works</td> <td>11%</td> </tr> <tr> <td>Library</td> <td>10%</td> </tr> <tr> <td>Police</td> <td>6%</td> </tr> <tr> <td>Parks and Recreation</td> <td>5%</td> </tr> <tr> <td>Other</td> <td>5%</td> </tr> <tr> <td>Planning and Development Services</td> <td>3%</td> </tr> <tr> <td>OSMP</td> <td>3%</td> </tr> <tr> <td>Finance</td> <td>2%</td> </tr> <tr> <td>Fire</td> <td>2%</td> </tr> <tr> <td>Human Resources</td> <td>2%</td> </tr> </tbody> </table>	Department	Percentage	Central IT Organization	51%	Public Works	11%	Library	10%	Police	6%	Parks and Recreation	5%	Other	5%	Planning and Development Services	3%	OSMP	3%	Finance	2%	Fire	2%	Human Resources	2%	<ul style="list-style-type: none"> • Increases citywide IT expenditures as departments fail to coordinate investments • Allows the purchasing of redundant goods and services • Increases the difficulty of managing the City's IT expenditures and environment
Department	Percentage																								
Central IT Organization	51%																								
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<p>Boulder's IT funding model deviates from best practices <i>The IT cost allocation model does not directly tie fees to goods and services received. Business unit staff frequently cited frustration with the perceived high cost and lack of information (e.g., what portion supports recurring costs versus one-time expenditures) surrounding the CRF.</i></p>	<ul style="list-style-type: none"> • Spurs departmental IT investments as business units attempt to avoid making "unnecessary" expenditures through the IT Department • Inhibits ability to evaluate sourcing alternatives (e.g., cloud computing) by making cost comparison with alternative service providers difficult 																								
<p>The City lacks IT performance and accountability measures <i>Boulder does not define, track, or communicate IT performance metrics.</i></p>	<ul style="list-style-type: none"> • Hinders the City's ability to identify and address service issues • Provides no clear way to demonstrate project outcomes • Contributes to a lack of confidence in centralized IT service delivery 																								

Finding	Impacts
<p>The City resists adopting business processes inherent to application functionality</p> <p><i>Rather than shift business processes to reflect software package capabilities, the City heavily customizes its software to mirror current practices.</i></p>	<ul style="list-style-type: none">• Foregoes best practices built into software• Requires additional application support resources• Complicates software upgrades• Increases reliance on institutional knowledge• Encourages proliferation of one-off custom solutions and workarounds

IT Service Delivery

IT service delivery refers to the organization, staffing levels, and allocation of technology support personnel. An assessment of this focus area provides insight into the alignment of IT services with overall business objectives and IT service demands.

PTI utilized its proprietary IT staffing matrix to gather information surrounding IT labor effort at the City of Boulder. The matrix asked each IT-titled employee to allocate the time he or she spends performing a variety of functions in five key IT disciplines: customer services, infrastructure services, application services, IT planning, and IT administration. This data, when combined with PTI's technical inventory, enables a comparison of city IT labor effort to industry best practices, PTI target ranges, and IT staffing in other government organizations.

Strengths

The following table describes the City's IT service delivery areas of strength and associated impacts.

Finding	Impacts
<p>City staff find individual central IT staff friendly and customer oriented</p> <p><i>In interviews and focus groups conducted by PTI, staff reported that central IT support staff are approachable, knowledgeable, and work hard to solve IT problems.</i></p>	<ul style="list-style-type: none"> • Builds strong individual IT service relationships • Increases willingness of staff to contact IT for support
<p>Business units perceive that their departmental IT support resources provide good support</p> <p><i>During PTI's interviews and focus groups, Boulder's business units largely praised the decentralized nature of IT staff and cited its positive effect on IT services.</i></p>	<ul style="list-style-type: none"> • Reinforces departments' desire to maintain their own IT staff
<p>Overall, the City is staffed in the lower middle of PTI's target range for local government IT staffing.</p> <p><i>Boulder's citywide IT staffing comprises 3.66% of overall city staffing, within PTI's target range of 3-5%</i></p>	<ul style="list-style-type: none"> • At an overall level, helps ensure Boulder's IT functions are adequately staffed

Overall, the City is staffed in the lower middle of PTI's target range for local government IT staffing.

The City relies heavily on custom application development – diverging from municipal automation best practices.

Opportunities for Improvement

The following identifies the City’s challenges regarding delivery of IT services.

Finding	Impacts
<p>The City relies heavily on custom application development <i>Boulder is diverging from municipal automation best practices.</i></p>	<ul style="list-style-type: none"> Increases dependence on specialized skill sets and knowledge Increases risk associated with application failure Complicates, delays and sometimes prohibits software upgrades
<p>45% of business unit IT staff perform commodity IT services⁸ <i>Approximately 7.23 FTE in the business units conduct IT customer support and infrastructure support functions. Best practices often centralize these services to achieve economies of scale, ensure consistency of configuration, and reduce costs.</i></p>	<ul style="list-style-type: none"> Duplicates effort and increases costs related to customer and infrastructure support Limits Boulders ability to discover and address potentially citywide IT issues Diverts labor from application services – the area of greatest value to the business units
<p>Central IT staff lack some industry skills and certifications <i>While business unit staff commend the customer orientation and friendliness of IT Department staff, they also cite a lack of skills in areas that would improve services. These areas include project management, Windows server administration, PC support and business analysis.</i></p>	<ul style="list-style-type: none"> Leads to customer perception that IT lacks the knowledge and skills to adequately support users Lowers confidence in central IT support Encourages business units to retain their own IT support personnel
<p>Employees with no IT-related job responsibilities (i.e., “non IT-titled” staff) comprise 11% of the City’s IT effort – primarily in PC support related functions <i>5.42 non-IT FTEs across 28 positions perform a variety of IT functions – with over half providing IT customer service functions including tier 1 support (help desk), tier 2 support (desk-side), and training.</i></p>	<ul style="list-style-type: none"> Increases Boulder’s reliance on non-specialized, institutional knowledge Potentially advocates inappropriate use of systems, data or technology

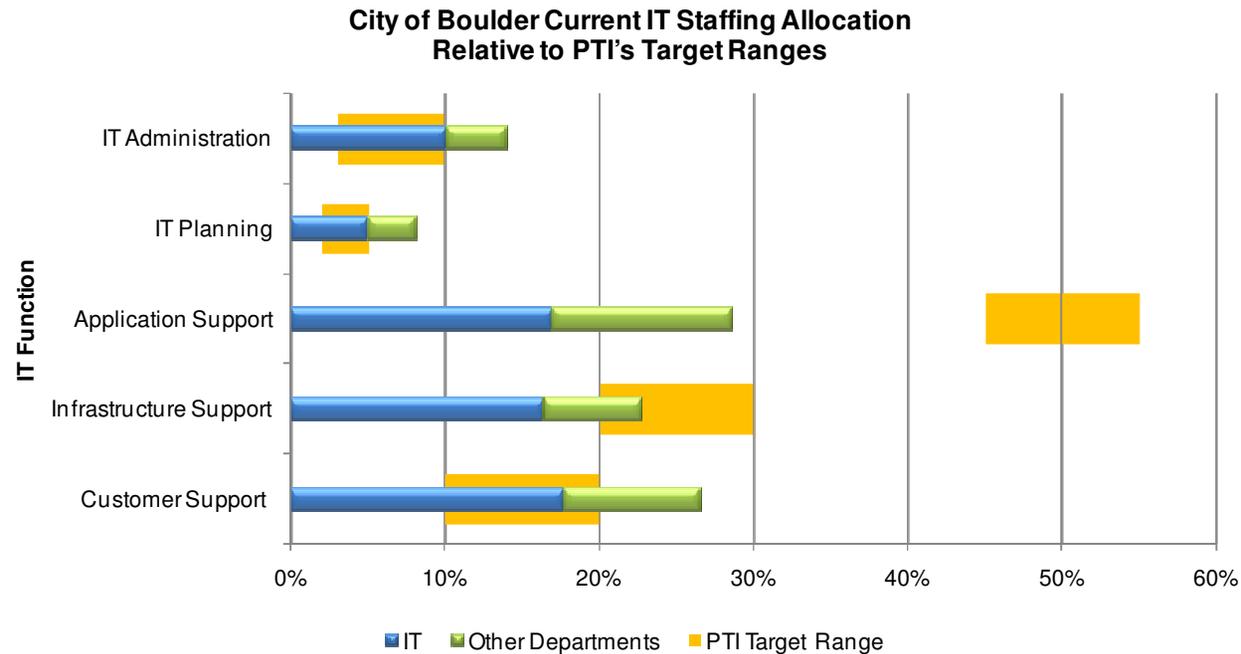
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⁸ Commodity IT services includes PC infrastructure support functions.

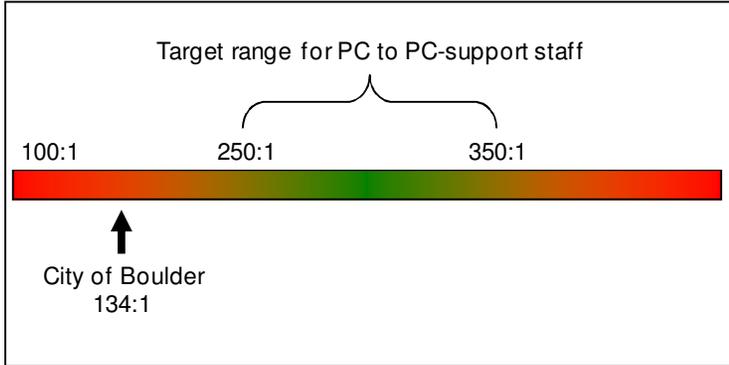
IT administration, IT planning and customer services functions are all over-allocated, while application support is vastly under-allocated. Suboptimal distributions such as this often occur in decentralized IT environments, where economies of scale in commodity IT services can be difficult to realize.

Finding	Impacts
<p>IT staff are not appropriately allocated across IT functions (relative to PTI's target ranges⁹)</p> <p><i>Accounting for IT labor across the City, Boulder falls into PTI's target allocation in only one area – infrastructure services. IT administration, IT planning and customer services functions are all over-allocated, while application support is vastly under-allocated. Suboptimal distributions such as this often occur in decentralized IT environments, where economies of scale in commodity IT services can be difficult to realize.</i></p>	<ul style="list-style-type: none"> • Erodes the City's ability to provide ongoing, long-term support for core business applications • Impairs ability of the business units to take full advantage of the capabilities inherent in the City's high-end applications • Expends unnecessary resources in IT administration, planning and customer support

The figure below depicts the overall distribution of Boulder's IT-titled labor effort across the five IT functions. The blue segments denote the proportion of the work performed by IT Department staff, while the green segments represent IT-titled staff in other departments. The yellow rectangles indicate PTI's target range for each IT function.



⁹ PTI's target benchmarks are based upon IT spending, staffing, and inventory data collected from industry best practices, surveys, and local government clients since 1993. These target benchmarks are updated annually.

Finding	Impacts
<p>The City lacks a formal ITSM¹⁰ methodology <i>The City's IT services do not adhere to best-practice service methodologies common in IT operations of Boulder's size.</i></p>	<ul style="list-style-type: none"> • May leave IT service expectations and policies unclear • Potentially encourages a reactionary IT service environment
<p>Users perceive that central IT is not proactive <i>PTI's focus group and interview participants expressed a desire for central IT staff to assess opportunities in Boulder's business units and communicate solutions without being solicited by departmental staff.</i></p>	<ul style="list-style-type: none"> • Promotes distrust in the IT Department's ability to evaluate business needs and develop solutions • Encourages business units to retain their own IT personnel
<p>PC support¹¹ is overstuffed</p>  <p><i>Boulder devotes 10.27 IT FTEs for supporting 1,378 PCs across approximately 50 City facilities. Boulder is not achieving maximum efficiency in this area due to its limited use of standardized desktop images, poorly utilized help-desk software, and lack of an online help repository.</i></p>	<ul style="list-style-type: none"> • Expends unnecessary resources on PC support activities

¹⁰ "Information Technology Service Management" – an IT management framework or discipline guided by business-based needs for technology. ITSM is a component of some proprietary IT service methodologies, including ITIL (Information Technology Infrastructure Library), MOF (Microsoft Operations Framework) and more.

¹¹ PC Support represents a combination of IT functions from PTI's staffing matrix, including all tier 1 and 2 support (within the customer services function) and personal computer administration (within the infrastructure services function)

Finding	Impacts
<p>Lack of intradepartmental communication hinders service delivery</p> <p><i>Users frequently cited difficulty resolving issues that required input from multiple IT support areas (e.g., application development, database administration) because one area was not sharing key information with the other.</i></p>	<ul style="list-style-type: none"> • Extends problem resolution time • Frustrates end users • Decreases confidence in IT support
<p>Contrary to best practices, no central unit has responsibility for maintaining enterprise GIS information</p> <p><i>GIS labor effort is divided among central IT, Planning and Development Services, Open Space and Mountain Parks, and Public Works. A more centrally managed enterprise GIS function, with common datasets, will help leverage the benefits of extensive GIS investments – for both operational and decision support related geospatial data. A central GIS unit also can support underserved departments that have critical GIS needs.</i></p>	<ul style="list-style-type: none"> • Limits the City’s ability to develop centralized GIS assets and analysis • Leads to data inconsistencies and inaccuracies • Decreases the likelihood of developing application and data integration opportunities with other city systems • Leaves several important GIS “customers” underserved (e.g. public safety)

Applications

Applications center on the software used to support core business functions. PTI conducted 10 desk-side reviews of the City's major applications, and gathered additional application information through interviews and focus groups.

Strengths

The following table describes the City's application strengths and associated impacts.

Finding	Impacts
<p>Nearly all business functions have some level of automation <i>Core city functions with automation in place include: finance (BFS), human resources (Vista), permitting (LandLink), recreation (CLASS), public safety (Tiburon and Firehouse), and infrastructure maintenance (Cartegraph).</i></p>	<ul style="list-style-type: none"> • Enhances services • Supports business operations • Streamlines business processes • Increases productivity
<p>Some applications are reasonably-well integrated <i>Through extensive customization by Boulder staff, BFS, Vista and LandLink are capable of sharing information.</i></p>	<ul style="list-style-type: none"> • Reduces the need for operating multiple systems to find information • Limits data re-entry • Increases data accuracy
<p>The City has implemented several market-leading software products <i>Leading automation includes Millennium (library management), Tiburon (police dispatch and records management), Firehouse (fire records management), and CLASS (parks and recreation).</i></p>	<ul style="list-style-type: none"> • Provides ample software capability to meet Boulder's business needs • Offers large user groups for increased software support and feedback
<p>The City's website offers some advanced functionality <i>Boulder's website broadcasts video of council events and stakeholders can look up their scheduled inspection date and time.</i></p>	<ul style="list-style-type: none"> • Improves transparency and accessibility of City government • Reduces customer traffic at City facilities • Potentially reaches a broader audience

Most functions are supported by some level of automation, though the City is very reliant on heavily customized and custom-developed software.

Core finance and human resources automation is beyond end-of-life.

Opportunities for Improvement

The following table describes the City's application portfolio challenges.

Finding	Impacts
<p>Boulder lacks a well-managed application portfolio</p> <p><i>Boulder's applications range from best-in-class solutions (e.g., Tiburon) to heavily customized software that is beyond end-of-life (e.g., BFS, Vista).</i></p>	<ul style="list-style-type: none"> • Inhibits the overall management and planned direction of the City's applications
<p>Core finance and HR automation is beyond end-of-life</p> <p><i>BFS and Vista, over 10 years old, are heavily customized to meet business needs. In addition, acquisition of these products by a vendor with other finance and HR applications in the market calls into question the long-term future of BFS and Vista.</i></p>	<ul style="list-style-type: none"> • Risks failure of two critical city systems • Risks the loss of vendor support for a critical city application • Threatens a significant, unplanned replacement expense
<p>Low-end applications support some key business functions</p> <p><i>Rather than procure a more robust application, Boulder automates its financial management (BFS), human resources (Vista) and infrastructure maintenance (Cartegraph) functions with heavily modified, low-end software.</i></p>	<ul style="list-style-type: none"> • Fosters operational inefficiencies • Best practice work processes embedded in modern packages are not available to Boulder staff
<p>Some city functions lack effective automation, including:</p> <ul style="list-style-type: none"> • Timekeeping (including currently missing functionality such as automated field worker time entry, automation of review and approval workflows, etc.) • Parking management • Decision support • Document management 	<ul style="list-style-type: none"> • Requires staff to rely on supplemental applications and paper-based processes • Exacerbates data integrity issues • Slows business processes • Provides poor and/or slow information for decision-making
<p>The City relies heavily on supplemental applications</p> <p><i>Staff utilizes a variety of spreadsheets and custom-developed databases to augment their business automation – indicating unmet needs.</i></p>	<ul style="list-style-type: none"> • Silos data and information in one-off solutions • Places a higher reliance on institutional knowledge • Requires redundant data entry • Increases data errors

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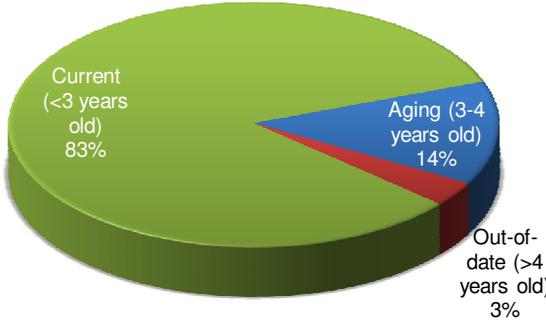
Finding	Impacts
<p>The City lacks an enterprise approach to asset/maintenance management</p> <p><i>Boulder currently utilizes two major systems for maintenance management. Public Works manages its facilities via UMMS – a custom developed system – and uses Cartegraph for transportation needs. Parks and Recreation is also beginning to utilize Cartegraph to maintain their facilities. Additional supplemental applications provide one-off data stores for other maintenance activities.</i></p>	<ul style="list-style-type: none"> • Impedes the adoption of standard maintenance processes across the City • Requires redundant data entry • Impairs data gathering and attendant decision making
<p>Future support for Boulder’s permitting automation (LandLink) is uncertain</p> <p><i>Accela – the company that purchased LandLink’s vendor (Tidemark) will cease support for the product within this plan’s time horizon. Although Accela is offering an upgrade path to their replacement product (Automation), the upgrade is quite expensive.</i></p>	<ul style="list-style-type: none"> • Jeopardizes Boulder’s permitting processes and associated revenue • Potentially subjects the City to the risks associated with operating unsupported software (e.g., system failure, system incompatibilities, software bugs)
<p>Multiple, independent Access databases for Housing and Human Services business functions exist</p> <p>More than any other department, HHS relies on custom databases and applications for conducting business.</p>	<ul style="list-style-type: none"> • Silos data and information, making it inaccessible for broader use • Increases reliance on institutional knowledge

Technical Infrastructure

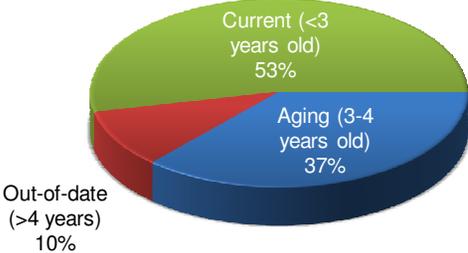
Technical infrastructure refers to the hardware, networks, databases, and operating systems that support the City’s applications. An organization’s technical infrastructure provides the critical foundation for connectivity and processing power.

Strengths

The following table describes technical infrastructure areas of strength and associated impacts.

Finding	Impacts
<p>Excluding public safety, the City houses many of its servers at the recently-constructed Boulder County data center <i>Boulder will keep the public safety data center as a backup site for the County’s data center.</i></p>	<ul style="list-style-type: none"> • Provides a robust, professionally designed and modern space for Boulder’s servers • Reduces infrastructure maintenance costs and labor effort for the City and County • Reduces server-related “carbon footprint”
<p>Boulder is pursuing VoIP¹² <i>Although still in the early stages of procurement, the City is committed to implementing VoIP – potentially in partnership with Boulder County.</i></p>	<ul style="list-style-type: none"> • Enables Boulder to pursue unified communications technologies
<p>The CRF keeps most PCs current</p> <p style="text-align: center;">PC Age</p>  <p><i>Though also tapped for many other expenditures, Boulder utilizes the CRF to upgrade City PCs approximately every 3-5 years.</i></p>	<ul style="list-style-type: none"> • Ensures staff have the processing power required to run modern client-side programs

¹² Voice communication over the Internet Protocol, utilizing data communications infrastructure (e.g., Ethernet, routers, switches) rather than phone lines.

Finding	Impacts								
<p>Nearly all of Boulder’s PCs are standardized on Windows XP</p> <p><i>With very few exceptions, all city PCs utilize Windows XP. Note that Microsoft ceased mainstream support for Windows XP in April 2009 but offers security patches (free) and extended support (by contract) until April 2014.</i></p>	<ul style="list-style-type: none"> • Simplifies PC image creation, management and deployment • Provides a common and familiar support environment • Eases patch deployment 								
<p>The City is beginning to utilize server virtualization¹³</p>	<ul style="list-style-type: none"> • Decreases physical servers and associated costs • Utilizes hardware more efficiently • Reduces server-related “carbon footprint” 								
<p>Boulder’s servers are largely current</p> <p style="text-align: center;">Physical Server Age</p>  <table border="1" style="margin-left: auto; margin-right: auto;"> <caption>Physical Server Age Data</caption> <thead> <tr> <th>Age Category</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Current (<3 years old)</td> <td>53%</td> </tr> <tr> <td>Aging (3-4 years old)</td> <td>37%</td> </tr> <tr> <td>Out-of-date (>4 years)</td> <td>10%</td> </tr> </tbody> </table>	Age Category	Percentage	Current (<3 years old)	53%	Aging (3-4 years old)	37%	Out-of-date (>4 years)	10%	<ul style="list-style-type: none"> • Ensures Boulder can operate the latest server software at appropriate speeds • Lessens the risk of hardware failure
Age Category	Percentage								
Current (<3 years old)	53%								
Aging (3-4 years old)	37%								
Out-of-date (>4 years)	10%								

¹³ The use of software to emulate multiple server environments on one physical server.

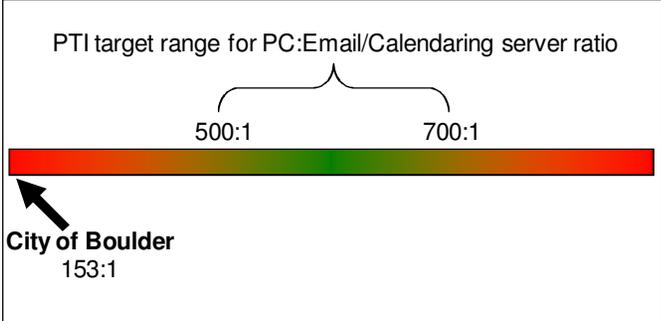
The City maintains a host of ad hoc, departmental data centers spread throughout Boulder's facilities.

Opportunities for Improvement

The following table describes challenges related to the City's technical infrastructure.

Finding	Impacts
<p>No coordinated citywide IT business resumption plan exists</p> <p><i>Some departments maintain informal disaster recovery plans, but IT is not formally involved in developing/testing department or citywide business resumption procedures.</i></p>	<ul style="list-style-type: none"> Increases risks surrounding operations during and/or after a disaster or emergency Potentially decreases Boulder's ability to provide needed services – especially during an emergency
<p>Despite prior IT funding requests, the City has not conduct regular infrastructure security audits/assessments</p> <p><i>Boulder has conducted a security assessment in the last five years, but does not formally conduct any IT audit or assessment on a recurring basis.</i></p>	<ul style="list-style-type: none"> Increases the chances of IT security risks going undetected – potentially leading to an attack on City technology assets
<p>Citrix (“Nexus”) is unreliable and slow for many of the City's applications</p> <p><i>The City's remote connection technology, nicknamed Nexus, creates a virtual PC desktop with access to applications and data stores according to user permissions. Users reported encountering frequent connection problems and difficulty getting application to launch properly.</i></p>	<ul style="list-style-type: none"> Decreases operational efficiency and mobile worker productivity Requires users to be physically present at Boulder facilities to perform most tasks Impairs telecommuting, counter to the City's sustainability priority
<p>The City currently maintains a host of ad hoc, departmental data centers</p> <p><i>Many departments utilize closet data centers for hosting their business-specific applications. These data centers are spread throughout the City's facilities.</i></p>	<ul style="list-style-type: none"> Distributes server hardware among facilities – increasing support labor requirements compared to centralized models Houses servers in locations with suboptimal security, power and environmental controls
<p>Boulder does not have a formal, standardized approach to database management</p> <p><i>The City reported utilizing Oracle, SQL, Access, and a number of proprietary databases. No clear criteria exist for making DBMS product determinations.</i></p>	<ul style="list-style-type: none"> Complicates the City's data storage environment Increases difficulty associated with integrating data stores

2

Finding	Impacts
<p>Boulder’s PC: email server ratio is well below PTI’s target range</p>  <p>The chart above depicts the ratio between the City’s PCs (1378) and email servers (9). Current email servers are capable of handling many more connections than Boulder is utilizing – indicating Boulder can reduce the number of servers and lower associated costs.</p>	<ul style="list-style-type: none"> • Increases email/calendaring administration effort • Raises costs associated with maintaining unnecessary hardware

* * * * *

After validating these findings in a series of workshops and follow-up interviews, the IT steering committee developed citywide IT goals that build upon Boulder’s existing strengths and address the opportunities for improvement identified in this chapter. Chapter 3 presents this new strategic IT direction.



Chapter 3: **Strategic Direction**

This chapter charts a strategic direction for information technology at the City. It outlines a core set of IT goals and attendant strategies to guide the deployment of technology – aligned with the City of Boulder’s strategic priorities.

IT Mission and Goals

The City recognizes that, properly used, IT represents a foundational element of city service delivery, driving the quality, efficiency, and effectiveness of city operations. During the course of this planning engagement, PTI and the project’s executive steering committee developed the following mission for citywide IT:

City of Boulder IT Mission

The effective and efficient delivery of city services to the Boulder community and organization is maximized through the seamless integration of people and technology.

In support of this mission, the steering committee also identified the following IT goals:

City of Boulder IT Goals

1	Service Quality and Accessibility	Technology improves access to city information and services and the quality of our customers’ experience.
2	IT Service and Decision Making Alignment	Technology services and decision making align with citywide priorities, customer needs and support sustainability.
3	Efficiency and Effectiveness	Technology maximizes the efficiency and effectiveness of city operations.
4	Innovation	Technology is used as a catalyst for innovation.
5	Quality, Sustainable IT Infrastructure	Technology is a key element of citywide infrastructure and is current, secure and reliable – ensuring customer confidence.

These goals support Boulder’s strategic priorities. In turn, one or more IT strategies support each IT goal. The remainder of this chapter details the five IT goals and associated IT strategies.

This plan outlines a core set of IT goals and attendant strategies to guide the deployment of technology – aligned with the City of Boulder’s strategic priorities.

Goal 1: Service Quality and Accessibility

Technology improves access to city information and services and the quality of our customers' experience.

IT has become a critical component of every public organization's ability to brand itself, do business with customers, provide public information, and facilitate internal communication. The following strategies support this goal and position Boulder to take better advantage of these opportunities.

Enhance self-service capabilities

The Internet and associated technologies have become a primary channel for delivering government services, disseminating and acquiring public information, and facilitating participation in government. This has led to higher expectations for web-based services (e.g., purchasing a license, applying for a building permit, investigating a utility bill, commenting on a development plan). Improved web site design and functionality will help meet the expectations of Boulder's educated and tech-savvy populace. Moving forward, the City should leverage the inherent web capabilities of new business software. This strategy will allow citizens to engage with city government from the comfort of their own home, while also enhancing the efficiency of City operations.

Improve the City's creation, access and retention of information

The digital age has expanded demand for information accessibility and transparency. By completing its citywide document management system implementation, Boulder can make public information available via the City's web site and integrate the new system with core business applications. This strategy will leverage modern automation capabilities to enhance Boulder's information management and public access. Additionally, it will reduce the City's reliance on paper, expand workflow automation, improve records management and increase stakeholder access to information.

The following implementation projects will help the City realize these strategies and achieve its service quality and accessibility goal.

Goal 1: Service Quality and Accessibility	Implementation Projects
	<ul style="list-style-type: none"> 1.1 Develop eGovernment strategic plan 1.2 Redesign the City's website 1.3 Complete document management implementation

Boulder should implement a structured, citywide approach to making major IT investment decisions.

Goal 2: IT Service and Decision Making Alignment

Technology services and decision making align with citywide priorities, meet customer needs, and support sustainability.

IT decision-making structures and processes are fundamental to effective IT services because they direct how Boulder plans for, allocates, and manages its IT resources. The City must also provide IT services that effectively and proactively respond to business unit needs, and stay current with technology. The following strategies address these objectives while also investing in ongoing staff development to ensure employees can effectively use technology to improve operational efficiency and effectiveness.

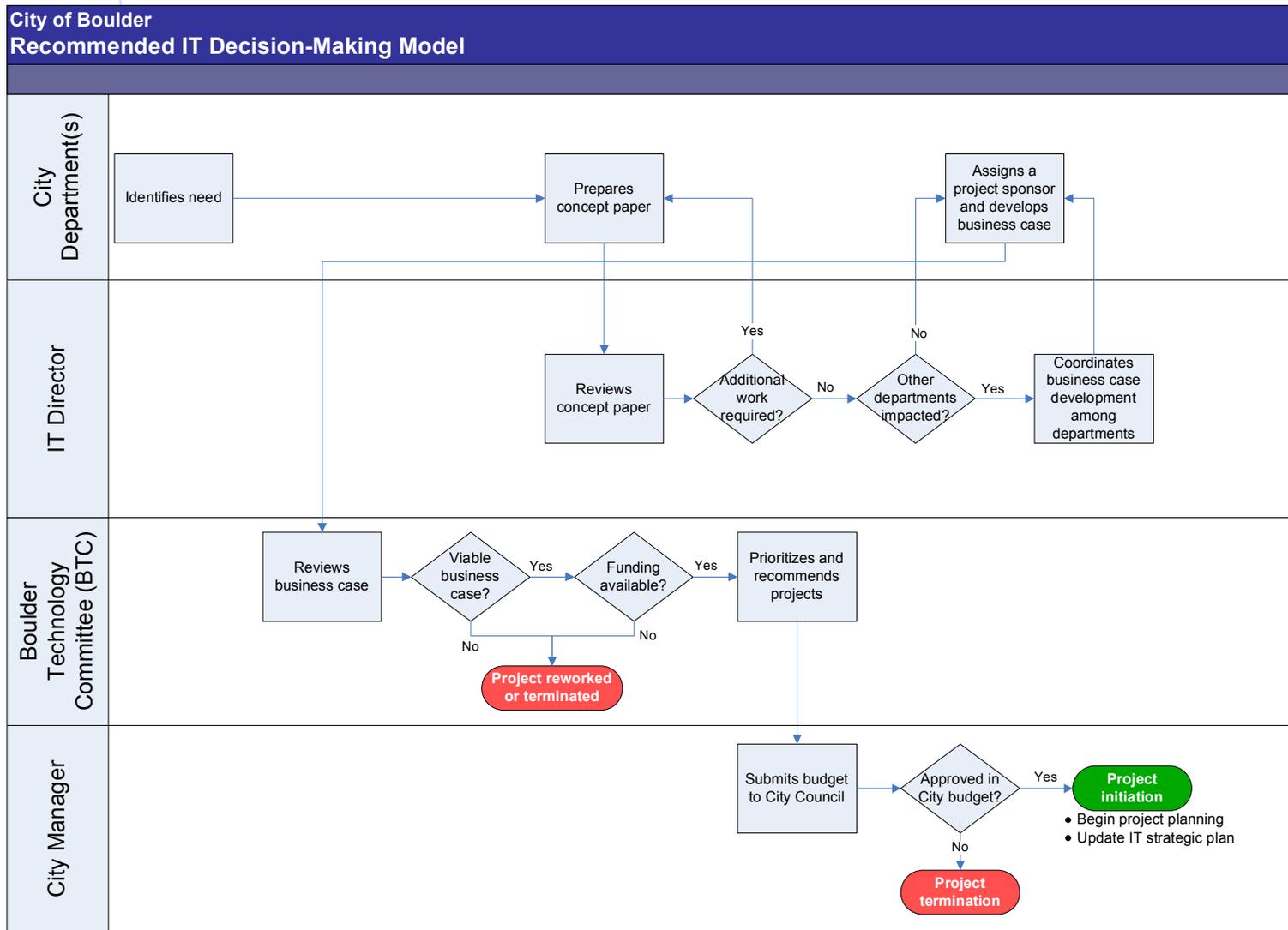
Establish a citywide IT governance structure

To maximize the efficiency and effectiveness of IT, Boulder should implement a structured, citywide approach (detailed on the following page) to making major IT investment decisions. This strategy represents a high-priority, foundational component of this IT strategic plan. A formal IT decision making approach will facilitate City leadership's ability to adopt an organization-wide view of technology, align IT investments with strategic priorities, manage overall IT spending and better leverage available economies of scale.

To be viable, this model must clearly define stakeholder roles and responsibilities, decision-making policies and processes, prioritization criteria, and methods for communicating outcomes. The City must also establish tools (e.g., concept paper, business case) to support the analysis and prioritization of potential IT investments and ensure that decisions are fully supported by an appropriate business impact assessment and financial analysis. This will ensure reliable and consistently informed IT planning and investment decisions and build trust and confidence among departments regarding IT investments. The following exhibit depicts a recommended IT decision-making model.



Recommended IT Decision-Making Model



3

The graphic below outlines recommended roles and responsibilities associated with the citywide IT governance model shown on the previous page.

IT Decision Making Roles and Responsibilities

City Manager

- ◆ Submits prioritized project list to Council
- ◆ Terminates unfunded IT projects
- ◆ Approves updates to the IT strategic plan in partnership with the IT director

IT Director

- ◆ Develops citywide IT policies, standards and exceptions
- ◆ Maintains the IT strategic plan
- ◆ Reviews business unit IT project proposals
- ◆ Assess resource impacts
- ◆ Coordinates joint business unit business case development

Boulder Technology Committee

- ◆ Comprised of executive-level staff
- ◆ Takes an enterprise view on improving business processes via technology
- ◆ Recommends funding sources
- ◆ Assesses multi-department impacts
- ◆ Serves as a clearinghouse for major information technology-related projects
- ◆ Prioritize major information technology projects
- ◆ Terminates projects with inadequate business cases
- ◆ Monitors post-project performance

City Department

- ◆ Identifies customer needs/wants
- ◆ Develops initial project proposal
- ◆ Develops business case
- ◆ Sponsors projects

3

The graphic below outlines components for two key tools required by this model – a concept paper and a business case.

Concept Paper

- ◆ **Less formal (e.g., one to three pages)**
- ◆ **Allows decision makers to explore ideas without placing too much of a burden on staff**
- ◆ **Includes:**
 - Brief statement of problem
 - Brief description of proposed solution or investment
 - High-level cost estimate
 - Identification of impacted stakeholders and business processes
 - Labor requirements
 - Benefits
 - Alignment with city and IT strategic plans

Business Case

- ◆ **More formal**
- ◆ **Requires thorough financial analysis**
- ◆ **Includes:**
 - Brief investment description
 - Business assessment:
 - ✓ Description of existing situation and problem
 - ✓ Description of proposed changes
 - ✓ Other alternatives considered
 - ✓ Description of proposed technology
 - ✓ Impacts on other business units
 - ✓ Measurements and major deliverables
 - ✓ Project organization
 - ✓ Disposal of old technology
 - Financial impacts:
 - ✓ One-time costs
 - ✓ Ongoing costs
 - ✓ Cost/benefit analysis, including return on investment
 - ✓ Intangible benefits
 - ✓ Risk assessment
 - ✓ Funding sources
 - Staffing impacts:
 - ✓ Implementation labor requirements
 - ✓ O&M labor requirements

3

Better enable the IT director

In concert with the IT governance model, Boulder's IT director needs to guide IT planning efforts, oversee IT budgeting, support cohesive citywide IT standards, promote and administer intergovernmental IT partnerships and provide leadership surrounding new technological opportunities. In summary, the city IT director needs to be the hub of IT activity, investments, and progress.

Define, monitor and communicate specific IT performance objectives

Boulder should implement a more formal approach to IT performance management. Central IT should collaborate with the business units to define specific IT performance targets and to develop a process for measuring and regularly reporting on IT service. These measures may include Tier 1 problem resolution rate (e.g., 75% of problems resolved via phone), number of problems per workstation, average time to resolution (e.g., 30 minutes), service unit cost for IT services, network uptime, number of unplanned outages, average length of unplanned outages, workstation impact minutes, number of security breaches, etc. Improved reporting will enable City leadership to identify and address service concerns, provide clear ways to measure project outcomes, and increase business user confidence in IT staff and tools. It will also build consensus around desired IT service levels and increase accountability. Boulder can use this objective analysis to identify and build on areas of strength – and address opportunities for improvement.

Optimize IT service delivery cross the City

A critical component of this IT plan, this strategy involves reorganizing delivery of IT services at the City to conform to best practices and help achieve economies of scale. Accordingly, it calls for the centralization of the following IT services within the IT Department:

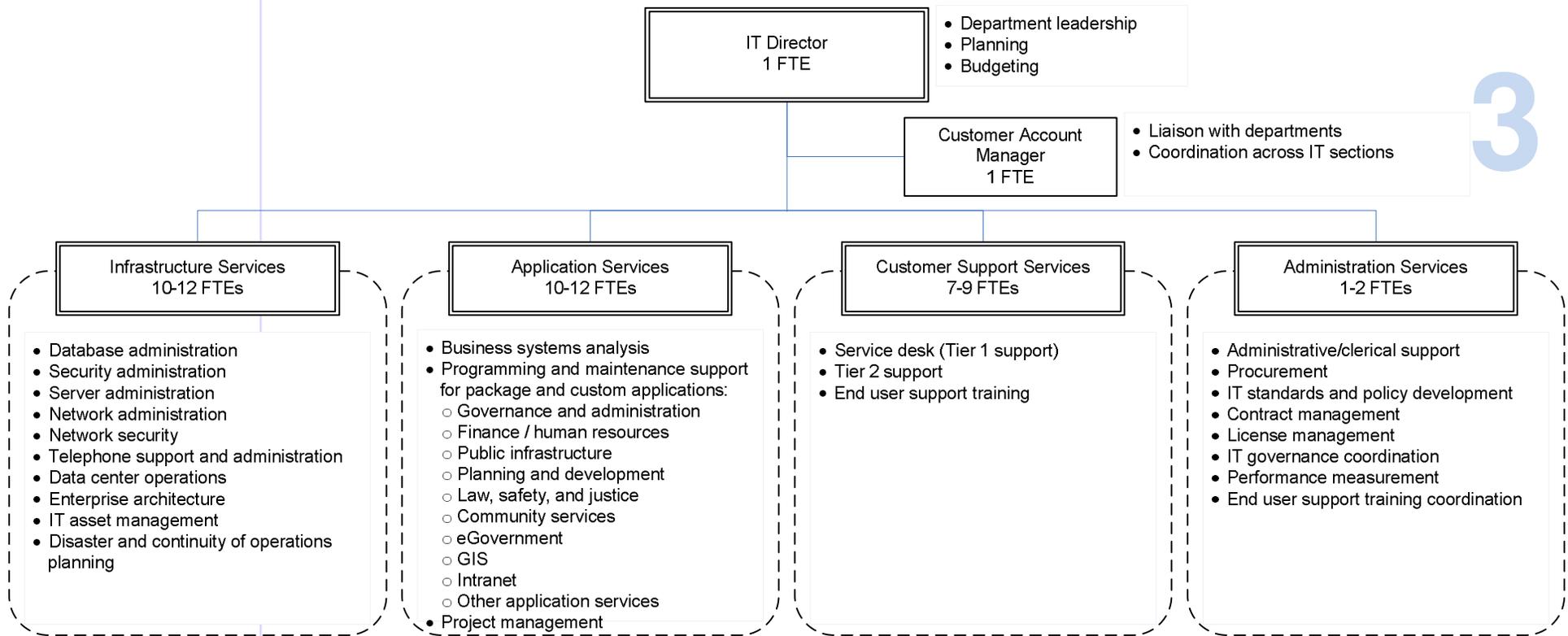
- Customer services (e.g., help desk, PC support)
- Infrastructure services (e.g., server, network administration)
- Enterprise application support (e.g., financial management)
- IT procurement (e.g., bulk purchasing of standard equipment)

At the same time, this strategy also calls for the City to improve the efficiency of delivery of these commodity IT services, freeing labor for enhanced support of business applications. The latter staff will remain in the business units, with the exception of individuals working on enterprise applications, or staff whom the business units would prefer to source from the IT Department. As a best practice, Boulder should centralize support for enterprise applications (e.g., financial management, document management, eGovernment). However, IT staff supporting non-enterprise applications (e.g., Police RMS, maintenance management, permit management) can be deployed to the business units as either direct reports or co-located central IT staff. To implement the IT strategic plan effectively, the City also needs to repurpose and fill its four vacant IT positions in alignment with the target IT staffing allocations described on the following pages and add a new position for customer account management.

The customer account manager will take responsibility for engendering a customer service ethos within the central IT organization. This person will coordinate service across the different IT sections, work with departments to assess business and service needs, manage the formal IT service methodology, review IT service performance measures, and provide key input into the City's IT strategic direction. The customer account manager will also work directly with the human resource department to develop and implement a business user technology training program.

In accord with making these changes, PTI also recommends reorganizing the IT Department to provide better functional specialization and a more customer-oriented structure. Boulder's current approach to IT service delivery does not align with best practices. Effective implementation of this IT strategic plan depends, in large part, upon the City's ability to organize its IT labor more efficiently. The graphic on the following page depicts the recommended central IT organization, including associated staffing levels.

Recommended Central IT Organization Model¹⁴

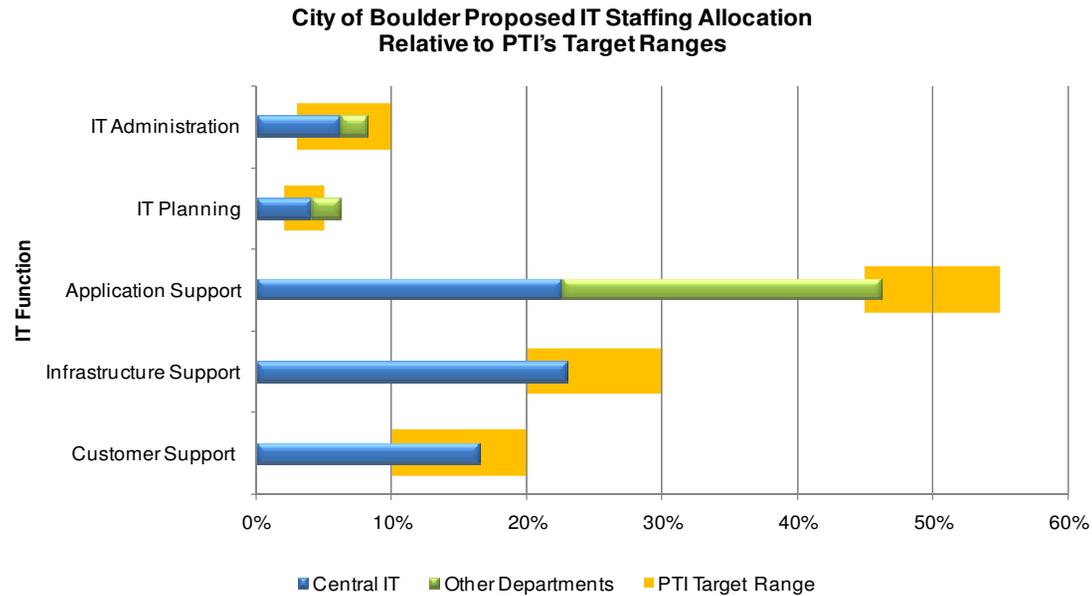


3

Once customer support services and infrastructure services are centralized and service efficiencies have been realized, IT labor formerly dedicated to these services should be repurposed to provide application support. As the following charts indicate, adopting PTI's IT staff reorganization and allocation recommendations more closely aligns citywide IT labor with PTI's target ranges. Note that *the largest improvement occurs in the application support discipline* – ensuring the City can take full advantage of the business improvements inherent in its software applications to improve overall operational efficiency and service quality.

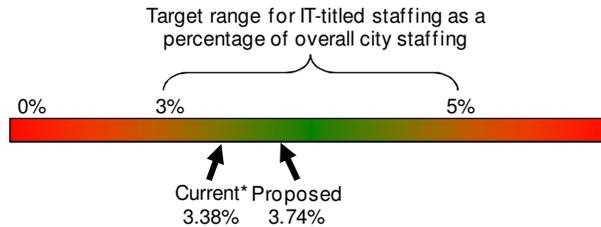
¹⁴ Subsequent to a pending City study on staffing and organizing finance-related positions, Administration Services may also include IT financial management.

The figure below depicts the overall distribution of Boulder’s IT-titled labor effort across the five IT functions. The blue segments denote the proportion of the work performed by IT Department staff, while the green segments represent IT-titled staff in other departments. The yellow rectangles indicate PTI’s target range for each IT function.



The following graphic demonstrates PTI’s proposed citywide IT staffing level. The green zone represents a strategically optimal range of IT labor.

Current and Proposed IT Staffing Levels¹⁵



*Note that this figure does not include Boulder’s open IT positions

¹⁵ The current IT staffing level does not include the four funded vacant IT positions. The proposed IT staffing level assumes the four vacant positions will be filled.

The following table provides a more detailed illustration of the recommended reallocation. The first three columns represent central IT labor, the second three columns represent business unit IT labor, and the last three columns represent total citywide IT labor. Columns labeled “current” indicate Boulder’s existing IT labor allocation. Columns labeled “target” indicate PTI’s recommended IT labor allocation, and the “Net Change (rounded)” column calculates the difference between the current and target IT staffing levels. The rows classify the labor effort into the five IT functions defined earlier.

Current and Recommended IT Staffing Allocation¹⁶

	Central IT Effort			Business Unit IT Effort			Citywide IT Effort		
	Current	Target	Net Change (rounded)	Current	Target	Net Change (rounded)	Current	Target	Net Change
Customer Services	8.46	8.00	(0.50)	4.23	0.00	(4.20)	12.69	8.00	(4.70)
Infrastructure Services	7.84	11.20	3.40	3.00	0.00	(3.00)	10.84	11.20	0.40
Application Services	8.10	11.00	2.90	5.53	11.50	6.00	13.63	22.50	8.90
IT Planning	2.40	2.00	(0.40)	1.47	1.00	(0.50)	3.87	3.00	(0.90)
IT Administration	4.84	3.00	(1.80)	1.83	1.00	(0.80)	6.67	4.00	(2.70)
Total	31.64	35.20	3.60	16.06	13.50	(2.50)	47.70	48.70	1.00

PTI evaluates application services labor effort in seven distinct categories. The following table categorizes major City applications into each of those areas.

Major Boulder Applications by Area

Application Area	Major Boulder Applications
Law, Safety and Justice	Tiburon, Mobile CAD, FireHouse, Full Court, TimeMatters, Parking
Public Infrastructure	CIS, Sprockets, Fleet Focus, Cartegraph, Tribal, OPSSQL
Planning and Development	Landlink
Community Services	Class, Millenium
Governance and Administration	Crystal Reports, Crystal Enterprise
Support Services	Boulder Financial System, Vista, LaserFiche, ArcGIS
eGovernment (Web/Internet)	SharePoint, Joomla, Calendar, RD RSS

¹⁶ The IT Administration staffing level presented in this chart may change as a result of the City’s current study of its approach to organizing finance related staff (as described previously).

The new IT organization model represents an end state. Shifts in IT labor effort should take place incrementally throughout the course of this plan.

The table below presents PTI's recommended IT labor effort by application area.

Current and Recommended Application IT Allocation

Application Area	Central IT Effort			Business Unit IT Effort			Citywide IT Effort		
	Current	Target	Net Change	Current	Target	Net Change	Current	Target	Net Change
Law, Safety and Justice	0.24	0.00	(0.24)	2.05	5.00	2.95	2.29	5.00	2.71
Public Infrastructure	0.01	0.00	(0.01)	0.53	3.00	2.47	0.54	3.00	2.46
Planning and Development	0.70	0.00	(0.70)	0.32	2.50	2.18	1.02	2.50	1.48
Community Services	0.28	0.00	(0.28)	1.14	1.00	(0.14)	1.42	1.00	(0.42)
Governance and Administration	0.18	1.50	1.32	0.00	0.00	0.00	0.18	1.50	1.32
Support Services	4.26	7.50	3.24	1.02	0.00	(1.02)	5.28	7.50	2.22
eGovernment (Web/Internet)	1.56	2.00	0.44	0.27	0.00	(0.27)	1.83	2.00	0.17
	7.23	11.00	3.77	5.33	11.50	6.17	12.56	22.50	9.94

3

It is important to recognize that the new IT organization model represents a target end state. Shifts in IT labor effort should take place incrementally throughout the course of this plan. For example, most of the increases in application support labor should coincide with the implementation of new business software.

In addition, the FTEs quantified in this analysis aggregate the partial labor effort of many individuals, as most staff work in more than one major IT discipline. Thus, the 12.69 FTEs shown as the current citywide effort devoted to customer services are composed of 46 individuals across the City. Correspondingly, simply moving individual personnel may not achieve the desired result – and will certainly not provide the correct mix of skill sets. In short, achieving the strategic IT service delivery position will require significant human resources planning, as well as some tough management decisions.

While developing PTI's strategic recommendations, we also considered outsourcing specific services – including email and personal productivity applications (e.g., word processing, spreadsheet). While this area is currently receiving a lot of media attention, at this time, we do not recommend that the City consider outsourcing on a large scale. The market for many of these services is still nascent. Pricing can be volatile and concerns surrounding security and discoverability are still being addressed. Vendors in this market also typically require certain levels of infrastructure standardization, specific technical architectures and/or clear staffing organization as a condition of executing a service agreement. This would require significant up-front expense and may not align with the City's strategic IT direction.

Over the lifetime of this plan, we expect this market to evolve and mature. The City may wish to revisit this area once it has consolidated its infrastructure and completed the associated organizational changes. At that point, Boulder will be able to provide accurate internal costs and service level benchmarks to support an informed decision.

Of course, the City should continue to take advantage of contract IT services on a short-term, case-by-case basis. This approach will be most beneficial when used to provide backfill labor for regular staff during large software and/or hardware implementations, to augment City staff in specific functional areas, or to leverage specialized skill sets (e.g., project management, business analysis) in support of major projects.

Ultimately, reorganizing IT will significantly enhance internal customer service, improve IT operational efficiency and staff productivity, ensure the availability of current IT skills and help the City obtain maximum business value from its application software.

Improve IT funding approach

Effective use of IT requires both adequate and transparent funding sources. Boulder's utilization of technology will benefit from the following adjustments:

- Re-architect the computer replacement fund (CRF) to support only physical technology replacement using multiple tiers of workstation standards aligned with business needs
- Implement an IT O&M funding model that clearly aligns IT charges with services, as follows:
 - Define a catalog of IT services:
 - Align with private sector offerings
 - Categorize as baseline or supplemental
 - Directly fund IT baseline services
 - Charge for IT supplemental services on a per use basis
- Implement a capital improvement project (CIP) process for major IT investments

These changes will expand funding opportunities for IT capital projects, encourage strategic technology investments, build business user confidence, and eliminate the use of O&M dollars and labor for capital projects.

Implement a formal IT service methodology

In association with the reorganization of IT services, Boulder should adopt a formal IT service model. Key elements of this strategy include clearly defining IT roles and responsibilities, aligning job descriptions with business needs and best practices, establishing a professional help desk, and developing standard problem resolution processes. The model should also describe the City's approach to providing 24/7 IT support. Many key municipal services (e.g., public safety, utilities) extend beyond normal business hours and require corresponding support. This strategy will streamline IT services, increase user confidence in IT support, and provide detailed management information surrounding IT service delivery.

The City should define requirements for new and/or enhanced competencies such as modern programming languages, project management, PC support, server administration, business analysis and data management. Subsequently, Boulder should establish a training program and recruitment strategy designed to acquire and retain these skills. This strategy will ensure a professional IT support environment and improve confidence in the use of technology across the City. It will also enhance customer service to the business units, improve IT operational efficiency and staff productivity, increase the return on technology investments and make the City a more attractive place to work.

Invest in business user training

In addition to enhancing IT staff skills and abilities, Boulder should also provide regular training opportunities for business users. This will ensure City staff are trained on core applications and technologies, and have the opportunity to regularly refresh and/or update their skills. Well-trained business users improve operational efficiency and staff productivity, make Boulder a more competitive employer, and increase the value received from technology.

Perform the necessary due diligence to support major IT investments

To aid IT decision-making and governance, Boulder should engage in detailed planning for major IT investments. This includes feasibility studies, business analysis, fit-gap assessments and targeted consulting assistance. Specifically, the City should conduct a finance/ERP¹⁷ needs assessment as well as developing plans for citywide document management implementation, server consolidation, and eGovernment strategy. These plans will ensure that major IT projects and expenditures provide a positive return on investment and align with Boulder's strategic and budget priorities.

¹⁷ Enterprise Resource Planning automation aims to automate all of an organization's business functions with integrated software modules. Originally a product for the private sector (specifically supply chain management), ERP has evolved to offer substantial automation capabilities for the public sector. Although packages vary greatly depending on cost, typical ERP products automate financial management (e.g., AP/AR, purchasing), HR management (e.g., workforce planning, training), inventory management, contract management, and provide a great deal of decision support/business intelligence capabilities.

Adopt a portfolio approach to managing IT assets

Aligned with best practices, this strategy provides a planned approach to life-cycle management of the City’s hardware and software. Boulder needs to inventory and identify the upgrade, replacement, or retirement schedules for business software and hardware. IT portfolio management ensures continuity of mission critical applications and infrastructure while avoiding large, unplanned and unbudgeted expenditures to upgrade or replace IT assets.

The implementation projects outlined below will help the City realize these strategies and achieve its IT service delivery and decision making alignment goal.

Goal 2: IT Service and Decision Making Alignment	Implementation Projects
	<ul style="list-style-type: none"> 2.1 Implement formal citywide IT governance 2.2 Establish IT performance measures 2.3 Create IT CIP Fund 2.4 Align IT charges with services 2.5 Conduct financial management/ERP needs assessment 2.6 Develop a document management implementation plan 2.7 Adopt IT portfolio management 2.8 Create a customer account representative position 2.9 Centralize infrastructure and customer services functions 2.10 Implement central IT service model enhancements

Goal 3: Efficiency and Effectiveness

Technology maximizes the efficiency and effectiveness of city operations.

Perhaps more than any other IT investment area, business software directly and visibly supports the City's ability to perform daily operations. Toward this end, Boulder's applications must be sufficiently integrated, current and easy to use. As business automation improves, the City should concurrently reduce its reliance on non-specialized and/or supplemental applications (e.g., Excel, Access).

The following strategies support this goal.

Improve business automation

Enhanced business applications can support significant improvements in both efficiency and service quality – especially for citywide functions (e.g., finance) and for major service areas (e.g., public works). Boulder should acquire robust software packages that support the City's business needs. Within the time frame of this plan, the City requires new applications to support maintenance management, finance/human resources management and permit management. The finance/ERP needs assessment should inform the City's approach to automating those business functions. Upgraded software in these areas will enhance asset maintenance and infrastructure, inform decision-making, streamline business processes and provide automated workflow capabilities. In addition, the City should evaluate and pursue timekeeping options (including those offered by finance/human resources management systems), extend Tiburon (police RMS) functionality as appropriate and utilize permit management software capabilities (e.g., licensing module) to meet parking management needs.

An increasing business need for customer relationship management (CRM) also exists at the City. However, software offerings in the CRM market space have not caught up with public sector demand. We have not seen this type of software effectively deployed by a municipality on an enterprise basis. Most CRM applications focus on supporting individual or closely related lines of business, rendering them largely ineffective for a local government organization – which operates multiple lines of business. In this respect, though, the City may be able to leverage a CRM product for specific business needs (e.g., Council contact tracking, information demand management). Most ERP and maintenance management software vendors offer CRM applications and/or modules that integrate with their core systems. Boulder should evaluate these options as part of the procurement/upgrade process in these functional areas. Beyond that, PTI also recommends that Boulder conduct a very limited pilot test to assess the business value of a stand-alone CRM product. The City will also need to evaluate the associated business process impacts and potential reengineering costs. As part of the next IT planning cycle, Boulder should revisit potential enterprise CRM options.

The City requires new applications to support maintenance management, finance/human resources management and permit management.

Over the long term, application investments, and associated business analysis, provide the best opportunity for Boulder to “do more with less.”

An expanded and modernized application portfolio will increase both the need for and the value of business analysis expertise. These skills will enable the City to properly evaluate the benefits offered by alternative software options, identify the most effective way to configure and implement new applications, and reengineer existing work processes to increase efficiency, as needed. In short, effective business analysis maximizes an application’s return on investment and supports continuous productivity improvements. Over the long term, application investments, and associated business analysis, provide the best opportunity for Boulder to “do more with less.”

Emphasize use of commercial software

The City needs to invest in applications that support maintenance management, finance/human resources management and permit management. To some extent, the City will always engage in software development. However, the advantages offered by commercial software packages are too great to be ignored. Additionally, custom software development is rarely cost effective. Emphasizing packaged solutions will offer significant benefits, including:

- Making available best practices built into the software
- Straightforward application support
- Regular software updates that keep pace with technology, fix bugs and enhance the application
- Limited or no reliance on institutional knowledge
- Improved data integration capabilities

When updating its application portfolio, Boulder should also take advantage of lower-priced architectures. Many major municipal software vendors support more cost effective database options. Approaching this incrementally may yield long-term cost savings, but the City will need to evaluate the impact of different IT skill set requirements, security implications, and information integration challenges. Replacing applications solely to reduce costs (without considering business needs and attendant impacts) would not be advantageous.

Similar to IT service delivery, we do not recommend an open source¹⁸ application strategy. No sufficiently developed market exists for this type of approach. Implementation of such a strategy would complicate support, reduce functionality, and incur large unintended costs. In addition, Boulder does not currently have the depth and breadth of specialized IT skills needed to support an extensively open source application portfolio.

Overall, this strategy will simplify the City’s application architecture, enhance software and data integration, and expedite new employee training.

¹⁸ Un-licensed software which allows users to copy or modify the program’s underlying code (i.e., source code) and freely distribute it.

Reduce reliance on supplemental systems

As the City implements new business applications with expanded functionality, it needs to retire existing supplemental systems, files, and tools (e.g., custom-developed Access databases). This strategy supports data and information integration, minimizes requirements for ongoing IT application support services, reduces staff training requirements, reduces the complexity of the city’s application architecture and focuses IT skills on a limited set of core competencies

The implementation projects listed below will help the City achieve its streamlined operations goal.

Goal 3: Efficiency and Effectiveness	Implementation Projects
	<ul style="list-style-type: none"> 3.1 Implement an integrated finance/HR system 3.2 Implement a maintenance management application 3.3 Implement permit management software

Goal 4: Innovation

Technology is used as a catalyst for innovation.

Continuing advancements in technology provide Boulder with opportunities to deliver better services at lower costs. This strategic goal emphasizes the benefits of improved management information, intergovernmental partnerships and focuses the City on taking advantage of emerging technologies, such as automated workflow. While these tools may not be as glamorous as social media, they will provide measurable productivity and cost benefit and – if successfully implemented – will establish Boulder as a municipal technology leader. The following strategies support the City’s innovation goal.

Empower decision makers with useful management information

Constituents and business partners place increasing emphasis on accountable, transparent government. To support more informed decision-making and better governance, city management needs more access to trended data that will help monitor performance and assess progress toward stated goals. This strategy emphasizes the implementation of systems to analyze and present useful indicators drawn from disparate data sources – in a timely and accurate fashion. In support of this strategy, the City should pilot a decision support project after upgrading or enhancing core enterprise applications. Consider business intelligence¹⁹ software options that will integrate with Boulder’s finance and human resource management system and automate the collection, analysis, and reporting of critical operational data. The City may be able to leverage a business intelligence module bundled with a new ERP software package. Such a system will provide meaningful, real-time decision support information (dashboards) with drill down capabilities, track and report on business unit performance in support of citywide objectives, and inform capital investment decisions.

Utilize automated workflow capabilities when available

Most municipal software vendors incorporate business process “best practices” into their software products, allowing work tasks to progress electronically. In concert with application upgrades or replacements, Boulder should implement workflow automation as often as possible. Hand in hand with business process analysis and reengineering, automated workflow dramatically streamlines operations, increases business user productivity, reduces costs, and enhances service quality.

¹⁹ Business intelligence (also referred to as decision support) is a category of applications and technologies that collects, stores, analyzes, and reports on data – presenting a management-level view (e.g., dashboard) of the results. It is an approach to organizing complex data relationships and trends that results in new, actionable information to help decision makers make better, more informed, and more timely decisions.

Leverage shared IT services and regional cooperation

Regional services and data sharing partnerships offer the potential to enhance citizen services and realize economies of scale. This strategy encourages Boulder to participate in partnerships whenever they improve services, support City strategic priorities and/or save resources via economies of scale. Major collaboration opportunities exist in GIS, emergency management services and planning, police records management, and technical infrastructure development. Specifically, the City should partner with Boulder County to develop a long-term GIS strategy, define GIS investment priorities and eliminate redundant GIS labor effort.

The following implementation projects will help the City realize these strategies and achieve its innovation goal.

Goal 4: Innovation	Implementation Projects
	<p>4.1 Pilot a business intelligence system</p> <p>4.2 Create a plan for establishing a county/city GIS group</p>

Goal 5: Quality, Sustainable IT Infrastructure

Technology is a key element of citywide infrastructure and is current, secure and reliable – ensuring customer confidence.

The City's technology infrastructure provides a foundation for the software that streamlines city operations and automates critical business functions. It includes the hardware, system software, databases, operating systems, and network components comprising Boulder's application architecture. The following strategies support a technology infrastructure aligned with this goal.

Consolidate core infrastructure

While Boulder has taken preliminary steps toward virtualization, the City's technical environment can be further optimized by consolidating servers and expanding the use of virtualization. This best practice strategy focuses on increasing overall server utilization and performance – a potentially significant money saver. It includes retiring old server operating systems, redistributing applications more logically across servers and consolidating hardware into two well-designed data centers (the Boulder County and police locations). It also involves formalizing the City's IT asset replacement cycles to ensure key infrastructure remains current. Maintaining a streamlined infrastructure will reduce costs associated with data center operations (e.g., backup power capacity, environmental controls, data storage), modernize the City's application/technology architecture, enhance storage and data management, increase both IT operational efficiency and business unit staff productivity and reduce environmental impacts.

Enhance communication via digital convergence

Today's workers need more frequent contact with their colleagues and customers than ever before. New technologies can now route disparate forms of communication onto a single path (e.g., email can be accessed via the voice mail system). To obtain the efficiencies and effectiveness offered by this technology, Boulder must replace its existing telephone systems with a voice over internet protocol (VoIP) system and, over time, implement additional hardware and software to support unified messaging. This strategy will enable city staff to engage in multi-modal, anywhere-anytime communication. It will lower costs associated with managing separate voice and data networks and increase business unit operational efficiency.

The City's technical environment can be further optimized by consolidating servers and expanding the use of virtualization.

Ensure appropriate security for IT systems

The growing demand for transparency and accountability in local government does not obviate the need for adequate information security. Data assets (e.g., customer/citizen information, city documents) should be categorized by security risk level and protected appropriately. Boulder should engage third-party specialists to conduct annual security audits and triennial security assessments to ensure that the City’s technical environment is equipped to deal with potential threats. In addition, the City can leverage appropriate security practices and protocols recommended by previous security assessments. This will ensure the security of Boulder’s information assets.

The following implementation projects and additional recommendations will help the City realize these strategies and achieve its technology infrastructure goal.

Goal 5: Quality, Sustainable IT Infrastructure	Implementation Projects
	<ul style="list-style-type: none"> 5.1 Migrate and optimize servers 5.2 Complete transition to VoIP 5.3 Conduct IT security audits/assessments

* * * * *

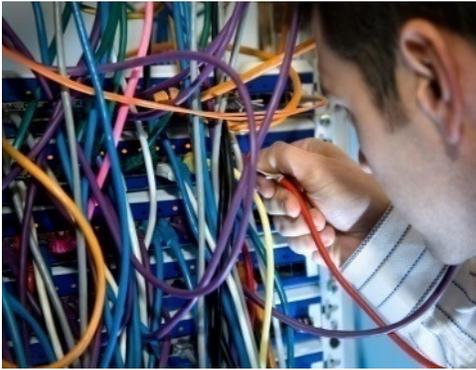
The table on the following page links PTI’s recommended IT projects to the City’s business imperatives. Chapter 4 presents an implementation plan for the key projects listed above.

IT Project Alignment with City Strategic Priorities

IT Projects

	Strategic Priority			
	Community Sustainability	Service Excellence	Leadership	Transparency
1. Service Quality and Accessibility				
1.1		✓	✓	✓
1.2	✓	✓	✓	✓
1.3	✓	✓	✓	✓
2. IT Service and Decision Making Alignment				
2.1	✓	✓	✓	✓
2.2		✓	✓	✓
2.3		✓		✓
2.4				✓
2.5				✓
2.6				✓
2.7		✓	✓	✓
2.8			✓	
2.9	✓		✓	
2.10		✓	✓	
3. Efficiency and Effectiveness				
3.1	✓	✓		✓
3.2	✓	✓		✓
3.3	✓	✓		✓
4. Innovation				
4.1	✓	✓	✓	✓
4.2		✓	✓	
5. Quality, Sustainable IT Infrastructure				
5.1	✓		✓	
5.2		✓	✓	
5.3			✓	✓

3



Chapter 4: Implementation Plan

In many respects, this plan represents the “easy part.” The real work lies ahead – translating the strategies outlined in Chapter 3 into projects that help Boulder achieve its technology goals. This chapter defines a five-year work plan to implement key projects aimed at improving city services and streamlining business operations. This chapter also summarizes associated costs and presents an attendant implementation timeline.

Implementation Projects

Based on the IT strategies defined in Chapter 3, PTI identified a series of key implementation projects aimed at improving the City’s technology position. PTI grouped these projects according to the City’s five IT goals:

1. Service Quality and Accessibility	
1.1	Develop eGovernment strategic plan
1.2	Redesign the City's website
1.3	Complete document management implementation
2. IT Service and Decision Making Alignment	
2.1	Implement formal citywide IT governance
2.2	Establish IT performance measures
2.3	Create IT CIP fund
2.4	Align IT charges with services
2.5	Conduct financial management/ERP needs assessment
2.6	Develop a document management implementation plan
2.7	Adopt IT portfolio management
2.8	Create a customer account representative position
2.9	Centralize infrastructure and customer services functions
2.10	Implement central IT service model enhancements
3. Efficiency and Effectiveness	
3.1	Implement integrated finance/HR system
3.2	Implement citywide maintenance management automation
3.3	Implement permit management
4. Innovation	
4.1	Pilot a business intelligence system
4.2	Create a plan for establishing a county/city GIS group
5. Quality, Sustainable IT Infrastructure	
5.1	Migrate and optimize servers
5.2	Complete replacing phone system with VoIP
5.3	Conduct IT security audits/assessments

Given the City's projected revenue shortfalls, PTI worked with Boulder staff to classify each project according to the City's recently adopted budgeting categories (i.e., fiscally constrained, action, vision) and priority level (i.e., essential, desirable, discretionary). The table below presents this categorization.

4

	Fiscally Constrained			Action			Vision		
	Essential	Desirable	Discretionary	Essential	Desirable	Discretionary	Essential	Desirable	Discretionary
IT Projects									
1. Service Quality and Accessibility									
1.1		✓							
1.2				✓					
1.3				✓					
2. IT Service and Decision Making Alignment									
2.1	✓								
2.2	✓								
2.3	✓								
2.4	✓								
2.5					✓				
2.6		✓							
2.7						✓			
2.8					✓				
2.9	✓								
2.10				✓					
3. Efficiency and Effectiveness									
3.1				✓					
3.2				✓					
3.3				✓					
4. Innovation									
4.1					✓				
4.2		✓							
5. Quality, Sustainable IT Infrastructure									
5.1	✓								
5.2	✓								
5.3					✓				

Based on each project's alignment with Boulder's strategic priorities and budget categories – and in acknowledgement of the City's greatest needs – PTI developed the following implementation timeline. PTI validated this timeline at the implementation-planning workshop, and refined it through subsequent meetings with the City's IT Director. The City will need to periodically review and make adjustments to this implementation timeline – based on resource constraints, changing business needs and priorities.

Proposed Implementation Timeline

4

Project	2009				2010				2011				2012				2013			
	Q1	Q2	Q3	Q4																
1. Service Quality and Accessibility																				
1.1 Develop eGov strategic plan																				
1.2 Redesign the City's web site																				
1.3 Complete document management implementation																				
2. Citywide IT Service and Decision Making Alignment																				
2.1 Implement citywide IT governance																				
2.2 Establish IT performance measures																				
2.3 Create IT CIP fund																				
2.4 Align IT charges with services																				
2.5 Conduct financial management/ERP needs assessment																				
2.6 Develop a document management implementation plan																				
2.7 Adopt IT portfolio management																				
2.8 Create customer account representative position																				
2.9 Centralize infrastructure and customer services functions																				
2.10 Implement central IT service model enhancements																				
3. Efficiency and Effectiveness																				
3.1 Implement an integrated finance/HR system																				
3.2 Implement citywide maintenance management automation																				
3.3 Implement permit management																				
4. Innovation																				
4.1 Pilot a business intelligence system																				
4.2 Create a plan for establishing a county/city GIS group																				
5. Quality, Sustainable IT Infrastructure																				
5.1 Migrate and optimize servers																				
5.2 Complete replacing phone system with VoIP																				
5.3 Conduct IT security audits/assessments																				

Implementation Project Costs

The cost estimates outlined in this section provide Boulder with budget guidelines for the above-listed strategic implementation projects. PTI developed these cost estimates based on industry knowledge, best practices, market research, and average vendor costs. The scope of this study did not include the definition of hard dollar benefits, or a return on investment analysis. Costs are in 2009 dollars and not adjusted for inflation.

One-time and Recurring Costs

The tables on the following pages present one-time and recurring cost estimates for each proposed project. In some instances, significant differences exist between the low-end and high-end estimates. In general, low-end estimates tend to reflect reduced scope, lower-cost materials (e.g., software, hardware), and a greater reliance on internal labor. High-end estimates reflect a broader scope, higher-cost components and software, larger labor requirements, and generally include external consulting for all or some of a project's implementation. The second table annualizes the high-end estimated costs of each project according to the Gantt chart presented on the previous page. Project cost estimates do not include currently budgeted or expended dollars, except where indicated by an asterisk (*).

Appendix E provides additional details and assumptions surrounding each project's cost estimates.

One-Time and Recurring Project Cost Estimates

Cost Summary		One-Time		Recurring	
Project ID		Low	High	Low	High
1. Service Quality and Accessibility					
1.1	Develop eGovernment strategic plan	\$ 74,000	\$ 118,000	\$ -	\$ -
1.2	Redesign the City's website	\$ 139,000	\$ 338,000	\$ -	\$ -
1.3	Complete document management implementation	\$ 395,000	\$ 793,000	\$ 10,000	\$ 26,000
	Subtotal	\$ 608,000	\$ 1,249,000	\$ 10,000	\$ 26,000
2. Citywide IT Service and Decision Making Alignment					
2.1	Implement citywide IT governance	\$ 11,000	\$ 46,000	\$ -	\$ -
2.2	Establish IT performance measures	\$ 13,000	\$ 28,000	\$ -	\$ -
2.3	Create IT CIP fund	\$ 17,000	\$ 50,000	\$ -	\$ -
2.4	Align IT charges with services	\$ 22,000	\$ 58,000	\$ -	\$ -
2.5	Conduct financial management/ERP needs assessment	\$ 25,000	\$ 84,000	\$ -	\$ -
2.6	Develop a document management implementation plan	\$ 24,000	\$ 63,000	\$ -	\$ -
2.7	Adopt IT portfolio management	\$ 162,000	\$ 686,000	\$ 10,000	\$ 44,000
2.8	Create customer account representative position	\$ 9,000	\$ 37,000	\$ 80,000	\$ 97,000
2.9	Centralize infrastructure and customer services functions	\$ 24,000	\$ 78,000	\$ -	\$ -
2.10	Implement central IT service model enhancements	\$ 83,000	\$ 172,000	\$ -	\$ -
	Subtotal	\$ 390,000	\$ 1,302,000	\$ 90,000	\$ 141,000
3. Efficiency and Effectiveness					
3.1	Implement an integrated finance/HR system*	\$ 2,278,000	\$ 3,680,000	\$ 96,000	\$ 176,000
3.2	Implement citywide maintenance management automation	\$ 698,000	\$ 1,798,000	\$ 35,000	\$ 92,000
3.3	Implement permit management	\$ 957,000	\$ 2,062,000	\$ 43,000	\$ 130,000
	Subtotal	\$ 3,933,000	\$ 7,540,000	\$ 174,000	\$ 398,000
4. Innovation					
4.1	Pilot a business intelligence system	\$ 95,000	\$ 242,000	\$ 3,000	\$ 19,000
4.2	Create a plan for establishing a county/city GIS group	\$ 65,000	\$ 151,000	\$ -	\$ -
	Subtotal	\$ 160,000	\$ 393,000	\$ 3,000	\$ 19,000
5. Quality, Sustainable IT Infrastructure					
5.1	Migrate and optimize servers**	\$ 325,000	\$ 489,000	\$ 38,000	\$ 56,000
5.2	Complete replacing telephone system with VoIP***	\$ 1,545,000	\$ 2,823,000	\$ 126,000	\$ 201,000
5.3	Conduct IT security audits/assessments	\$ 46,000	\$ 92,000	\$ 12,000	\$ 54,000
	Subtotal	\$ 1,916,000	\$ 3,404,000	\$ 176,000	\$ 311,000
	Total Cost	\$ 7,007,000	\$ 13,888,000	\$ 453,000	\$ 895,000

Note: Costs are rounded to nearest thousand dollars

- * The City currently pays approximately \$120,000 in annual maintenance fees for BFS and Vista which could transition to the new system. Boulder has also budgeted approximately \$40,000 for replacing BFS and Vista servers in 2010
- ** The City has already budgeted for the hardware, software, and professional services related to this server optimization project
- *** The City has already budgeted for the hardware, software, professional services and ongoing labor effort associated with this telephony project

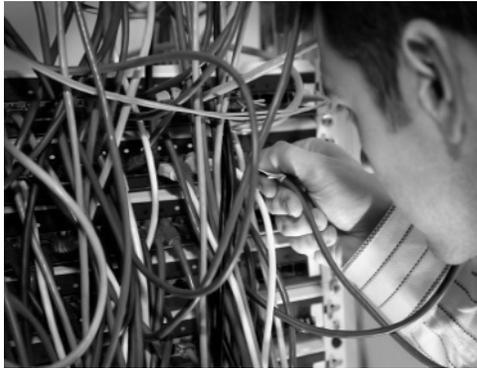


Annualized Project Cost Estimates

Annualized Cost Summary					
Project	Year 1	Year 2	Year 3	Year 4	Year 5
1. Service Quality and Accessibility					
1.1 Develop eGovernment strategic plan	\$ -	\$ 79,000	\$ 39,000	\$ -	\$ -
1.2 Redesign the City's website	\$ -	\$ 111,000	\$ 226,000	\$ -	\$ -
1.3 Complete document management implementation	\$ 386,000	\$ 227,000	\$ 227,000	\$ 26,000	\$ 26,000
Annual Subtotal	\$ 386,000	\$ 417,000	\$ 492,000	\$ 26,000	\$ 26,000
2. Citywide IT Service and Decision Making Alignment					
2.1 Implement citywide IT governance	\$ 23,000	\$ 23,000	\$ -	\$ -	\$ -
2.2 Establish IT performance measures	\$ 14,000	\$ 14,000	\$ -	\$ -	\$ -
2.3 Create IT CIP fund	\$ 10,000	\$ 40,000	\$ -	\$ -	\$ -
2.4 Align IT charges with services	\$ 19,000	\$ 39,000	\$ -	\$ -	\$ -
2.5 Conduct financial management/ERP needs assessment	\$ -	\$ 28,000	\$ 57,000	\$ -	\$ -
2.6 Develop a document management implementation plan	\$ 63,000	\$ -	\$ -	\$ -	\$ -
2.7 Adopt IT portfolio management	\$ 116,000	\$ 580,000	\$ 44,000	\$ 44,000	\$ 44,000
2.8 Create customer account representative position	\$ 12,000	\$ 74,000	\$ 97,000	\$ 97,000	\$ 97,000
2.9 Centralize infrastructure and customer services functions	\$ 16,000	\$ 62,000	\$ -	\$ -	\$ -
2.10 Implement central IT service model enhancements	\$ -	\$ 138,000	\$ 34,000	\$ -	\$ -
Annual Subtotal	\$ 273,000	\$ 998,000	\$ 232,000	\$ 141,000	\$ 141,000
3. Efficiency and Effectiveness					
3.1 Implement an integrated finance/HR system*	\$ -	\$ -	\$ 571,000	\$ 1,967,000	\$ 1,299,000
3.2 Implement citywide maintenance management automation	\$ -	\$ -	\$ -	\$ 282,000	\$ 1,516,000
3.3 Implement permit management	\$ -	\$ -	\$ -	\$ 1,610,000	\$ 581,000
Annual Subtotal	\$ -	\$ -	\$ 571,000	\$ 3,859,000	\$ 3,396,000
4. Innovation					
4.1 Pilot a business intelligence system	\$ -	\$ -	\$ -	\$ -	\$ 242,000
4.2 Create a plan for establishing a county/city GIS group	\$ 50,000	\$ 101,000	\$ -	\$ -	\$ -
Annual Subtotal	\$ 50,000	\$ 101,000	\$ -	\$ -	\$ 242,000
5. Quality, Sustainable IT Infrastructure					
5.1 Migrate and optimize servers**	\$ 161,000	\$ 356,000	\$ 56,000	\$ 56,000	\$ 56,000
5.2 Complete replacing telephone system with VoIP***	\$ 1,033,000	\$ 1,815,000	\$ 201,000	\$ 201,000	\$ 201,000
5.3 Conduct IT security audits/assessments	\$ -	\$ 30,000	\$ 16,000	\$ 16,000	\$ 30,000
Annual Subtotal	\$ 1,194,000	\$ 2,201,000	\$ 273,000	\$ 273,000	\$ 287,000
Projected Net New Funding Required	\$ 1,903,000	\$ 3,717,000	\$ 1,568,000	\$ 4,299,000	\$ 4,092,000

Note: Costs are rounded to nearest thousand dollars

- * The City currently pays approximately \$120,000 in annual maintenance fees for BFS and Vista which could transition to the replacement system(s). Boulder has also budgeted approximately \$40,000 for replacing BFS and Vista servers in 2010
- ** The City has already budgeted for the hardware, software, and professional services related to this server optimization project
- *** The City has already budgeted for the hardware, software, professional services and ongoing labor effort associated with this telephony project



Appendix A: **List of Participants**

Approximately 200 city stakeholders – including city executives, managers, IT professionals, and end users – contributed to this planning effort through interviews, focus groups, and other data collection efforts. The following table lists these participants:

Name	Position/Title	Department/Agency
Scott Adams	Officer	Patrol/Watch 1
Jessica Adler	911 Dispatch	BPC
Gabriela Aguilar	Telecom-Admin Specialist	Administration
Beverly Allenson	Community Police Specialist	Police / OSU
Maureen Amundson	Paralegal	CAO
Mark Anderson	Cataloger	Library
Marti Anderson	Archivist	Library/Carnegie
Laura Armstrong	Records	BPD
Jeff Arthur	Engineering Review Manager	Public Works/Development & Support Services
Pam Aubry	Probation Officer	Municipal Court
Andrew Barth	Communications Specialist	Public Works and Community Planning & Sustainability
Kellie Battaglia	HHS Administrator	Admin
Thomas Battaglia	Applications Manager	IT
Lynnette Beck	Office Administrator	CAO
Terzah Becker	Reference Specialist	Library/Main
Mark Bliley	Traffic Officer	BPD
Tom Bonacci	Application Developer	IT
Melanie Borski-Howard	Youth Librarian	Library
Bill Boyes	Facilities Maintenance Program Manager	Public Works/Development & Support Services
Jane Brautigam	City Manager	CMO
Josie Brockmann	Reference Specialist	Library
Steve Buckbee	Civil Engineer II	Public Works/Development & Support Services
Laura Burton	Senior Applications Developer	IT-Apps
David Cain	Deputy Chief-Fire	BFD
Jodie Carroll	Interim Communication Manager	CMO
Duane Casmey	Network Services	IT
Joe Castro	Facilities and Fleet Manager	Public Works/Development & Support Services



A

Name	Position/Title	Department/Agency
Don Chapman	Station Director	CMO/Communication
James Cho	Deputy Court Administrator	Municipal Court
Ruth Christopher	Detective	BPD
Ken Clark	Reg. Compliance Specifier	Public Works/Utilities
Toria Clark	Regulatory Compliance Specifier	Library/Reynolds
Matt Claussen	Urban Resource Manager	Parks and Recreation
Beth Cooper	Application Developer	Apps
Annette Crawford	Recruitment & Training Program Mgr	HHS/CYF
Randy Crittenden	Water Treatment Plant Coordinator	Public Works/Utilities
Jake Cseke	GIS Analyst	OSMP
Judy Cvetkovich	LandLink Administrator	Public Works and Community Planning & Sustainability
Sharon Danson	Financial / Reporting Manager	Finance
Reggie DePass	Police Officer	Patrol
Corey Dickerson	Senior PC Specialist	IT
Anthony DiGiovanni	Officer	BPD
Steve Dirks	Network Services	IT
Lonna Donin	Police Communications Manager	Police
Chris Douville	Wastewater Treatment Coordinator	Public Works/Utilities
Tom Dowd	Detective	Boulder Police
Marion Down	Apps Developer	IT
Jennifer Dudley	Application System Specialist	Public Works and Community Planning & Sustainability
Jason Duffy	Traffic Officer	BPD
Sandy Duff	Acquisitions Assistant	OSMP/RES
Sheri Duren	Process Optimization Specialist	Public Works/Utilities
Alice Eccles	Youth Services Specialist	Library/Main
Benjamin Edelen	Linux System Administrator	IT
Bob Eichem	Finance Director	Finance
Carol Ellinghouse	Water Resources Coordinator	Public Works/Utilities
Daniel Fairchild	Software Developer	IT
Eric Faisler	Natural Resources Specialist	OSMP

A

Name	Position/Title	Department/Agency
Louise Ferguson	Admin Specialist II	IT
Paul Fetherston	Deputy City Manager	CMO
Andy Fogg	Battalion Chief	Boulder Fire
Steve Folle	Treatment Plant Supervisor	Public Works/Utilities
John Frazer	Financial Manager	Public Works/Development & Support Services
Felix Gallo	Transportation & Utilities Maintenance Coordinator	Public Works/Transportation/Utilities
Joe Gaona	Library IT	Library
Brian German	Right-of-Way Construction Inspector	Public Works/Development & Support Services
Mark Getman	Program Planner	Public Works/Transportation/Utilities
Suzanne Givler	Water Quality Project Manager	Public Works/Utilities
Eileen Gomez	HR Director	HR
R. Gosage	Police Commander	Police
Rose Gracie	Police Financial Services Supervisor	Boulder Police Department
Kevin Granberg	Police Officer	Traffic
Calder Grey	Purchasing Coordinator	Finance
Trish Hughes	Network Services	IT
Donna Hamilton	Librarian	Library
Matthew Hamilton	Library Innovation Manager	Library and Arts
Jeremy Hanel	Traffic Officer	BPD
Judy Harlan	Payroll Manager	HR
Sean Havins	Systems Administrator	IT
D. Hayes	Deputy Police Chief	Police
Bob Hendry	Photo Enforcement	Police Traffic
Marcie Hendren	Benefits Specialist	HR
Paul Heppler	Treatment Plant Supervisor-Resource Program	Public Works/Utilities
Matt Hickey	Class Systems Supervisor	P&R/Recreation
Brett Hill	Senior GIS Specialist	Public Works and Community Planning & Sustainability
Sarah Hill	Permit/Web Admin	OSMP
Therese Hilleary	Dispatch Supervisor	BPD

A

Name	Position/Title	Department/Agency
Melissa Holladay	Circ Clerk/Processor	Library
Brian Holmes	Zoning Administrator – Planner II	Community Planning & Sustainability
Gunn Holton	MDWS Circ Clerk	Library
Ron Hoskins	Admin Specialist II	DUHMD/PS
Duane Hudson	Deputy Finance Director/Controller	Finance Department
Don Ingle	IT Director	IT
Joshua Jackson	Court Specialist	Municipal Court
Jody Jacobson	Communications Coordinator	Public Works and Community Planning & Sustainability
Tresa Jacob	Banking Services Accountant	Finance
Leigh Jesser	Parking Attendant Supervisor	DUHMD/PS
Julie Johnston	Senior Planner	Community Planning & Sustainability
Mark Johnson	BC-Fire	Fire
Whit Johnson	Resource Info. Supervisor	Open Space and Mountain Parks (OSMP)
Noel Johnson	SCADA System Administrator	Public Works/Utilities
Rick Jones	HD Coordinator	IT
Vicki Jones	Process Optimization Specialist	Public Works/Utilities
Krissy Kaplan	HRIS Manager	HR
Tamara Killian	Budget Specialist	Parks and Recreation
Sally Kornbith	Cataloger	Library
Kip Korthuis	Captain	Boulder Fire
Leslie Labrecque	Webmaster	IT
John Leither	Trails Specialist	OSMP
Beth Lemur	Financial Manager	IT
Terri Lewis	Tech. Services Supervisor	Library
Kim Liakea	Central Supervisor	P/R
Carol Linn	Financial Manager	Public Works/Utilities
Brett Liwendelsen	Water Quality Coordinator	Public Works/Utilities
Barbara Long	HHS Finance Assistant	Housing
Marnie Lowrey	Application Support	Public Works/Utilities
Terri Luebs	Finance Systems Manager	Finance

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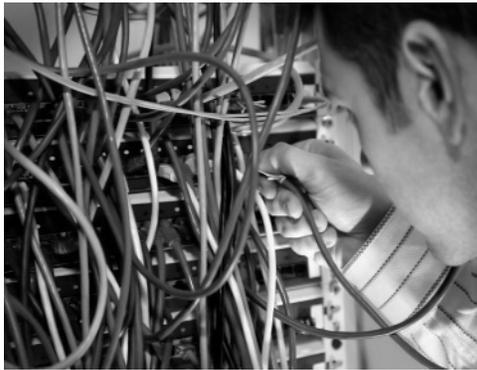
Name	Position/Title	Department/Agency
Catherine Maestas	Draftsperson II	Public Works/Utilities
Melinda Mattingly	Reference and Collections Manager	Library
Kurt Mauthues	Mar Parking Services	PUHMD/PS
Kim McClesky	PC Support Manager	IT
Renee J. McCoy	Information Specialist	Police Records
Mary McKeihan	Administrative Assistant	Parks and Recreation
Bill McLure	Network Services	IT
Allyn McMullin	System Administrator	Network Services
David Mallett	Customer Service Team Member	P&R
Chris Meschuk	Planner I	Community Planning & Sustainability
Ted Morrison	Ent. Services Manager	IT
Joe Mulder	Customer Services Team Member	Parks & Recreation
Cory Nicholas	Police Officer	Police / Patrol
Kristi Nicholson	Financial Admin Specialist III	Municipal Court
Lisa Nieman	Web Specialist	Parks and Recreation
Abbie Novak	Business Finance Manager	P&R
Elizabeth Ordaltz	Apps Developer	IT
Mike Orosel	Finance Manager	Open Space & Mountain Parks
Bridget Pankow	Admin Specialist	Financial Services
Ferne Parmenter	DBA	IT
Michael Patton	Director of OSMP	OSMP
Wanda Pelegrina Caldas	CYF/PRS	HHS/CYF
Tara Peltier	Software Developer	IT
Bruce Penfold	Lieutenant Police Officer	Boulder Fire
Scott Phelps	Help Desk	IT
Teresa Plutos	Admin Specialist	Police S&S Services
Neil Poulsen	Chief Building Official	Public Works/Development & Support Services
Michael Purcell	Computerized Irrigation Specialist	Parks
Maureen Rait	Executive Director of Public Works	Public Works
Jim Reasor	Budget Manager	Finance
Sarah Rebman	Senior Services	HHS/Senior Services

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Name	Position/Title	Department/Agency
John Reilly	Network Engineer	IT
Mel Rhamey	Detective	Boulder Police
Ross Richard	Traffic Officer	BPD
Penn Richmann	Applications Manager	IT
David Ritchey	Tiburon System Admin	Police / Records
Nestor Rizo-Patdon	Software Developer	IT
Leanne Rizzo	Circ Specialist	Library
Beth Roberts	HHS Coordinator	Housing
Shane Rodgers	Police Officer	Traffic
Sean Roth	Apps Developer	IT
Shelly Ruspakka	Communications	Parks & Recreation
Randall Rutsch	Senior Transportation Planner	Public Works/Transportation
Phil Sanders	Senior Engineering Technician	Public Works/Transportation
Don Schuler	Police Officer	Patrol WI
Gina Scioscia	Reference Specialist	Library
Manuel Sedillo	LT-Fire	Fire
Dave Seper	Sergeant Detective	Detectives/TSP
Diana Sherry	Director of Boulder Reads!	Library
Cindy Smith	Children Youth & Facilities Div. Mgr.	CYF/HHS
Betty Solek	Water Quality Planner	Public Works/Utilities
Jon D. Soloman	Digital Services Manager	Library
Maureen Spitzer	Landscape Designer	Parks & Recreation
Andrea Spraggs	Records Supervisor	Police
Cindy Spritzer	HHS/Senior Services/PR	Seniors/PR
Miriam Sproul	Project Manager	IT
Elijah Stephenson	Maintenance Person III	Public Works/Transportation
Terry Stonich	Information Resources	Public Works and Community Planning & Sustainability
Jay Subramaniam	DBA	IT
Eric Swanson	CYF Administrator	CYF
Mike Sweeney	Traffic Engineer	Public Works/Transportation
Jayson Swigart	Center Supervisor (SBRC)	Recreation
Tony Tallert	Library and Arts Director	Library

A

Name	Position/Title	Department/Agency
Matt Taran	Program Planner	Public Works/Utilities
Anna Taylor	HHS/Senior Services	Seniors
Chris Toebe	Project Specialist II	Public Works and Community Planning & Sustainability
Mitch Trujillo	Officer	BPD
Karl Veitch	Police Officer	Traffic/Patrol
Donald Vetterling	Temporary Administrative	Public Works/Utilities
Sam VeuCasovic	Facilities Coordinator I	Public Works/Development & Support Services
Mary Wallace	Legal Secretary	CAO
Kurt Weiler	Police Commander	Police
Ruth Weiss	Admin Specialist DU	DUHMD/PS
Kip White	GIS DBA	IT
Steve Whitehead	Shelving Aide	Library
Paul Williams	Network Planner	IT
Karla Wood	Revenue and Expenditure Analyst	Public Works and Community Planning & Sustainability
Frank Young	Deputy Fire Chief	Fire



Appendix B: **Business Function Model**

A business function model identifies the activities an organization performs to meet its business and service objectives. Each of the activities shown in a business function model becomes a potential candidate for automation. The model, therefore, serves as a template for driving an organization's overall approach to automating its business functions.

It is important to distinguish between a function model and an organization model. An organization model depicts an organization's structure, typically in a hierarchical fashion. A business function model depicts *what* an organization does, independent of *who* does it in the organizational structure.

Business functions tend to be much more stable than organizational units. Organizations typically change over time to accommodate changes in how services are delivered. The business functions themselves remain relatively unchanged, unless the organization significantly alters its mix of services.

Pacific Technologies Inc. worked with members of Boulder's project team to develop a business function model for the City. PTI then utilized this model to drive the development of an ideal application architecture for the City of Boulder, presented in Appendix C.

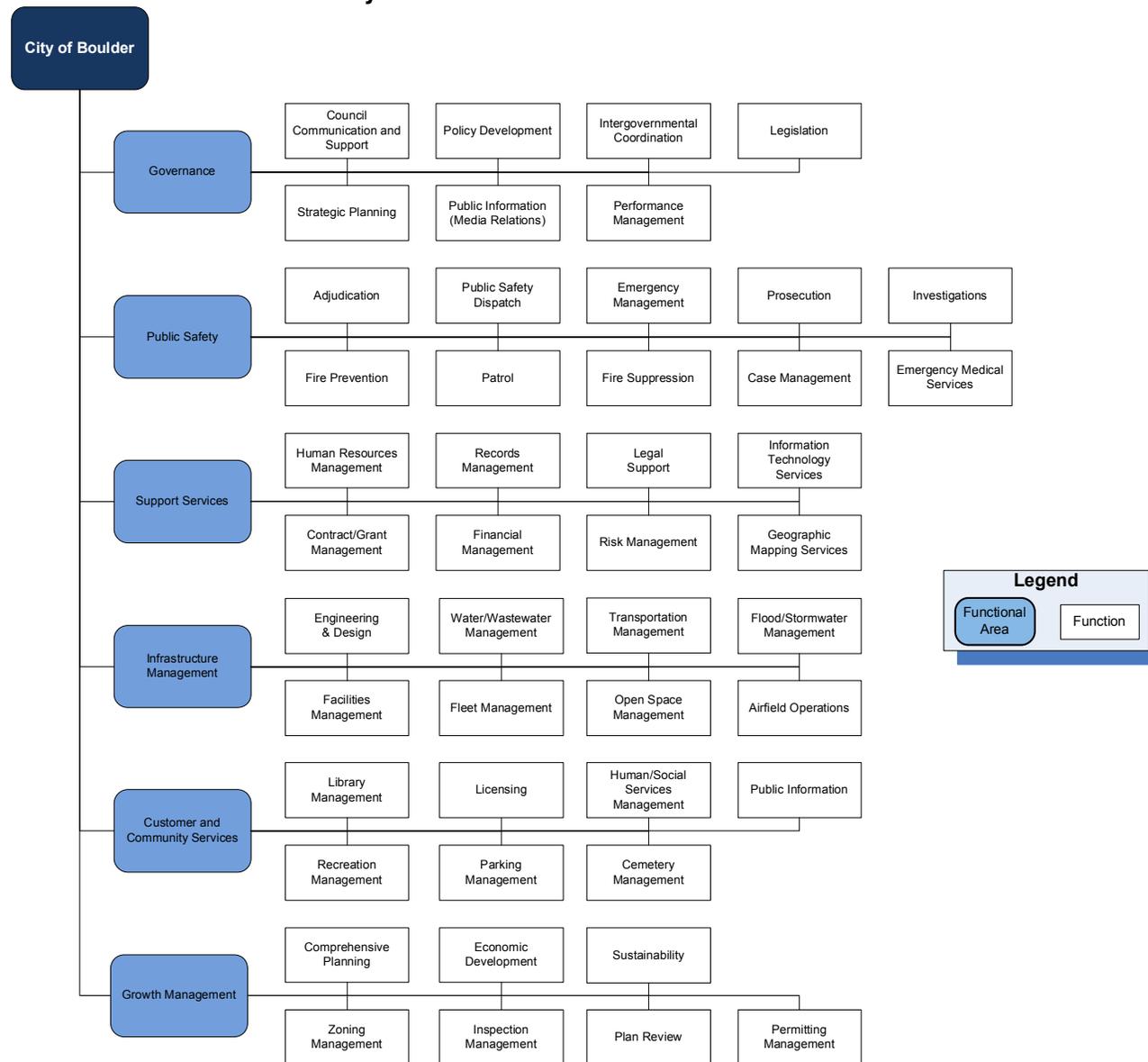
Business function models contain two primary components:

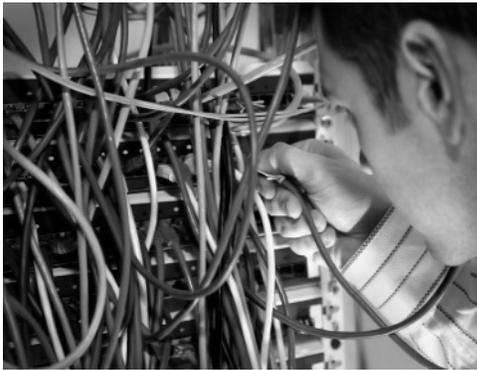
- ◆ **Functional Areas** – the major categorization of all tasks required to conduct business (e.g., Public Safety)
- ◆ **Functions** – a group of ongoing activities, which together completely support one functional area (e.g., Incident Response)

The diagram on the following page depicts a model of the City of Boulder's business. The "roundtangles" represent functional areas. The rectangles connected to the right of the "roundtangles" represent subordinate business functions.

Please note that the order in which the functional areas, functions, and sub-functions are listed, does not imply any precedence of dependence.

City of Boulder Business Function Model





Appendix C: **Ideal Application Architecture**



Based upon the City's business function model (Appendix B), Pacific Technologies, Inc. developed an ideal application architecture to support Boulder's critical business functions and services. The ideal application architecture on the following page illustrates those specialized applications that – in an ideal environment – would support each of the City's business functional areas (listed across the top of the diagram), as well as shared and citywide applications that would support multiple functional areas.

PTI then worked with the City – through interviews, focus groups, desk-side application reviews, and a workshop with city stakeholders – to conduct a gap analysis of existing business applications.

PTI first documented application strengths and weaknesses during interviews and focus groups with city staff.

PTI then conducted desk-side application reviews, during which power users were asked to assign a gap on a scale of 1 (severe gap) to 5 (no gap) for six separate evaluation criteria:

- **Functionality** – the ability of the application to support necessary business processes
- **Ease of use** – the degree of user friendliness of the application's interface, screen layout, navigation, etc.
- **Integration** – the degree to which the application shares data with other applications, to minimize duplicate data entry
- **Implementation** – the degree to which the department's purchased application has been deployed
- **Reporting** – the appropriateness of canned reports and the degree/ease of report customization
- **Supporting systems** – the reliability, responsiveness, and/or "newness" of the support operating system, databases, etc.

Finally, PTI revised and validated these gap assignments during a workshop with the City's project steering team.

The gaps assigned in the following diagram represent the gap between the functionality of existing applications and the target or ideal application environment, based on PTI's analysis described above. Specifically:

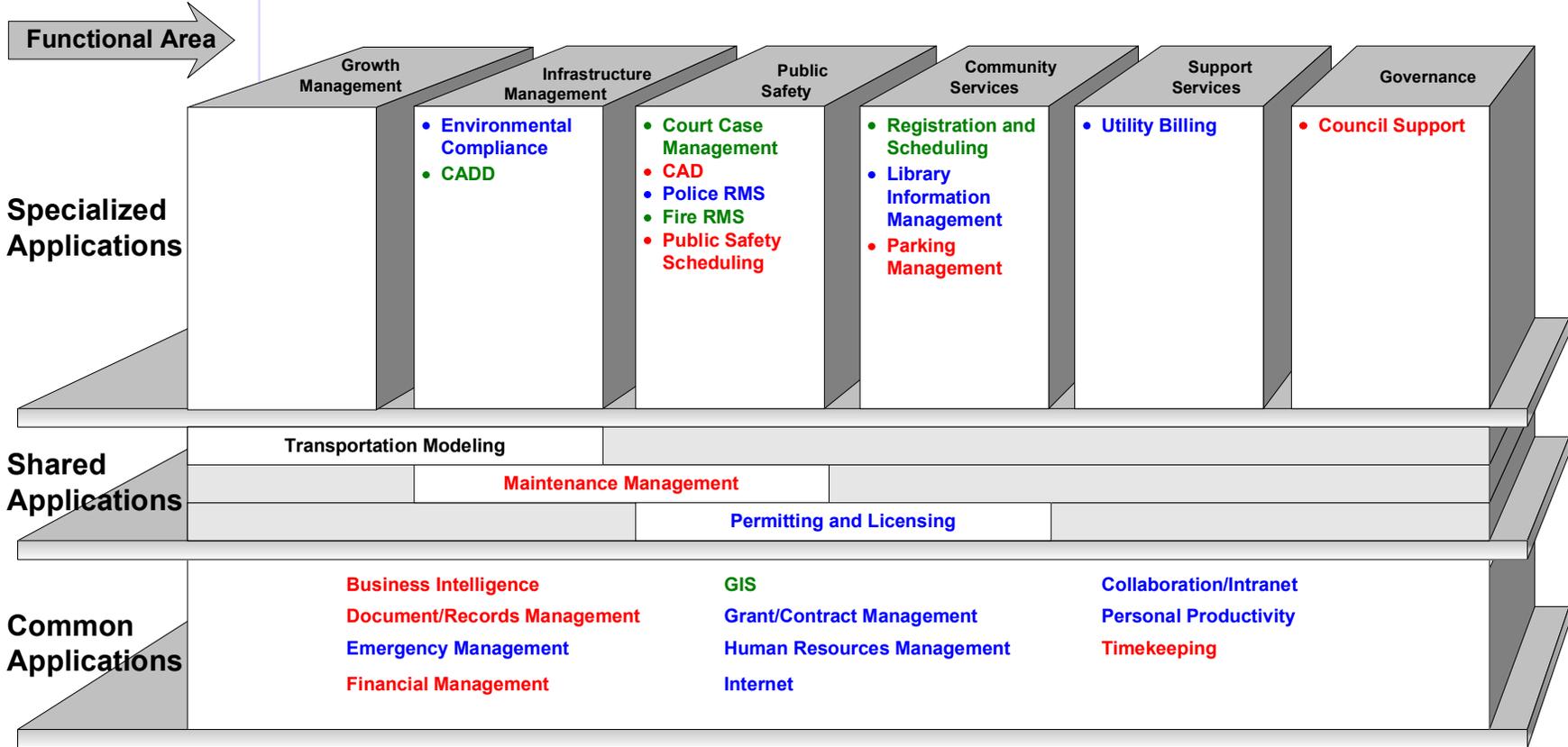
- ◆ Minimal gap – the City's application is technically current, easy to use, integrated with other key city applications and offers sufficient functionality
- ◆ Moderate gap – the City's application is aging, moderately difficult to use, integrated with some key applications, and meets most needs but requires more investment to offer desired functionality

- ◆ Severe gap – the City’s application is at or beyond end-of-life, is difficult to use, integrated with few or no other key city applications, and meets very few needs – these applications require significant investment or replacement to offer needed functionality

In some cases, no current application corresponds to the ideal state. In these cases, the severe gap results from the absence of ideal functionality. Where the gap is severe, opportunities exist for significant return on investment.



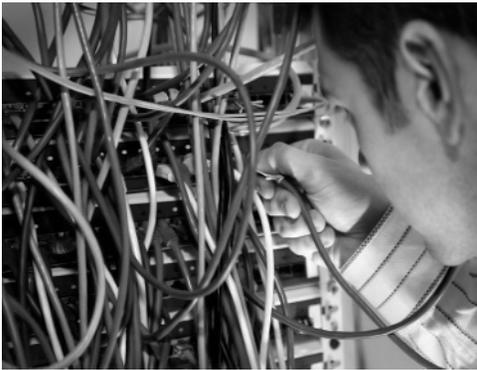
City of Boulder Ideal Application Architecture and Gap Analysis



Overall Gap Assessment	Minimal
	Moderate
	Severe
	Not Reviewed

Number of Applications by Gap





Appendix D: IT Staffing Detail

In developing the information technology service delivery findings in Chapter 2, PTI evaluated information technology staffing levels across five functional areas:

- **Customer Support** – labor related to directly helping end users utilize IT systems and services (e.g., help desk, tier 2 support)
- **Infrastructure Support** – labor related to implementing and maintaining the organization’s computers, systems software, and connectivity (e.g., servers, networks)
- **Application Support** – labor related to developing, installing, configuring, and otherwise maintaining the software needed to meet the operational, management, and reporting requirements of the organization
- **IT Planning** – labor related to technology planning and governance
- **IT Administration** – labor related to the oversight and administration of technology

The tables presented on the following pages reflect ongoing operations and maintenance (O&M) labor expressed as a percentage of full time equivalent (FTE) effort. They do not include IT labor paid for by capital allocations.

City staff initially provided this data, and reviewed and validated it after PTI assembled and analyzed it.

The table below presents a breakout of technology staffing levels and allocation between the central IT department and the City's business units.

IT-titled Staff Labor Distribution*			
	IT FTE	% of all City IT FTE	% of all City FTE
Central IT	31.64	66.3%	2.43%
Business Units	16.06	33.7%	1.23%
Total City IT FTE	47.70	100.0%	3.66%
			*Excluding Shadow Staff



The table below summarizes the technology labor effort related to each of the IT disciplines.

IT Functions	IT-Titled Staff - Labor Effort					
	IT Department FTE	IT Department Allocation	Business Units' IT FTE	Business Units' Allocation	Citywide IT FTE	Citywide Allocation
Customer Services	8.46	26.7%	4.23	26.4%	12.69	26.6%
Infrastructure Services	7.84	24.8%	3.00	18.7%	10.84	22.7%
Application Services	8.10	25.6%	5.53	34.4%	13.63	28.6%
IT Planning	2.40	7.6%	1.47	9.1%	3.87	8.1%
IT Administration	4.84	15.3%	1.83	11.4%	6.67	14.0%
Total:	31.64	100.0%	16.06	100.0%	47.70	100.0%

The following table presents a detailed overview of the City's *application support discipline* staffing levels. These numbers are representative of the effort devoted to support for software of a particular business function area.

Application Services	IT-Titled Staff - Application Area Labor Effort					
	IT Department FTE	IT Department Allocation	Business Units' IT FTE	Business Units' Allocation	Citywide IT FTE	Citywide Allocation
GIS Support	0.77	9.6%	0.20	3.6%	0.97	7.2%
Law, Safety and Justice	0.24	3.0%	2.05	37.1%	2.29	16.9%
Public Infrastructure	0.01	0.1%	0.53	9.6%	0.54	4.0%
Planning and Development	0.70	8.8%	0.32	5.8%	1.02	7.5%
Community Services	0.28	3.5%	1.14	20.6%	1.42	10.5%
Governance and Administration	0.18	2.3%	0.00	0.0%	0.18	1.3%
Support Services	4.26	53.3%	1.02	18.4%	5.28	39.0%
eGovernment (Web/Internet)	1.56	19.5%	0.27	4.9%	1.83	13.5%
Total:	8.00	100.0%	5.53	100.0%	13.53	100.0%



The following tables present summary data for the staffing matrix, completed and verified by the City during the assessment phase of this project, for FTE counts and labor costs. Due to the nature and size of the data set, the full matrix and associated data cannot be effectively presented in this report. Definitions for each of the IT disciplines and associated activities used in the staffing matrix follow the summary tables.

	Central Org IT Staff	Business Unit IT Staff	FTE TOTAL
FTE Totals			
Customer Services	8.46	4.23	12.69
Help Desk (Tier 1)	1.96	1.24	3.20
Tier 2 support:	5.08	1.03	6.11
Personal Computer Support	2.42	0.70	3.12
Portable Device/Specialized Device Support	1.38	0.12	1.50
Personal Productivity Tool Support	1.28	0.21	1.49
Business Application Support	0.78	1.05	1.83
Training	0.64	0.91	1.55
Infrastructure Services	7.84	3.00	10.84
Personal Computer Administration	0.66	0.30	0.96
Database Administration	1.41	0.87	2.28
Security Administration	0.45	0.13	0.58
Data Center/Server Room Operations	0.33	0.28	0.61
Project Management	0.26	0.45	0.71
Server Administration:	2.99	0.76	3.75
Email/Calendar Administration	0.65	0.20	0.85
File/Print Administration	0.40	0.11	0.51
Application Server Administration	0.72	0.15	0.87
Database Server Administration	0.32	0.09	0.41
Storage Administration	0.30	0.12	0.42
Other Server Administration	0.60	0.09	0.69
Communication Services:	1.74	0.21	1.95
Network Administration (WAN/LAN/Wireless)	1.12	0.13	1.25
Radio Support	0.00	0.00	0.00
Telephone Systems Support	0.62	0.08	0.70
Business Application Services	8.70	5.53	13.63
Law, Safety and Justice	0.32	2.06	2.38
Packaged application support	0.13	1.04	1.17
Custom application support	0.11	1.01	1.12
GIS Support	0.08	0.01	0.09
Public Infrastructure	0.11	0.57	0.68
Packaged application support	0.01	0.28	0.29
Custom application support	0.00	0.25	0.25
GIS Support	0.10	0.04	0.15
Planning and Development	0.80	0.37	1.17
Packaged application support	0.53	0.28	0.81
Custom application support	0.17	0.04	0.21
GIS Support	0.10	0.05	0.15
Community Services	0.31	1.14	1.45
Packaged application support	0.04	0.68	0.72
Custom application support	0.24	0.46	0.70
GIS Support	0.03	0.00	0.03
Governance and Administration	0.23	0.00	0.23
Packaged application support	0.03	0.00	0.03
Custom application support	0.15	0.00	0.15
GIS Support	0.05	0.00	0.05
Support Services	4.50	1.02	5.52
Packaged application support	2.47	0.62	3.09
Custom application support	1.79	0.40	2.19
GIS Support	0.24	0.00	0.24
eGovernment (Web/Internet)	1.73	0.37	2.10
Packaged application support	0.58	0.09	0.67
Custom application support	0.98	0.18	1.16
GIS Support	0.17	0.10	0.27
Geographic Information Systems (GIS)	0.70	0.00	0.70
Packaged application support	0.05	0.00	0.05
Custom application support	0.05	0.00	0.05
GIS Support	0.00	0.00	0.00
IT Planning	2.40	1.47	3.87
Strategic planning & governance	1.06	0.58	1.64
Research and development	0.79	0.62	1.41
Disaster recovery/planning	0.55	0.27	0.82
IT Administration	4.84	1.83	6.67
Asset management	0.73	0.31	1.04
IT procurement	0.75	0.16	0.91
Standards and policies development	0.53	0.22	0.75
Customer Account Management	0.82	0.18	1.00
Administrative support	0.55	0.11	0.66
Departmental management	1.46	0.85	2.31
Geographic Information Systems			
GIS Data Entry/Maintenance	0.00	5.13	0.17
Capital IT Projects			
Capital IT Project Labor	4.97	0.85	5.82
Totals (excluding capital projects):	31.64	16.06	47.70

	Central Org IT Staff	Business Unit IT Staff	Cost TOTAL
Cost Totals			
Customer Services	\$ 654,930	\$ 323,974	\$ 978,904
Help Desk (Tier 1)	\$ 109,140	\$ 92,636	\$ 201,777
Tier 2 support:	\$ 419,892	\$ 78,781	\$ 498,672
Personal Computer Support	\$ 208,408	\$ 53,137	\$ 261,545
Portable Device/Specialized Device Support	\$ 118,329	\$ 8,977	\$ 127,306
Personal Productivity Tool Support	\$ 93,155	\$ 16,666	\$ 109,821
Business Application Support	\$ 70,533	\$ 81,084	\$ 151,617
Training	\$ 55,364	\$ 71,473	\$ 126,837
Infrastructure Services	\$ 702,040	\$ 246,594	\$ 948,634
Personal Computer Administration	\$ 53,580	\$ 22,804	\$ 76,383
Database Administration	\$ 168,526	\$ 65,230	\$ 233,756
Security Administration	\$ 31,006	\$ 11,831	\$ 42,837
Data Center/Server Room Operations	\$ 24,571	\$ 22,279	\$ 46,850
Project Management	\$ 41,870	\$ 40,806	\$ 82,676
Server Administration:	\$ 237,653	\$ 67,136	\$ 304,789
Email/Calendar Administration	\$ 54,487	\$ 15,774	\$ 70,262
File/Print Administration	\$ 40,955	\$ 8,648	\$ 49,603
Application Server Administration	\$ 60,970	\$ 14,697	\$ 75,668
Database Server Administration	\$ 16,710	\$ 8,724	\$ 25,434
Storage Administration	\$ 15,298	\$ 10,365	\$ 25,663
Other Server Administration	\$ 49,231	\$ 8,928	\$ 58,160
Communication Services:	\$ 144,834	\$ 16,509	\$ 161,343
Network Administration (WAN/LAN/Wireless)	\$ 139,448	\$ 10,906	\$ 150,354
Radio Support	\$ -	\$ -	\$ -
Telephone Systems Support	\$ 5,387	\$ 5,603	\$ 10,990
Business Application Services	\$ 820,840	\$ 572,851	\$ 1,393,691
Law, Safety and Justice	\$ 40,072	\$ 169,993	\$ 210,064
Packaged application support	\$ 16,070	\$ 75,825	\$ 91,895
Custom application support	\$ 13,585	\$ 93,120	\$ 106,705
Project Management	\$ 10,417	\$ 1,048	\$ 11,465
Public Infrastructure	\$ 14,156	\$ 119,109	\$ 133,265
Packaged application support	\$ 1,134	\$ 76,752	\$ 77,886
Custom application support	\$ -	\$ 38,724	\$ 38,724
Project Management	\$ 13,021	\$ 3,633	\$ 16,654
Planning and Development	\$ 78,600	\$ 38,140	\$ 116,740
Packaged application support	\$ 46,522	\$ 25,398	\$ 71,920
Custom application support	\$ 20,279	\$ 7,904	\$ 28,183
Project Management	\$ 11,799	\$ 4,838	\$ 16,638
Community Services	\$ 30,905	\$ 94,286	\$ 125,191
Packaged application support	\$ 3,877	\$ 55,639	\$ 59,516
Custom application support	\$ 23,121	\$ 61,768	\$ 84,889
Project Management	\$ 3,906	\$ -	\$ 3,906
Governance and Administration	\$ 4,002	\$ -	\$ 4,002
Packaged application support	\$ -	\$ -	\$ -
Custom application support	\$ 17,337	\$ -	\$ 17,337
Project Management	\$ 6,175	\$ -	\$ 6,175
Support Services	\$ 474,947	\$ 112,500	\$ 587,446
Packaged application support	\$ 249,842	\$ 54,584	\$ 304,426
Custom application support	\$ 193,853	\$ 57,915	\$ 251,769
Project Management	\$ 31,251	\$ -	\$ 31,251
eGovernment (Web/Internet)	\$ 143,711	\$ 38,824	\$ 182,535
Packaged application support	\$ 37,410	\$ 6,560	\$ 43,970
Custom application support	\$ 85,005	\$ 23,952	\$ 108,956
Project Management	\$ 21,297	\$ 8,312	\$ 29,609
Geographic Information Systems (GIS)	\$ 10,936	\$ -	\$ 10,936
Packaged application support	\$ 5,468	\$ -	\$ 5,468
Custom application support	\$ 5,468	\$ -	\$ 5,468
Project Management	\$ -	\$ -	\$ -
IT Planning	\$ 243,557	\$ 127,237	\$ 370,794
Strategic planning & governance	\$ 123,172	\$ 48,547	\$ 171,719
Research and development	\$ 78,974	\$ 54,262	\$ 133,237
Disaster recovery/planning	\$ 41,410	\$ 24,428	\$ 65,839
IT Administration	\$ 438,412	\$ 178,460	\$ 616,872
Asset management	\$ 53,810	\$ 36,399	\$ 90,209
IT procurement	\$ 56,653	\$ 17,522	\$ 74,175
Standards and policies development	\$ 53,507	\$ 22,165	\$ 75,672
Customer Account Management	\$ 73,969	\$ 18,064	\$ 92,033
Administrative support	\$ 39,923	\$ 13,338	\$ 53,261
Departmental management	\$ 160,551	\$ 70,971	\$ 231,522
Capital IT Projects	\$ -	\$ 1	\$ 1
Capital IT Project Labor	\$ -	\$ 1	\$ 1
Totals (excluding capital projects):	\$ 2,859,779	\$ 1,449,116	\$ 4,308,895

Customer Support

Customer Services includes those activities related to directly supporting users of IT systems and services (e.g., help desk).

Help Desk (Tier 1)

The activities related to providing a first point of contact for users to report problems and seek answers to questions related to their personal computers, network access, email, personal productivity software, and business application software. Includes initial problem resolution, triage, and problem escalation.

Tier 2 Support

The activities related to providing in-person assistance with the software and hardware that support user work functions, including PCs, handhelds and other mobile devices, peripherals, and specialized computing environments such as public kiosks.

Personal Computer Support (Tier 2)

The activities related to onsite support of the organization's network applications (e.g., calendar, email, etc.), desktop computers, laptop computers, terminals, and attendant operating systems and peripherals.

Portable/Specialized Device Support (Tier 2)

The processes related to onsite support of personal digital assistants (PDAs), including troubleshooting syncing to desktop PCs, network connectivity, and their business-specific applications. The processes related to onsite support of the special purpose devices (beyond portable devices), such as kiosks, mobile data terminals (MDTs), etc., along with attendant peripherals.

Personal Productivity Tool Support (Tier 2)

The processes related to providing onsite end user support concerning the use of desktop applications such as word processing, spreadsheets, presentation tools, and other organizational office productivity tools.

Business Application Support (Tier 2)

The processes related to providing end-user support (answering questions, etc.) regarding the use of business-specific software (e.g., financial management, permit management, etc.) beyond that which is provided by the first point of contact.

Training

The processes related to providing technology-related instruction to staff aimed at enhancing their skills, knowledge, and performance. Includes training requirement analysis, course design and development, and training delivery.

Infrastructure Support

Infrastructure Services include those activities related to implementing and maintaining the organization's computers, systems software, and connectivity (servers, networks, etc.).

Personal Computer Administration

The activities related to the setup, configuration, original installation, and scheduled maintenance of end users' desktop and laptop computers, end-user terminals, and related peripherals. Includes installation and configuration of PC operating systems and software, such as personal productivity tools and anti-virus applications. Includes the creation and maintenance of disk images, application of patches and updates, and all scheduled maintenance.

Database Administration

The processes related to planning, implementing, and administering the data structures required to support the organization's applications portfolio, and to maintaining the data contained within the Organization's defined data structures. Includes performance management and recovery.

Security Administration

The processes related to developing, maintaining, and administering the security plan for the organization's host processors, servers, personal computers, communication devices and networks. Does not include installation of desktop security tools nor server account management – does include managing centrally managed server based security solutions.

Data Center/Server Room Operations

The processes related to the planning, administration, and operation of the facility that houses all centralized citywide computing equipment, including backup/restore operations and storage management. It also includes operation and maintenance of the attendant systems, including fire suppression, backup electrical power, air conditioning, etc.

Project Management

Those processes related to the oversight and coordination of major systems-related technology initiatives.

Server Administration

The activities related to implementing and maintaining servers, including both Intel-based and mid-range devices (such as AS/400). These activities also include administration, account management, and operation of file, print, and application servers and other logical network devices; performance management; tuning; applying operating system patches and upgrades; and administering configuration data.

Email/Calendaring Administration

Administration of email and calendaring servers, including account set-up, backup administration, account restoration, etc.

File/Print Administration

Administration of file and print servers including account administration, print queue monitoring, back-up and optimization, etc.

Application Server Administration

Administration of servers used to house or deliver application software to end-users. Includes account administration, optimization of network connectivity, data backup, database restoration, etc. Covers ERP and departmental application hosting, as well as GIS, Web sites for eGovernment and/or Intranet, etc.

Database Server Administration

Labor concerned with maintaining the hardware and network capabilities associated with the Organization's database servers. Examples include assessing and increasing storage capacity, improving data throughput, overseeing server access security, etc.

Storage Administration

Labor associated with the administration of SANS/NAS data storage, centralized archival storage systems and/or off site data storage. Activities would include performing scheduled backups, assessing storage capacity and growth demands, setting end-user storage quotas, monitoring data storage security and integrity, assisting with emergency planning and data recovery efforts, etc.

Other Server Administration

Administration of any other servers not accounted for in the prior categories. Examples may be dedicated proprietary SCADA servers, server used for administration of MDTs or other secure communications services, video and webcasting servers, etc. NOTE: Web server administration is NOT in this category -- labor related to these should go under "Application Server Administration", above.

Communication Services

Administration of the devices, services and vendors responsible for voice and data communication within and external to the organization. May include infrastructure device installation and maintenance (phones, routers, etc.), and managing service agreements and relationships with vendors and/or contractors.

Network Administration (LAN/WAN/Wireless)

The activities related to implementing and maintaining the operational integrity of the organization's local and wide-area networks, both wired and wireless, and video technology. Technologies include building wiring, fiber optic data circuits, and point-to-point technologies such as laser and microwave. These activities include responding to user requests for assistance, performance monitoring, coordinating with external network service providers, and taking appropriate corrective actions as needed.

Radio Support

The activities related to maintaining a radio communication infrastructure inclusive of end-user radio support for both public safety and other government needs. May include direct infrastructure technical support or oversight of independent contractors, and managing vendor relationships. Staff in this role may be involved in developing radio maintenance procedures and operational policies, communications protocols, and/or emergency response planning efforts.

Telephone Systems Support

Implementation, administration and management of analog and/or Voice over IP telephone services, including number assignment, phone moves, voice mail system management, connectivity, switch or gateway maintenance, etc.

Application Support

Application Services includes those activities related to developing, installing, configuring, and otherwise maintaining the software needed to meet the operational, management, and reporting requirements of the organization.

Law, Safety, and Justice

Management and maintenance of the applications related to the administration and delivery of services within law enforcement, emergency services, fire services and court automation systems.

Public Infrastructure

Management and maintenance of the applications related to supporting the organizations utilities, transit, and transportation infrastructure, and other major physical assets.

Planning and Development

Management and maintenance of the applications related to the administration of the organizations planning and development automation, such as permit issuance, land use planning, code enforcement, etc.

Community Services

Management and maintenance of the applications related to the delivery of social services, health, and recreation.

Governance and Administration

Management and maintenance of the applications that support elections, legislative decision support, and related functions of the organization.

Support Services

Management and maintenance of the applications that are used to support to internal administrative needs.

eGovernment (Web/Internet)

Management and maintenance of applications related to design, maintenance, and development of internal and public-facing web pages and online services not covered by business applications in other categories.

Geographic Information System (GIS)

Management and maintenance of the applications related to the design, development, and maintenance of mapping layers, mapping data, and data conversion.

IT Planning

IT Planning includes those activities related to planning for the technology function at the organization.

Strategic Planning and Governance

The processes related to identifying and evaluating the future directions for IT application, networks, and hardware for the organization. Includes strategic planning, evaluating and prioritizing IT investments, technology research, participating in committees and task forces, and feasibility studies.

Research and Development

The processes related to evaluation and testing of current and future IT products and services, and to the deployment of pilot projects to test the viability of these technologies for the organization. Includes dissemination of relevant information to appropriate parties.

Disaster Recovery/Planning

The processes related to developing, maintaining, updating, and testing the organization's IT disaster recovery/business resumption plan, and to activating and managing the plan in the event of a disaster.

IT Administration

IT Administration includes those activities related to the oversight and administration of the technology function at the organization.

Asset Management

The processes related to managing the IT properties of the organization, include tracking serial number, warranty, and inventory.

IT Procurement

The processes related to acquisition of goods and services in support of all IT functions; including the development of RFP's, evaluation and selection of vendors, management of purchasing activities, receipt and inventory of goods, and tracking of warranty information and performance guarantees.

Standards and Policies Development

Those processes related to the creation and updating of citywide IT standards and policies related to hardware, software, procurement, security, and staffing.

Customer Account Management

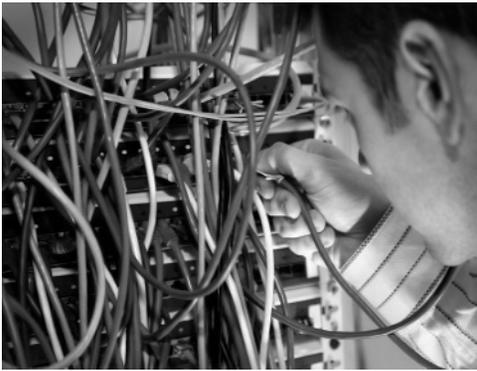
Staff work in conjunction with departments or divisions guaranteeing that service level agreements are adhered to and customer needs are being met. Includes tracking and reporting service levels, business need assessments and service gap determination, and the collection and reporting of service measures (e.g., tier 1 and tier 2 response and resolution rates, customer satisfaction surveys). May also include directly managing vendor service contracts or assisting with vendor relationship management.

Administrative Support

The processes related to the provision of clerical, administrative, and related services required for the ongoing operation of the IT division.

Departmental Management

The processes related to management and oversight of the organization's technology functions: including staff evaluation, quality assurance, and budgeting.



Appendix E: Implementation Project Descriptions

This section describes the recommended strategic technology projects, grouped by Boulder's IT goals:

- Service Quality and Accessibility
- IT Service and Decision Making Alignment
- Efficiency and Effectiveness
- Innovation
- Quality, Sustainable IT Infrastructure

Global Cost and Labor Assumptions

PTI costed each project adhering to the following global assumptions:

- All costs are incremental to current City budgets (i.e., the figures do not include amounts already budgeted) unless otherwise noted
- A work year (FTE) comprises 1,761 hours
- All central IT and business unit subject matter expert (SME) labor effort estimates are in FTE
- Costs are applied to internal labor at the following burdened labor rates:
 - ◆ Business unit (SME) – \$44.20
 - ◆ Central IT – \$56.69
- One-time internal labor estimates are calculated based on total required labor effort over the duration of the project
- Backfill is not included
- All external (i.e., professional services) labor effort estimates are in hours
- Costs are applied to external labor (e.g., procurement, implementation, project management, quality assurance services, training, and miscellaneous consulting) at \$150 per hour
- Software and hardware cost estimates are informed by market research, where appropriate
- Recurring software costs are estimated at 20% of one-time license costs, except where otherwise noted
- Recurring hardware costs (e.g., maintenance, support) are estimated at 10% of one-time purchase costs, except where otherwise noted
- Recurring internal labor estimates are shown without associated dollars to provide context for the required amount of ongoing effort (note that Boulder may already have this effort allocated)

Sample Project – Cost Framework Explanation

The following pages detail the cost figures and assumptions behind PTI's recommended projects. Each page references the estimated costs and labor effort associated with a project, utilizing the framework below:

Cost Category	One-time			Recurring			
	FTE	Costs		Time (Hours)		Costs	
		Low	High	Low	High	Low	High
Internal Labor (Total)	14,088	\$ 411,176	\$ 666,679	2,201	4,403	\$ 119,290	\$ 238,580
Business Unit SME	7,804	10,566	\$ 311,345	\$ 467,017	440	881	\$ -
Central IT	1,761	3,522	\$ 99,831	\$ 199,662	1,761	3,522	\$ -
Professional Services Labor	9,313	14,386	\$ 1,396,950	\$ 2,157,900	80	120	\$ -
Procurement	400	600	\$ 60,000	\$ 90,000			\$ -
Implementation and Training	6,625	10,250	\$ 993,750				\$ -
Project Management	2,080	3,120	\$ 312,000				\$ -
Quality Assurance	208	416	\$ 31,200				\$ -
Hardware			\$ -				\$ 7,500
Software			\$ 420,000			\$ 84,000	\$ 150,000
Total Time and Costs	18,118	28,474	\$ 3,649,579	2,281	4,523	\$ 203,290	\$ 414,080

PTI estimated FTE for internal City labor and included cost projections using an average hourly rate.

When included, independent, third-party quality assurance is estimated at the high-end at **10%** of implementation costs for hardware and software implementation projects.

One-time external labor costs are calculated based on total required labor hours over the duration of the project.

Recurring hardware costs are estimated at **10%** of one-time purchase costs, except where otherwise noted.

Software and hardware cost estimates, where appropriate, are informed by market research.

Recurring software costs are estimated at **20%** of one-time purchase costs, except where otherwise noted.



1.1 Develop eGovernment strategic plan

This projects assesses Boulder’s current web presence, constructs a vision for the future of Boulder’s website, and identifies an implementation plan for achieving the City’s eGovernment goals. Feedback from internal staff and external stakeholders is crucial to the development of a website vision. The resulting plan is utilized in project 1.2 for guiding the City’s website redesign effort.

Budget category: Fiscally Constrained

Budget priority: Desirable

Cost Category	One-time				Recurring			
	Time*		Costs		Time*		Costs	
	Low	High	Low	High	Low	High	Low	High
Internal Labor (Total)	0.25	0.50	\$ 21,659	\$ 43,317	0.06	0.12	\$ -	\$ -
Business Unit SME	0.15	0.30	\$ 11,675	\$ 23,351	0.05	0.10	\$ -	\$ -
Central IT FTE	0.10	0.20	\$ 9,983	\$ 19,966	0.01	0.02	\$ -	\$ -
Professional Services Labor (Total)	350	500	\$ 52,500	\$ 75,000				
Procurement			\$ -	\$ -				
Implementation and Training	350	500	\$ 52,500	\$ 75,000				
Project Management			\$ -	\$ -				
Quality Assurance			\$ -	\$ -				
Hardware			\$ -	\$ -			\$ -	\$ -
Software			\$ -	\$ -			\$ -	\$ -
Total Cost			\$ 74,159	\$ 118,317			\$ -	\$ -

*PTI estimates internal labor in FTE and external labor in hours

Cost assumptions:

- .15 - .3 business unit SME FTE to:
 - Participate in focus groups and brainstorming activities
 - Validate the plan
- .1 - .2 central IT FTE to:
 - Manage the plan development effort
 - Participate in focus groups and brainstorming activities
 - Validate the plan
- The City utilizes external professional services for developing the plan
- Both business unit SME FTE and central IT FTE update the plan as new needs and technologies arise

1.2 Redesign the City's website

In accordance with the eGovernment strategic plan created in project 1.1, this project implements a redesigned website with current web technologies.

Budget category: Action

Budget priority: Essential

Cost Category	One-time				Recurring			
	Time*		Costs		Time*		Costs	
	Low	High	Low	High	Low	High	Low	High
Internal Labor (Total)	1.50	1.20	\$ 138,749	\$ 97,802	1.00	2.00	\$ -	\$ -
Business Unit SME	0.50	1.00	\$ 38,918	\$ 77,836			\$ -	\$ -
Central IT FTE	1.00	0.20	\$ 99,831	\$ 19,966	1.00	2.00	\$ -	\$ -
Professional Services Labor (Total)		1,600	\$ -	\$ 240,000				
Procurement			\$ -	\$ -				
Implementation and Training		1,600	\$ -	\$ 240,000			\$ -	\$ -
Project Management			\$ -	\$ -				
Quality Assurance			\$ -	\$ -				
Hardware			\$ -	\$ -			\$ -	\$ -
Software			\$ -	\$ -			\$ -	\$ -
Total Cost			\$ 138,749	\$ 337,802			\$ -	\$ -

*PTI estimates internal labor in FTE and external labor in hours

Cost assumptions:

- Business unit SME FTE:
 - Participate in focus groups/interviews
 - Help determine the new site's organization/information/services
- On the high end, the City contracts for web development services
- On the low end, central IT FTE designs and implements the new site
- On the high end, central IT FTE facilitates third-party design and implementation services
- Ongoing central IT FTE perform site administration, maintenance and design activities

1.3 Complete document management implementation

In accordance with project 2.6 (document management implementation plan) this project extends the initial document management pilot by implementing LaserFiche throughout the City.

Budget category: Action

Budget priority: Essential

Cost Category	One-time				Recurring			
	Time*		Costs		Time*		Costs	
	Low	High	Low	High	Low	High	Low	High
Internal Labor (Total)	2.25	4.00	\$ 191,628	\$ 344,337	0.35	0.70		
Business Unit SME	1.50	2.50	\$ 116,754	\$ 194,591	0.10	0.20	\$ -	\$ -
Central IT FTE	0.75	1.50	\$ 74,873	\$ 149,747	0.25	0.50	\$ -	\$ -
Professional Services Labor (Total)	1,020	1,760	\$ 153,000	\$ 264,000				
Procurement			\$ -	\$ -				
Implementation and Training	500	720	\$ 75,000	\$ 108,000			\$ -	\$ -
Project Management	520	1,040	\$ 78,000	\$ 156,000				
Quality Assurance			\$ -	\$ -				
Hardware			\$ -	\$ 110,000			\$ -	\$ 11,000
Software			\$ 50,000	\$ 75,000			\$ 10,000	\$ 15,000
Total Cost			\$ 394,628	\$ 793,337			\$ 10,000	\$ 26,000

*PTI estimates internal labor in FTE and external labor in hours

Cost assumptions:

- Business unit SME FTE participate in:
 - Workflow design
 - Process engineering
 - Training
 - System testing
- Central IT FTE:
 - Roll out client-side applications
 - Test the system
 - Train users
- Recurring business unit SME FTE effort informs ongoing system tailoring
- Central IT FTE effort performs ongoing system maintenance and administration

2.1 Implement formal citywide IT governance

This project establishes a citywide IT governance model for information technology at the City (detailed in Chapter 3). It re-charters the existing technology steering team and defines membership, scope of authority, roles, responsibilities, and relationships between central IT and other city departments. This project also creates the governance processes and associated tools to support IT project oversight.

Budget category: Fiscally Constrained

Budget priority: Essential

Cost Category	One-time				Recurring			
	Time*		Costs		Time*		Costs	
	Low	High	Low	High	Low	High	Low	High
Internal Labor (Total)	0.13	0.19	\$ 10,750	\$ 16,125	0.15	0.30	\$ -	\$ -
Business Unit SME	0.09	0.13	\$ 6,895	\$ 10,343	0.10	0.20	\$ -	\$ -
Central IT	0.04	0.06	\$ 3,855	\$ 5,782	0.05	0.10	\$ -	\$ -
Professional Services Labor (Total)		200	\$ -	\$ 30,000				
Procurement			\$ -	\$ -				
Implementation and Training		200	\$ -	\$ 30,000			\$ -	\$ -
Project Management			\$ -	\$ -				
Quality Assurance			\$ -	\$ -				
Hardware			\$ -	\$ -			\$ -	\$ -
Software			\$ -	\$ -			\$ -	\$ -
Total Cost			\$ 10,750	\$ 46,125			\$ -	\$ -

*PTI estimates internal labor in FTE and external labor in hours

Cost assumptions:

- Four 2-hour meetings with 12 department representatives to:
 - Establish objectives
 - Review and finalize the technology steering team charter
 - Review and finalize attendant processes and tools
- Additional central IT and business unit staff support for the development and finalization of materials
- On the high end, the City utilizes professional implementation/change management services
- On a recurring basis, the same group of business unit and central IT representatives meet 6 times per year

2.2 Establish IT performance measures

This project defines specific IT performance level targets, and establishes mechanisms to regularly monitor and report on targets.

Budget category: Fiscally Constrained

Budget priority: Essential

Cost Category	One-time				Recurring			
	Time*		Costs		Time*		Costs	
	Low	High	Low	High	Low	High	Low	High
Internal Labor (Total)	0.16	0.24	\$ 13,348	\$ 20,022	0.15	0.28	\$ -	\$ -
Business Unit SME	0.10	0.16	\$ 8,133	\$ 12,199	0.05	0.08	\$ -	\$ -
Central IT	0.05	0.08	\$ 5,215	\$ 7,823	0.10	0.20	\$ -	\$ -
Professional Services Labor (Total)		50	\$ -	\$ 7,500				
Procurement			\$ -	\$ -				
Implementation and Training		50	\$ -	\$ 7,500			\$ -	\$ -
Project Management			\$ -	\$ -				
Quality Assurance			\$ -	\$ -				
Hardware			\$ -	\$ -			\$ -	\$ -
Software			\$ -	\$ -			\$ -	\$ -
Total Cost			\$ 13,348	\$ 27,522			\$ -	\$ -

*PTI estimates internal labor in FTE and external labor in hours

Cost assumptions:

- Six 2-hour meetings with 12 department representatives to:
 - Establish objectives for reporting
 - Review and finalize performance targets
 - Review and finalize reporting mechanisms
- Additional central IT staff support for developing and finalizing materials
- On the high end, the City utilizes professional services to identify performance targets
- Recurring internal FTE perform ongoing measurement, analysis and reporting, as well as participate in six, 1-hour meetings for reviewing/analyzing performance reports and measures

2.3 Create IT CIP fund

This project develops an IT CIP funding model/approach and moves this approach through the City's governance process for approval.

Budget category: Fiscally Constrained

Budget priority: Essential

Cost Category	One-time				Recurring			
	Time*		Costs		Time*		Costs	
	Low	High	Low	High	Low	High	Low	High
Internal Labor (Total)	0.20	0.33	\$ 16,558	\$ 27,488			\$ -	\$ -
Business Unit SME	0.15	0.27	\$ 12,022	\$ 20,686			\$ -	\$ -
Central IT	0.05	0.07	\$ 4,535	\$ 6,803			\$ -	\$ -
Professional Services Labor (Total)		150	\$ -	\$ 22,500				
Procurement			\$ -	\$ -				
Implementation and Training		150	\$ -	\$ 22,500			\$ -	\$ -
Project Management			\$ -	\$ -				
Quality Assurance			\$ -	\$ -				
Hardware			\$ -	\$ -			\$ -	\$ -
Software			\$ -	\$ -			\$ -	\$ -
Total Cost			\$ 16,558	\$ 49,988			\$ -	\$ -

*PTI estimates internal labor in FTE and external labor in hours

Cost assumptions:

- Eight 2-hour meetings with 12 city representatives to:
 - Create the CIP fund
 - Acquire appropriate approvals
 - Implement new fund
- Additional business unit staff support the development and finalization of materials
- The City utilizes professional services for developing the funding model



2.4 Align IT charges with services

This project re-architects the computer replacement fund (CRF) to support only physical technology replacement using multiple tiers of workstation standards aligned with business needs. It also implements an IT O&M funding model that clearly aligns IT charges with services, as follows:

- Define a catalog of IT services:
- Align with private sector offerings
- Categorize as baseline or supplemental
- Directly fund IT baseline services
- Charge for IT supplemental services on a per use basis

Budget category: Fiscally Constrained

Budget priority: Essential

Cost Category	One-time				Recurring			
	Time*		Costs		Time*		Costs	
	Low	High	Low	High	Low	High	Low	High
Internal Labor (Total)	0.25	0.42	\$ 22,006	\$ 35,660			\$ -	\$ -
Business Unit SME	0.15	0.27	\$ 12,022	\$ 20,686			\$ -	\$ -
Central IT	0.10	0.15	\$ 9,983	\$ 14,975			\$ -	\$ -
Professional Services Labor (Total)		150	\$ -	\$ 22,500				
Procurement			\$ -	\$ -				
Implementation and Training		150	\$ -	\$ 22,500			\$ -	\$ -
Project Management			\$ -	\$ -				
Quality Assurance			\$ -	\$ -				
Hardware			\$ -	\$ -			\$ -	\$ -
Software			\$ -	\$ -			\$ -	\$ -
Total Cost			\$ 22,006	\$ 58,160			\$ -	\$ -

*PTI estimates internal labor in FTE and external labor in hours

Cost assumptions:

- Eight 2-hour meetings with 12 city representatives to:
 - Assess current IT O&M funding approach
 - Evaluate potential alternatives
 - Review and improve IT charges and rate structure
- Additional business unit staff support to develop and finalize attendant materials
- The City utilizes professional services for evaluating potential internal funding alternatives

2.5 Conduct financial management/ERP needs assessment

This project develops a plan to replace aging city finance and human resource systems. It evaluates alternatives (including integrated enterprise resource planning software), estimates costs, and establishes an implementation timeline, including key milestones and resource assignments.

Budget category: Action

Budget priority: Desirable

Cost Category	One-time				Recurring			
	Time*		Costs		Time*		Costs	
	Low	High	Low	High	Low	High	Low	High
Internal Labor (Total)	0.28	0.11	\$ 24,598	\$ 9,465			\$ -	\$ -
Business Unit SME	0.17	0.09	\$ 13,260	\$ 6,630			\$ -	\$ -
Central IT	0.11	0.03	\$ 11,338	\$ 2,835			\$ -	\$ -
Professional Services Labor (Total)		500	\$ -	\$ 75,000				
Procurement			\$ -	\$ -				
Implementation and Training		500	\$ -	\$ 75,000			\$ -	\$ -
Project Management			\$ -	\$ -			\$ -	\$ -
Quality Assurance			\$ -	\$ -			\$ -	\$ -
Hardware			\$ -	\$ -			\$ -	\$ -
Software			\$ -	\$ -			\$ -	\$ -
Total Cost			\$ 24,598	\$ 84,465			\$ -	\$ -

*PTI estimates internal labor in FTE and external labor in hours

Cost assumptions:

- On the low end, business unit FTE and central IT FTE develop the plan
- On the high end, the City utilizes professional consulting services in place of internal labor

2.6 Develop a document management implementation plan

This project assesses lessons learned from the City's document management pilot and develops a plan for implementing LaserFiche throughout the City. The plan should identify high-volume paper transactions and prioritize implementation activities accordingly.

Budget category: Fiscally Constrained

Budget priority: Desirable

Cost Category	One-time				Recurring			
	Time*		Costs		Time*		Costs	
	Low	High	Low	High	Low	High	Low	High
Internal Labor (Total)	0.25	0.20	\$ 23,858	\$ 17,767			\$ -	\$ -
Business Unit SME	0.05	0.10	\$ 3,892	\$ 7,784			\$ -	\$ -
Central IT	0.20	0.10	\$ 19,966	\$ 9,983			\$ -	\$ -
Professional Services Labor (Total)		300	\$ -	\$ 45,000				
Procurement			\$ -	\$ -				
Implementation and Training		300	\$ -	\$ 45,000			\$ -	\$ -
Project Management			\$ -	\$ -				
Quality Assurance			\$ -	\$ -				
Hardware			\$ -	\$ -			\$ -	\$ -
Software			\$ -	\$ -			\$ -	\$ -
Total Cost			\$ 23,858	\$ 62,767			\$ -	\$ -

*PTI estimates internal labor in FTE and external labor in hours

Cost assumptions:

- Business unit SME FTE inform business area prioritization
- On the low end, central IT FTE develop the plan
- On the high end, the City reduces internal central IT involvement in favor of utilizing professional consulting services for plan development

2.7 Adopt IT portfolio management

Similar to project management software, this automation tracks costs associated with IT resources, assets, activities, initiatives and – perhaps most importantly – investments. This project implements an IT portfolio management application at the City of Boulder.

Budget category: Action

Budget priority: Discretionary

Cost Category	One-time				Recurring			
	Time*		Costs		Time*		Costs	
	Low	High	Low	High	Low	High	Low	High
Internal Labor (Total)	0.50	1.00	\$ 49,916	\$ 99,831	0.25	0.50	\$ -	\$ -
Business Unit SME			\$ -	\$ -			\$ -	\$ -
Central IT FTE	0.50	1.00	\$ 49,916	\$ 99,831	0.25	0.50	\$ -	\$ -
Professional Services Labor (Total)	450	2,440	\$ 67,500	\$ 366,000				
Procurement		500	\$ -	\$ 75,000				
Implementation and Training	450	900	\$ 67,500	\$ 135,000			\$ -	\$ -
Project Management		1,040	\$ -	\$ 156,000				
Quality Assurance			\$ -	\$ -				
Hardware			\$ -	\$ 40,000			\$ -	\$ 4,000
Software			\$ 45,000	\$ 180,000			\$ 9,900	\$ 39,600
Total Cost			\$ 162,416	\$ 685,831			\$ 9,900	\$ 43,600

*PTI estimates internal labor in FTE and external labor in hours

Cost assumptions:

- Central IT FTE:
 - Participate in RFP development
 - Attend and judge product demonstrations
 - Facilitate system implementation
 - Test the system
- On the high end, the City utilizes:
 - Professional procurement assistance
 - Third-party project management
- Central IT FTE provide ongoing system tailoring, maintenance and support

2.8 Create a customer account representative position

Aligned with PTI’s recommendations in chapter 3, this project adds 1.0 FTE in central IT for managing business unit relationships – serving as a critical liaison for identifying needs, surfacing potential solutions, and enhancing overall communication and customer service. This position would report to the Director of Information Technology.

Budget category: Action

Budget priority: Desirable

Cost Category	One-time				Recurring			
	Time*		Costs		Time*		Costs	
	Low	High	Low	High	Low	High	Low	High
Internal Labor (Total)	0.10	0.20	\$ 8,883	\$ 17,767	1.00	1.00	\$ 79,791	\$ 97,401
Business Unit SME	0.05	0.10	\$ 3,892	\$ 7,784			\$ -	\$ -
Central IT	0.05	0.10	\$ 4,992	\$ 9,983	1.00	1.00	\$ 79,791	\$ 97,401
Professional Services Labor (Total)		130	\$ -	\$ 19,480				
Procurement		130	\$ -	\$ 19,480				
Implementation and Training			\$ -	\$ -			\$ -	\$ -
Project Management			\$ -	\$ -				
Quality Assurance			\$ -	\$ -				
Hardware			\$ -	\$ -			\$ -	\$ -
Software			\$ -	\$ -			\$ -	\$ -
Total Cost			\$ 8,883	\$ 37,247			\$ 79,791	\$ 97,401

*PTI estimates internal labor in FTE and external labor in hours

Cost assumptions:

- Business unit SME FTE:
 - Create the job description
 - Manage the candidate hiring process
- Central IT FTE participate in interviews and provide input to Human Resources
- On the high end, the City utilizes professional placement services at 20% of the position’s salary
- Recurring costs incorporate 1.0 central IT FTE on both low and high ends

2.9 Centralize infrastructure and customer services functions

This project moves business unit IT staff involved in customer support and infrastructure support under central IT, as outlined in chapter 3.

Budget category: Fiscally Constrained

Budget priority: Essential

Cost Category	One-time				Recurring			
	Time*		Costs		Time*		Costs	
	Low	High	Low	High	Low	High	Low	High
Internal Labor (Total)	0.25	0.50	\$ 23,858	\$ 47,716			\$ -	\$ -
Business Unit SME	0.05	0.10	\$ 3,892	\$ 7,784			\$ -	\$ -
Central IT	0.20	0.40	\$ 19,966	\$ 39,932			\$ -	\$ -
Professional Services Labor (Total)		200	\$ -	\$ 30,000				
Procurement			\$ -	\$ -				
Implementation and Training		200	\$ -	\$ 30,000			\$ -	\$ -
Project Management			\$ -	\$ -				
Quality Assurance			\$ -	\$ -				
Hardware			\$ -	\$ -			\$ -	\$ -
Software			\$ -	\$ -			\$ -	\$ -
Total Cost			\$ 23,858	\$ 77,716			\$ -	\$ -

*PTI estimates internal labor in FTE and external labor in hours

Cost assumptions:

- Business unit SME FTE:
 - Communicate support changes
 - Aid central IT in transitioning to a central IT support model
- Central IT FTE organize and manage the transition
- The high end includes costs for professional change management services

2.10 Implement central IT service model enhancements

This project defines and implements an integrated, process-based set of best practices to manage IT services, including: configuration management, change management, release management, incident management, problem management, and service desk, availability management, service continuity, capacity management, service level management, and financial management. It develops a phased transition plan; implements the plan; and monitors outcomes and integrates enhancements as needed.

Budget category: Action

Budget priority: Essential

Cost Category	One-time				Recurring			
	Time*		Costs		Time*		Costs	
	Low	High	Low	High	Low	High	Low	High
Internal Labor (Total)	0.57	0.74	\$ 53,016	\$ 68,040			\$ -	\$ -
Business Unit SME	0.16	0.26	\$ 12,199	\$ 20,420			\$ -	\$ -
Central IT	0.41	0.48	\$ 40,817	\$ 47,620			\$ -	\$ -
Professional Services Labor (Total)	200	694	\$ 30,000	\$ 104,100				
Procurement			\$ -	\$ -				
Implementation and Training	200	484	\$ 30,000	\$ 72,600			\$ -	\$ -
Project Management		210	\$ -	\$ 31,500				
Quality Assurance			\$ -	\$ -				
Hardware			\$ -	\$ -			\$ -	\$ -
Software			\$ -	\$ -			\$ -	\$ -
Total Cost			\$ 83,016	\$ 172,140			\$ -	\$ -

*PTI estimates internal labor in FTE and external labor in hours

Cost assumptions:

- 3 days of training for 20-25 IT staff at \$1,500-\$2,000 per student
- Business unit hours consist of participation in interviews and focus groups as well as steering committee time necessary to help IT translate a service delivery approach and methodology into actual work practices and tools
- The high-end includes costs for professional change management and project management services

3.1 Implement an integrated finance/HR system

Building on the ERP needs analysis (project 2.5), this project replaces Boulder’s finance system (BFS) and human resources system (Vista) with a tier 2 ERP (enterprise resource planning) system.

Budget category: Action

Budget priority: Essential

Cost Category	One-time				Recurring			
	Time*		Costs		Time*		Costs	
	Low	High	Low	High	Low	High	Low	High
Internal Labor (Total)	5.00	8.00	\$ 411,176	\$ 666,679	1.75	3.00	\$ -	\$ -
Business Unit SME	4.00	6.00	\$ 311,345	\$ 467,017	0.25	0.50	\$ -	\$ -
Central IT	1.00	2.00	\$ 99,831	\$ 199,662	1.50	2.50	\$ -	\$ -
Professional Services Labor (Total)	9,413	14,586	\$ 1,411,950	\$ 2,187,900	80	120	\$ 12,000	\$ 18,000
Procurement	500	800	\$ 75,000	\$ 120,000				
Implementation and Training	6,625	10,250	\$ 993,750	\$ 1,537,500	80	120	\$ 12,000	\$ 18,000
Project Management	2,080	3,120	\$ 312,000	\$ 468,000				
Quality Assurance	208	416	\$ 31,200	\$ 62,400				
Hardware			\$ 35,000	\$ 75,000			\$ -	\$ 7,500
Software			\$ 420,000	\$ 750,000			\$ 84,000	\$ 150,000
Total Cost			\$ 2,278,126	\$ 3,679,579			\$ 96,000	\$ 175,500

*PTI estimates internal labor in FTE and external labor in hours

Cost assumptions:

- Business unit SME FTE:
 - Participate in RFP development
 - Attend and judge product demonstrations
 - Choose the product/vendor
 - Inform business process and workflow design
 - Test the system
- Central IT FTE:
 - Participate in RFP development
 - Attend and judge product demonstrations
 - Assist with software implementation
 - Perform data conversion
 - Coordinate outages and migration with business units
- The City contracts for professional services, including:
 - Project management for up to 1.5 years
 - Quality assurance for 10-20% of one year (implementation duration)
- Ongoing business unit SME FTE contribute support effort as necessary
- Recurring central IT FTE provide ongoing application support
- The City conducts recurring annual training for 80-120 hours

Please note:

- The City currently pays approximately \$120,000 in annual maintenance fees for BFS and Vista which it could transition to the new system
- Boulder has budgeted approximately \$40,000 for replacing BFS and Vista servers in 2010

E

3.2 Implement citywide maintenance management automation

This project implements a single maintenance management solution at the City. It replaces multiple solutions currently in use by Public Works (including Facilities, Fleet, Transportation, Utilities) and Parks and Recreation.

Budget category: Action

Budget priority: Essential

Cost Category	One-time				Recurring			
	Time*		Costs		Time*		Costs	
	Low	High	Low	High	Low	High	Low	High
Internal Labor (Total)	1.75	3.50	\$ 152,710	\$ 305,419	1.20	2.40	\$ -	\$ -
Business Unit SME	1.00	2.00	\$ 77,836	\$ 155,672	1.00	2.00	\$ -	\$ -
Central IT FTE	0.75	1.50	\$ 74,873	\$ 149,747	0.20	0.40	\$ -	\$ -
Professional Services Labor (Total)	2,500	7,350	\$ 375,000	\$ 1,102,500		60		\$ 9,000
Procurement	500	750	\$ 75,000	\$ 112,500				
Implementation and Training	2,000	6,000	\$ 300,000	\$ 900,000		60	\$ -	\$ 9,000
Project Management			\$ -	\$ -				
Quality Assurance		600	\$ -	\$ 90,000				
Hardware			\$ 20,000	\$ 40,000			\$ 5,000	\$ 13,333
Software			\$ 150,000	\$ 350,000			\$ 30,000	\$ 70,000
Total Cost			\$ 697,710	\$ 1,797,919			\$ 35,000	\$ 92,333

*PTI estimates internal labor in FTE and external labor in hours

Cost assumptions:

- Business unit SME FTE:
 - Participate in RFP development
 - Attend and judge product demonstrations
 - Choose the product/vendor
 - Review and adjust business processes
 - Inform workflow design
 - Test the system
- Central IT FTE:
 - Participate in RFP development
 - Attend and judge product demonstrations
 - Facilitate system implementation
 - Perform data conversion
 - Test the system
- On the high end, Boulder implements remote access for field workers
- Recurring business unit SME FTE inform ongoing system tailoring/administration
- Recurring central IT FTE perform system maintenance and administration
- Ongoing professional training for 60 hours per year
- Note: Boulder can transition current software and hardware maintenance expenditures to the new system

3.3 Implement permit management

In response to Accela's purchase and eventual phasing out of PermitsPlus (also known as "LandLink"), this project replaces PermitsPlus with a new permitting application.

Budget category: Action

Budget priority: Essential

Cost Category	One-time				Recurring			
	Time*		Costs		Time*		Costs	
	Low	High	Low	High	Low	High	Low	High
Internal Labor (Total)	2.00	3.75	\$ 177,667	\$ 335,876	1.25	2.50	\$ -	\$ -
Business Unit SME	1.00	1.75	\$ 77,836	\$ 136,213	1.00	2.00	\$ -	\$ -
Central IT FTE	1.00	2.00	\$ 99,831	\$ 199,662	0.25	0.50	\$ -	\$ -
Professional Services Labor (Total)	3,536	6,880	\$ 530,400	\$ 1,032,000				
Procurement	400	600	\$ 60,000	\$ 90,000				
Implementation and Training	2,116	4,200	\$ 317,400	\$ 630,000			\$ -	\$ -
Project Management	1,020	2,080	\$ 153,000	\$ 312,000				
Quality Assurance			\$ -	\$ -				
Hardware			\$ 35,000	\$ 45,000			\$ -	\$ -
Software			\$ 214,079	\$ 648,725			\$ 42,816	\$ 129,745
Total Cost			\$ 957,147	\$ 2,061,601			\$ 42,816	\$ 129,745

*PTI estimates internal labor in FTE and external labor in hours

Cost assumptions:

- Business unit SME FTE:
 - Participate in RFP development
 - Attend and judge product demonstrations
 - Choose the product/vendor
 - Review and adjust business processes
 - Inform workflow design
 - Test the system
- Central IT FTE:
 - Participate in RFP development
 - Attend and judge product demonstrations
 - Facilitate system implementation
 - Perform data conversion
 - Test the system
- On the high end, Boulder implements remote access for field workers
- The City acquires new application servers for production and test environments, as well as a new database server
- Low-end software costs reflect upgrade pricing
- High-end software costs reflect entirely new software (no upgrade)
- Recurring business unit SME FTE provide ongoing application support and system tailoring
- Recurring central IT FTE provide system support as necessary

- Note: Boulder can transition current software and hardware maintenance expenditures to the new system

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4.1 Pilot a business intelligence system

This project pilots a decision support system/tool in a single business area, such as financial management.

Budget category: Action

Budget priority: Desirable

Cost Category	One-time				Recurring			
	Time*		Costs		Time*		Costs	
	Low	High	Low	High	Low	High	Low	High
Internal Labor (Total)	0.50	1.00	\$ 44,417	\$ 88,834	0.20	0.40	\$ -	\$ -
Business Unit SME	0.25	0.50	\$ 19,459	\$ 38,918	0.10	0.20	\$ -	\$ -
Central IT FTE	0.25	0.50	\$ 24,958	\$ 49,916	0.10	0.20	\$ -	\$ -
Professional Services Labor	250	417	\$ 37,500	\$ 62,550				
Procurement			\$ -	\$ -				
Implementation and Training	250	417	\$ 37,500	\$ 62,550			\$ -	\$ -
Project Management			\$ -	\$ -				
Quality Assurance			\$ -	\$ -				
Hardware			\$ 10,000	\$ 20,000			\$ 2,500	\$ 5,000
Software			\$ 2,925	\$ 71,000			\$ 585	\$ 14,200
Total Cost			\$ 94,842	\$ 242,384			\$ 3,085	\$ 19,200

*PTI estimates internal labor in FTE and external labor in hours

Cost assumptions:

- Business unit SME FTE:
 - Participate in RFP development
 - Attend and judge product demonstrations
 - Choose the product/vendor
 - Review and adjust business processes
 - Test the system
- Central IT FTE:
 - Participate in RFP development
 - Attend and judge product demonstrations
 - Facilitate system implementation
 - Perform data conversion
 - Test the system
- The City purchases a new server and database for hosting the application
- Recurring business unit SME FTE inform ongoing system tailoring
- Recurring central IT FTE conduct ongoing system maintenance and administration

4.2 Create a plan for establishing a county/city GIS group

In accordance with current city and county plans, this project develops an approach for sharing GIS services between the City and Boulder County. The plan identifies each party's role, reporting structure and funding mechanism(s). It also identifies how other interested agencies (e.g., the City of Longmont) may participate, or receive services from the group. Note that the City may be able to share the costs of this plan with Boulder County.

Budget category: Fiscally Constrained

Budget priority: Desirable

Cost Category	One-time				Recurring			
	Time*		Costs		Time*		Costs	
	Low	High	Low	High	Low	High	Low	High
Internal Labor (Total)	0.70	1.15	\$ 65,483	\$ 106,008			\$ -	\$ -
Business Unit SME	0.20	0.40	\$ 15,567	\$ 31,134			\$ -	\$ -
Central IT FTE	0.50	0.75	\$ 49,916	\$ 74,873			\$ -	\$ -
Professional Services Labor (Total)		300	\$ -	\$ 45,000				
Procurement			\$ -	\$ -				
Implementation and Training		300	\$ -	\$ 45,000			\$ -	\$ -
Project Management			\$ -	\$ -				
Quality Assurance			\$ -	\$ -				
Hardware			\$ -	\$ -			\$ -	\$ -
Software			\$ -	\$ -			\$ -	\$ -
Total Cost			\$ 65,483	\$ 151,008			\$ -	\$ -

*PTI estimates internal labor in FTE and external labor in hours

Cost assumptions:

- Business unit SME FTE provide input for a shared services model
- Central IT FTE:
 - Work with Boulder County to establish the staffing, reporting structure and services of the GIS services group
 - Manage City expectations
 - Identify attendant City/County funding mechanisms and procedures
- On the high end, the City utilizes professional services for plan development

5.1 Migrate and optimize servers

This project entails finishing Boulder’s migration of servers to Boulder County’s new data center. Where possible, it also replaces physical servers with virtual (i.e., logical) servers in an optimized environment.

Budget category: Fiscally Constrained

Budget priority: Essential

Cost Category	One-time				Recurring			
	Time*		Costs		Time*		Costs	
	Low	High	Low	High	Low	High	Low	High
Internal Labor (Total)	0.40	0.65	\$ 37,733	\$ 61,591	0.05	0.10	\$ -	\$ -
Business Unit SME	0.10	0.15	\$ 7,784	\$ 11,675			\$ -	\$ -
Central IT FTE	0.30	0.50	\$ 29,949	\$ 49,916	0.05	0.10	\$ -	\$ -
Professional Services Labor (Total)	240	400	\$ 36,000	\$ 60,000				
Procurement			\$ -	\$ -				
Implementation and Training	240	400	\$ 36,000	\$ 60,000			\$ -	\$ -
Project Management			\$ -	\$ -				
Quality Assurance			\$ -	\$ -				
Hardware			\$ 125,000	\$ 175,000			\$ 12,500	\$ 17,500
Software			\$ 126,000	\$ 192,500			\$ 25,200	\$ 38,500
Total Cost			\$ 324,733	\$ 489,091	0	0	\$ 37,700	\$ 56,000

*PTI estimates internal labor in FTE and external labor in hours

Cost assumptions:

- Business unit SME FTE communicate and coordinate server moves
- On both the low and high-end estimates, the City utilizes professional services to analyze requirements, make recommendations, and assist with migration
- Regarding hardware, Boulder procures:
 - Low end – 10 new servers for \$12,500 each
 - High end - 10 new servers for \$17,500 each
- Regarding software, Boulder procures virtualization licenses on a per processor model for:
 - Low end – 45 licenses at \$2,800 each
 - High end –55 licenses at \$3,500 each
- Note: The City has already budgeted for \$36,000 in professional services for the analysis phase, as well as hardware and software related to this project

5.2 Complete replacing telephone system with VoIP

In line with current plans – and possibly involving Boulder County – this project replaces the City’s aging PBX phone system with a VoIP system on the City’s data network.

Budget category: Action

Budget priority: Desirable

Cost Category	One-time				Recurring			
	Time*		Costs		Time*		Costs	
	Low	High	Low	High	Low	High	Low	High
Internal Labor (Total)	1.25	2.50	\$ 119,290	\$ 238,580	2.00	3.00	\$ -	\$ -
Business Unit SME	0.25	0.50	\$ 19,459	\$ 38,918			\$ -	\$ -
Central IT FTE	1.00	2.00	\$ 99,831	\$ 199,662	2.00	3.00	\$ -	\$ -
Professional Services Labor (Total)	2,440	5,881	\$ 366,038	\$ 732,075				
Procurement			\$ -	\$ -				
Implementation and Training	2,000	4,000	\$ 300,000	\$ 600,000			\$ -	\$ -
Project Management	440	881	\$ 66,038	\$ 132,075				
Quality Assurance			\$ -	\$ -				
Hardware			\$ 480,000	\$ 945,000			\$ 25,500	\$ 49,500
Software			\$ 504,700	\$ 757,050			\$ 100,940	\$ 151,410
Total Cost			\$ 1,470,028	\$ 2,672,705			\$ 126,440	\$ 200,910

*PTI estimates internal labor in FTE and external labor in hours

Cost assumptions:

- Business unit SME FTE communicate and manage the transition to VoIP phones
- Central IT FTE:
 - Participate in system requirements definition and design
 - Install necessary hardware and software
 - Manage the transition from PBX to VoIP
- The City acquires 1,442 VoIP phones
- Recurring central IT FTE perform ongoing system administration and maintenance
- Note: The City has already budgeted for the hardware, software, consulting and ongoing labor effort associated with this project

5.3 Conduct IT security audits/assessments

This project conducts a citywide, in-depth security assessment. Topics include technical infrastructure security (e.g., networks, servers), security policies, physical security (e.g., locking doors, security cameras), and potentially involves attempting to break or hack into the City’s systems. After conducting the initial security assessment, this project has Boulder conducting higher-level security audits on an annual basis, with the detailed security assessments occurring every three years.

Budget category: Action

Budget priority: Desirable

Cost Category	One-time				Recurring			
	Time*		Costs		Time*		Costs	
	Low	High	Low	High	Low	High	Low	High
Internal Labor (Total)	0.10	0.20	\$ 9,983	\$ 19,966			\$ -	\$ -
Business Unit SME			\$ -	\$ -			\$ -	\$ -
Central IT FTE	0.10	0.20	\$ 9,983	\$ 19,966			\$ -	\$ -
Professional Services Labor (Total)	240	480	\$ 36,000	\$ 72,000	80	360	\$ 12,000	\$ 54,000
Procurement			\$ -	\$ -				
Implementation and Training	240	480	\$ 36,000	\$ 72,000	80	360	\$ 12,000	\$ 54,000
Project Management			\$ -	\$ -				
Quality Assurance			\$ -	\$ -				
Hardware			\$ -	\$ -			\$ -	\$ -
Software			\$ -	\$ -			\$ -	\$ -
Total Cost			\$ 45,983	\$ 91,966			\$ 12,000	\$ 54,000

*PTI estimates internal labor in FTE and external labor in hours

Cost assumptions:

- Central IT FTE coordinates each IT audit or assessment
- The City retains professional services for conducting a citywide security assessment
- Low-end recurring costs reflect annual, high-level security audits
- High-end recurring costs reflect security assessments – which may be conducted every three years