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Audit Report

**CITYWIDE INFORMATION TECHNOLOGY
PROJECT MANAGEMENT**

May 2002

**Office of the City Auditor
Austin, Texas**

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On May 30, 2002, the Office of the City Auditor presented this audit report to the City Council Audit and Finance Committee. The Committee accepted the audit report.

This report is also available at our website, <http://www.ci.austin.tx.us/auditor>, in pdf format. You may also request additional hard copies through the website or by email at oca_auditor@ci.austin.tx.us. Please request Audit No. AU01301.



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May 21, 2002

To: Mayor and Council Members

From: Stephen L. Morgan

Subject: Citywide Information Technology Project Management Audit Report

Attached is our audit report on Citywide Information Technology (IT) Project Management. Our objectives in this audit were to:

- Determine the extent to which key project management elements are applied to individual major IT projects, and
- Benchmark IT project management corporate governance.

We conducted this audit because IT is pervasive in the City and critical to basic City operations. The manner in which new IT systems or applications are managed and implemented in the City dramatically affects the efficiency and effectiveness of basic services.

Other organizations are currently using corporate tools that can be implemented in the City of Austin to increase the amount of guidance and support for project managers. The lack of corporate governance for IT project management resulted in inconsistencies in the use of sound project management practices across the City.

We have made seven recommendations that directly address the corporate governance issues as well as the inconsistencies in IT project management. Management has concurred with all seven recommendations.

We appreciate the assistance and cooperation we have received from City management, IT project managers, and IT systems users throughout the City.

Stephen L. Morgan, CIA, CGAP, CFE, CGFM
City Auditor

CITYWIDE IT PROJECT MANAGEMENT COUNCIL SUMMARY

This report presents findings and recommendations from our audit of Citywide information technology project management.

The City Departments' management of information technology (IT) projects is uneven in quality and lacks minimum levels of corporate guidance.

We found that IT projects in the City of Austin were managed inconsistently across departments. In addition, the City is not consistently exercising due diligence over resources allocated to IT projects. Mechanisms for monitoring IT projects and ensuring that IT projects support corporate IT goals are missing. By looking at projects across the City and mechanisms for corporate guidance, we found:

- **Four projects (out of 33), with a combined value of approximately \$106 million (out of \$146 million) scored perfectly across at least 3 of the 4 project management elements.** Two of these projects scored perfectly across all of the project management elements, while two scored perfectly across three of the four project management elements. The remainder of the projects had mixed performance in the four key project management element areas: user requirements, project plan, risk management, and change management. Overall, project ratings scored higher in the area of user requirements and received lower ratings in the area of managing risks.
- **Financial resources related to IT projects are not systematically budgeted and tracked.** It is nearly impossible to determine the actual cost of City IT projects. We identified an estimated \$200 million planned, underway, or implemented projects between FY 00 and FY 05. The performance of budget to actual expenditures was mixed for IT projects reviewed.
- **Corporate involvement is critical to maximize return on investment and align IT projects with City goals.** Overall, most department managers do not know if an IT project has achieved its expected business value upon implementation. Additionally, the City does not have an overall IT inventory to monitor project status and risk. One reason is that the City does not use a corporate IT strategic plan to guide the selection, prioritization, development, and execution of City IT projects. The adoption of a common project management methodology can mitigate many risks associated with IT projects.



ACTION SUMMARY

Citywide Information Technology Project Management

Rec#	Recommendation Text	Management Concurrence	Proposed Implementation Date
01	The City Manager and the Chief Information Officer should require that project managers develop a business analysis and technical viability analysis to provide sufficient information for department directors to authorize the initiation of major IT projects.	Concur	01/01/03
02	<p>In order to establish authority and responsibility for the management of IT projects, the City Manager should issue an administrative bulletin assigning authority to the Chief Information Officer to provide uniform and consistent guidelines for the development of major IT projects.</p> <p>a. The uniform and consistent guidelines should at a minimum include the following requirements that project managers:</p> <ul style="list-style-type: none">i. develop a budget (including personnel costs) prior to the start of a projectii. track expenditures throughout the project's life cycleiii. develop a baseline project schedule with milestonesiv. include users in the development of functional requirementsv. document a project plan and related documentsvi. develop a risk management planvii. follow a change management system	Concur	10/01/02

Rec#	Recommendation Text	Management Concurrence	Proposed Implementation Date
03	To facilitate budget and financial tracking of major IT projects in the City of Austin, the Budget Officer and the Chief Information Officer should require project managers to use existing capabilities in AFS2 and Banner that would result in easier financial monitoring of project budgets and expenditures.	Concur	10/01/02
04	The Chief Information Officer (CIO) should create a team of Executive-level management to develop a Citywide strategic information technology (IT) plan. Once developed, the CIO should oversee the maintenance and updating of the plan annually.	Concur	10/01/02
05	After the Citywide IT strategic plan is developed, the City Manager should require department directors to develop departmental IT plans that align department IT objectives with the Citywide IT strategic plan. This could be part of the current annual departmental business planning process.	Concur	01/01/03
06	In order to maximize return on investment and ensure alignment with City IT goals, the City Manager and the Chief Information Officer should create a corporate IT steering committee. This steering committee should ensure that major IT projects support the corporate strategic goals, priorities are set for the allocation of IT dollars, and organize resources to leverage technical assistance for challenged projects.	Concur	10/01/02

Rec#	Recommendation Text	Management Concurrence	Proposed Implementation Date
07	<p>The Chief Information Officer should report periodically (at least annually) to the City Manager's Office on major IT projects and related IT priorities. The reported status could be done in conjunction with reporting under the City's Managing for Results Initiative and should at a minimum include for each project: a description, progress to date, budget and milestones, return on investment, and any related performance measures.</p>	Concur	01/01/03

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BACKGROUND

Information technology (IT) projects cover a variety of areas.

For the purposes of this audit, we defined information technology as encompassing all forms of technology used to create, store, exchange, and use information in its various forms. Specifically, this definition includes projects that involved not only hardware, or software, but also any combination of hardware or software. Software includes applications and programs whether they are purchased off the shelf (such as Windows or Microsoft Word) or obtained as custom applications from contractors or in-house programmers. Hardware includes items such as personal computers, monitors, and printers, as well as cabling, routers, servers, and other equipment. Projects included in our audit ranged from system upgrades to entirely new systems.

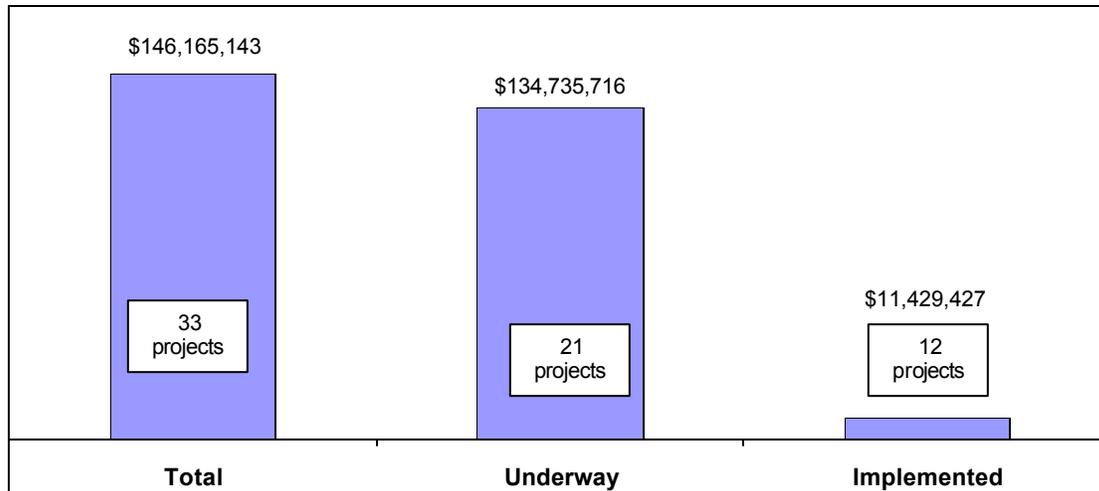
The Office of the City Auditor (OCA) identified over 70 self-reported IT projects in the City of Austin with an estimated budget of more than \$200 million over a five year window.

We identified 73 major planned, underway, or implemented IT projects in the City of Austin, with an estimated budget of approximately \$200 million. These major projects had been implemented in FY 00 or FY 01, were underway, or were planned between FY 01- FY 05. We defined a major project as meeting any one of the following criteria:

- Took over one year to implement;
- Involved more than one department;
- Significantly changed the way business was conducted;
- Was critical to the operation of the department/program or the department's/program's customers; or
- Cost over \$500,000.

From the 73 IT projects identified, we extracted a sample of 33 major IT projects that had a total combined budget of approximately \$146 million. The 33 projects audited were from 12 City departments. Some of the projects were upgrades to existing City systems, while others were entirely new systems. Additionally, the projects were diverse in terms of their developmental stages. Exhibit 1, below, shows the number of audited IT projects that were underway and implemented, including their approximate total budgets. A complete list of the 73 IT projects is presented in Appendix B.

EXHIBIT 1
Value of Audited IT Projects Underway or Implemented



SOURCE: OCA analysis of Citywide IT Project financial data as of 12/06/01.
 NOTE: This exhibit does not include 40 projects, budgeted at approximately \$54 million that were excluded from our detailed audit testing.

Various City of Austin departments have an influence on information technology (IT) project management.

The City of Austin’s IT functions are decentralized with some support provided by the Information Systems Department (ISD). The mission statement of the ISD is to provide information technology services to City departments and other customers so they can accomplish their mission. The extent to which an individual department will rely on ISD depends on the amount of resources at its disposal. For example, many of the enterprise funds have their own information technology divisions to provide their IT services. Other departments may rely on ISD to provide network support for systems they purchase themselves or rely on ISD to implement a new system. Other City business units that influence IT project management are:

- Purchasing Office if a system is bought, and
- Department of Public Works if the system is a component of a Capital Improvement Project.

IT project management is an element of the IT governance processes.

IT projects involve high risks, and significant dollar and staff resources and (when successful) are critical to business processes and customer services. To increase the likelihood of the success of IT projects, certain

corporate governance tools need to be in place. IT corporate governance is defined as the set of rules and agreements that permit the entity to make IT decisions, resolve disputes concerning IT issues, and enable staff to work effectively across departments and organizational levels to accomplish IT goals. These can include an IT strategic plan, the development of an annual IT business plan, assessment of an IT project's business value, an IT steering committee, and standardized IT system development methodologies.

An annual IT strategic plan establishes a corporate vision for IT projects and a monitoring and control function for management.

This document serves as a blueprint for individuals at different organizational levels to work towards the same overall technological goals for an organization. While different lines of business require different technological solutions, there are underlying architecture and compatibility constraints under which a corporate organization must operate. Further, this plan helps to guide and monitor major IT projects across departments in the prioritizing, planning, and executing of major IT projects.

IT strategic planning can strengthen stakeholder participation and foster a shared understanding among corporate level management across an organization regarding IT projects.

Assessing an IT project's business value helps to ensure that limited resources are expended on projects that add sufficient value to the City. Failing to assess the return on investment of an IT project prior to its development increases the risk of an organization implementing IT projects that are unnecessary or are not aligned with organizational missions, goals, and objectives. These risks can be reduced by the development of corporate-level policies requiring a business unit to quantify business value for major IT projects, before implementation. In addition, assessing whether the business value was delivered after implementation can help managers determine if their objectives were met, as well as set the stage for a "lessons learned" approach to prepare for future projects.

An IT steering committee provides oversight for major IT projects organizationwide. Steering committee activities aid in the effective and efficient utilization of IT resources by ensuring that individual department proposals for IT projects are aligned with corporate objectives. Typically, an IT steering committee consists of representatives from the City Manager's Office (CMO), the Chief Financial Officer (CFO), the Chief Information Officer (CIO), and corporate division executives.

The utilization of standardized IT systems development and acquisition methodologies can minimize exposure to project risks. The use of standardized IT project management methodologies aid in risk mitigation and increase the probability of project success. In general, few IT projects are completed on time, on budget, and with all the anticipated functionality. Further, these problems can be intensified when documented corporate level project management practices are absent from the organization. Some of the most frequently used project management models applied to mitigate project risks include:

- Project Management Institute's Project Management Body of Knowledge - incorporates nine project management components within the different phases of the project management processes including: integration, scope, time, cost, quality, human resource, communication, risk, and procurement management.
- Commercial off the shelf model - includes four phases: requirements analysis, an architecture definition, integration and test, and a technology update. Used by the City of Austin Financial Services Department's 911-RDMT project office.

For more details about the different project management models, see Appendix C.

OBJECTIVES, SCOPE AND METHODOLOGY

Objectives

Our objectives for this audit were to:

1. Determine the extent to which key project management elements are applied to individual major Information Technology (IT) projects in the City of Austin (COA), and
2. Benchmark the City of Austin's IT project management corporate governance against other government entities.

Scope and Methodology

The scope of the first objective involved a review of major IT projects throughout the City of Austin for evidence of key project management concepts.

To obtain our universe of major IT projects, we administered an electronic Citywide survey to all COA departments. Using these survey responses, we were able to compile a master list of major City IT projects. We categorized each major IT project into one of the following three categories: implemented between FY 00 and FY 01, underway at the time of data collection, or planned for FY 01-FY 05.

Some of the major projects were excluded from our audit work. Projects that were excluded:

- Legal and competitive constraints – projects involved in a legal dispute or containing competitive information.
- Planned projects – the planned projects had not yet started resulting in little of the project management elements to test.
- Unidentified projects – the majority of projects were self-reported by project managers, projects that were not reported and identified were not included.

As a result, a final sample of 33 underway and implemented major IT projects were reviewed for evidence of compliance with four key project management components.

After our extensive review of the project management literature and interviews with project management staff both within and outside the City of Austin, we identified four project management elements that are

critical for project success. Specifically, the key project management elements were:

- User requirements;
- Project plan;
- Risk management; and
- Change management.

These elements were classified as the independent variables in our statistical analyses.

We constructed and administered a second survey to collect documented evidence of the above project management elements as well as to follow up on questions we had regarding the responses to the initial survey. To determine whether or not there was evidence supporting the existence of each of the key elements, we conducted a content analysis of documents related to all 33 projects.

We identified indicators such as customer satisfaction, actual costs vs. budget, and completion dates (or progress towards milestones) vs. projected scheduled as the dependent variables in our statistical analysis. Functionality was also included as a dependent variable for implemented projects only.

Prior to analyzing the data, we took steps to ensure the reliability and validity of our results. These steps included rating each IT project element individually and then discussing the ratings as a team until we achieved a high degree of inter-rater reliability. Once we achieved a strong level of inter-rater reliability, we rated each remaining project individually.

We hired a consultant to assist us with the statistical regression analysis using the Statistical Analysis System software program to examine the relationship between the utilization of key project management elements and IT project success. We defined IT project success as projects being completed on schedule, on budget, and with the desired level of user functionality upon implementation. Additionally, our consultant assisted us in determining an appropriate confidence interval and acceptable margins of error for our sample size. We used the Statistical Package for the Social Sciences software to generate the descriptive statistics for the data set.

Our statistical analysis had some limitations. First, we were working with a relatively small sample size. For instance, our sample included only twelve implemented projects. In addition, budget information that we used to aid in measuring project success was often incomplete. For

example, most IT projects neither budgeted nor tracked expenses associated with City personnel expenses.

Our second objective involved comparing the City of Austin with other governmental entities that were similar in population size and operating budget and had other characteristics deemed to be best practices by both the City's Chief Information Officer (CIO) and the City Manager's Office (CMO). We selected nine cities to survey and received responses from five. For those cities that did not respond, we were able to find some basic information on their websites that we used in our analysis.

The procedures used to accomplish the second objective involved developing a data collection instrument to gather information related to IT governance. We forwarded the survey instrument to each entity's CIO or CIO representative. We conducted surveys both over the telephone and by email.

We compared the City of Austin to the other government entities in the areas of corporate oversight, the approval and funding processes, and other processes that major IT projects are required or recommended to follow. Additionally, we collected data on "lessons learned" including how corporate oversight was implemented in the government organization and how it became successful. We also interviewed Austin's CIO, representatives from the CMO and City project managers to gain an understanding of the existing level of corporate oversight in the City and what is planned for the future.

This audit was conducted in accordance with generally accepted government auditing standards.

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AUDIT FINDINGS

The City departments' management of information technology (IT) projects is uneven in quality and lacks minimum levels of corporate guidance.

The City is not exercising due diligence over resources allocated to IT projects. Due diligence ensures that return on investments and system compatibility issues are systematically addressed and managed. Specifically, there is a lack of systematic resource budgeting and cost tracking related to IT projects. In addition, corporate oversight and controls are not in place in regard to planning and monitoring IT projects to compensate for the City's decentralized project management practices. There is no formalized plan or documented strategic direction to guide departments in prioritizing, planning, and executing IT projects in alignment with overall City goals and objectives. This lack of corporate oversight may be why we saw inconsistencies in the way individual projects were planned, including basic project management planning, risk management planning, and change management planning. One area where project managers did well was having documented user requirements for their projects.

The global issue is the inconsistency in project management from department to department. For example, out of the 33 projects reviewed in detail, three managed by the Financial Services Department's 911 RDMT project office and one managed by the Water and Wastewater Department, which accounted for approximately \$106 million dollars (out of \$146 million) were managed well and scored high in our review of project management elements. Other departments lacking a project management structure or methodology did not fare as well in our review.

Financial resources related to IT projects are not systematically budgeted and tracked. The question "what level of City resources are being spent on IT projects?" is impossible to answer. Attempts to gather this information by the Information Systems Department in the past have been unsuccessful. Not only is there no centralized list of major IT projects budgeted in the City of Austin and the associated dollar value, there is also no systematic tracking of the costs attributed to these projects. Not surprisingly, performance on meeting budgets was mixed among IT projects we reviewed.

In the absence of City budgeting or tracking of major IT projects, the Office of the City Auditor (OCA) identified an estimated \$200 million planned, underway, or implemented projects between FY 00 and FY 05. A list of major IT projects in the City would assist with planning for the allocation of resources among IT projects during the budgeting cycle as well as allow for monitoring ongoing progress (as discussed later in the report). Since there is no list of major IT projects, we identified projects from several sources. First, we identified the majority of the IT projects through our survey of department directors. Second, we reviewed City Council agendas, attended various IT groups' meetings and interviewed various personnel to identify a few additional projects. Our list of IT projects may not be complete due to differing interpretations of the definition of information technology projects. For example, one project budgeted at \$21 million was referred to us by another audit team. In this case, it was not originally self-reported, because the project manager did not consider it an IT project. Once the definition of an IT project was clarified, the project manager completed our survey.

We found that the City of Austin has plans to allocate or has already allocated approximately \$200 million on 73 IT projects. However, no one at the corporate level has knowledge of the total amount of resources that are allocated towards IT projects against which to compare our estimates. Since the total amount of allocated resources is currently unknown, it is impossible for the City Manager's Office and the Budget Office to exercise due diligence over the actual spending of those resources.

The absence of systematic budgeting and cost-tracking strategies makes the actual costs attributable to City IT projects nearly impossible to determine. Industry accounting guidelines for IT projects state that a budget should be established prior to commencing the project, and costs should be monitored throughout the course of the project to help ensure objectives are met in the most efficient manner. Moreover, documented budgets can be used as management tools to hold IT project managers accountable if controllable costs exceed proposed or budgeted amounts. Despite this, we found that not all project managers utilize formal project budgets to systematically plan and track project fiscal and personnel expenditures. In fact, neither the City Manager or the Budget Office require managers of major IT projects to develop a budget specific to an individual project or monitor the total financial and staff expenditures associated with major IT projects. Reportedly, this is because IT project funding is often

intended to come from the department's operating budget, which was previously approved through the annual budget process.

Because no systematic method to account for financial and staff resources allocated to the City's IT projects is used, we found that department managers are often unable to accurately and consistently report costs for major IT projects. In fact, we found that some City project managers not only do not systematically track expenditures using a documented budget, but some are entirely unaware of the costs associated with projects under their management. These tracking deficiencies are exacerbated by the fact that there is no corporate oversight to ensure the efficient tracking of IT project fiscal expenditures and staff time throughout a project's life cycle in City financial systems such as AFS2 and Banner. While these systems have the capability to track costs and staff time associated with IT projects, they are not consistently being used.

Without this crucial cost information, determining whether limited City resources allocated to major IT projects are being utilized economically, efficiently, or effectively is difficult. Given the current economic hardship the City faces, effective budgeting and cost tracking efforts are essential to ensure the most effective and efficient use of valuable City resources. Without the establishment of consistent and systematic methods for financial monitoring of budgets and cost information throughout the life of major IT projects, the City will continue to have difficulty both in gathering accurate financial information for IT projects and in ensuring prudent use of scarce City resources.

The performance of IT projects' budget-to-actual expenditures was mixed. Though most of the IT projects reviewed were within their identified budget some were over budget while others had no budget allocation. One complicating issue was that for many of the projects the most typical cost, City personnel cost, was not budgeted or tracked. In addition, a determination of whether a project is over or under budget becomes further complicated when strong project budgets and plans are not put into place. For example, the Computerized Traffic Signal System Upgrade was categorized as underway during our audit and classified as under budget. A firm project plan was never put into place outlining the amount of money that would be spent in various sections of work. In addition, as changes were made to the project due to unforeseen circumstances, there was no formal

modification of a plan to make sure all stakeholders had a similar understanding. While some of the changes resulted in enhancements to the project and the money may have been spent judiciously, it is difficult to ascertain if this project would be overbudget if all of the originally planned functionality had been included.

As noted previously, not all projects that we reviewed had documented project budgets or other systematic means to document planned and actual project expenditures. This is especially true in the tracking of City personnel costs related to a project. Although the original IT project budget for all the IT projects reviewed was not readily available from the City’s financial system (AFS2) or any other system, original cost estimates or cost proposals were found using one or more of the following sources:

- Project plans,
- Requests for Council Actions,
- Vendor contracts and purchase orders, and
- City financial systems.

In order to make assessments about whether projects were in line with the proposed and approved expenditures, we looked at the most comprehensive cost estimate that we could find from one of these four sources. We then compared it to the actual expenditures for the project to determine whether a project was over, under, or on budget.

We found that, of the 33 major underway and implemented IT projects that we audited, 12 (36 percent) appeared to be underbudget, 8 (24 percent) appeared to be on budget, 9 (27 percent) had exceeded their budget, and the remaining 4 (12 percent) did not have a budget. Exhibit 2, below, shows the budgetary status of the IT projects we audited in more detail.

EXHIBIT 2
Budgetary Status of Underway and Implemented IT Projects Audited

Project Status	Under Budget	On Budget	Over Budget	No Project Budget	Totals
Implemented	2	5	4	1	12
Underway	10	3	5	3	21
Totals	12	8	9	4	33

Source: OCA analysis of IT project management data as of 12/06/01.

When looking at projects that are not yet complete, it is important to note that one of the difficulties of measuring success at spending in accordance with a budget is that there may be loaded expenses (such as large hardware purchases) at the front or back end of the project. Accurate financial information would allow for a closer examination of IT projects that would potentially decrease the costs of underway and planned IT projects in the City.

Corporate involvement is critical to maximize return on investment and align IT with City goals. Corporate oversight, planning, and coordination can be accomplished through the implementation of the following tools:

- an IT strategic plan aligned with organizational business objectives,
- return on investment methodologies,
- an inventory of major IT projects, and
- a common project management methodology.

Responsibility for implementing these tools can be assigned to a corporate IT steering committee that can help ensure maximum return on investment or business value and alignment with an organization's goals.

Currently, City of Austin IT projects are managed in a decentralized manner with little corporate oversight or controls. In 2000, the City Manager recognized the need for an IT strategic framework for the City and hired both a Chief Information Officer (CIO) and a Deputy Chief Information Officer (DCIO). Further in 2000, the City chartered an Information Technology Council (ITC) made up of IT representatives from different City departments, who developed and documented intentions to consolidate a corporate IT approach and strategic direction aligned with City business objectives. Components of the ITC's plans included developing an IT strategic plan; fostering a cooperative IT environment across City departments; establishing a common methodology for project management; and working on specifically focused projects such as the City's e-Government initiative. While the City is currently pursuing this e-Government initiative, further work to formalize and implement the ITC's other plans has not yet been done. In fact, during this audit we were advised that the ITC is virtually defunct and no replacement infrastructure has been created to realize the ITC's original plans.

BEST PRACTICES: IT STEERING COMMITTEE*

- Fairfax County, VA,
- City of Phoenix, AZ,
- City of San Jose, CA. all have corporate IT steering committees.

* for budget information on best practice entities, see Appendix D.

Since there currently is no City of Austin IT steering committee, the City is losing the opportunity to:

- Prioritize and coordinate use of City IT dollars to ensure the best return on investment,
- Identify potential cost savings by utilizing City-owned technologies or by jointly reviewing similar individual project requests to minimize IT software and hardware duplication and to leverage existing technology investments,
- Ensure that proposed project time frames, areas of responsibility and funding accurately reflect City procurement, budget, and existing IT project commitments, as well as clearly identify the impact of the project on business functions, technical staff, and City operations,
- Direct or assist with improving projects that may appear beneficial to City business, but lack critical project management information in areas such as staffing plans, technical architecture, project deliverables and benefits, and
- Ensure that all proposed project schedules are feasible, within scope, on budget, and on schedule.

The City of Austin does not have a corporate IT strategic plan to guide the selection, prioritization, development, and execution of City IT projects. An IT strategic plan documents the planning process used by management and staff to establish the mission, goals, objectives, and strategies of the organization's future information technology needs.

An IT strategic plan assists management in the effective and efficient utilization of IT resources by providing means to:

- Design a prioritization scheme that meets and aligns corporate and department-level goals and objectives,
- Minimize system redundancies and duplication of effort across departments,
- Leverage IT solutions across departments,
- Ensure organizationwide compatibility of technologies,
- Identify measurable IT goal and performance indicators.

BEST PRACTICES: IT STRATEGIC PLAN

- Fairfax County, VA,
- City of San Jose,
- City of Oakland, CA. all have developed an IT strategic plan that ties IT goals to their overall organizational goals.

The Canadian Institute of Chartered Accountants states that the main reason to conduct IT strategic planning is to allow for an organized and systematic way of focusing management and staff on what needs to be accomplished over the long term in an organization.

Despite the known benefits of IT strategic planning, the City of Austin has not developed a formal strategic plan to guide its IT initiatives. In 1995, there were efforts by City management to develop Citywide goals and plans for an information technology infrastructure; however, no such infrastructure or corporate IT direction was formally established.

The absence of a regularly updated corporate IT strategic plan makes it difficult for City management to guide and monitor the selection and management of the City's IT projects and foster a united approach to Citywide IT issues. Further, adopting an IT strategic plan would improve the ability of the City Manager and the Chief Information Officer to ensure that corporate IT goals are established and met and that City resources are effectively and efficiently utilized. Finally, specific City IT-related initiatives such as the City's e-Government project could be enhanced if they were linked to corporate goals specifically stated in a Citywide IT strategic plan.

Managers in the City of Austin do not know if an IT project has achieved its expected business value upon implementation.

Neither management at the corporate level or departmental level consistently know if major IT projects have achieved their business value. This is due to the fact that there is no established policy requiring a department to quantify business value for major IT projects either before implementation or after go-live. Further, there are no controls in place to ensure that the promised business value of an IT project has actually been realized upon implementation.

Business value is defined as *Project Benefit – Project Cost*. A business value assessment should clearly define the detailed project costs as well as the expected payback period and benefits for the IT project after completion. The assessment of IT business value should be used in establishing accountability for the realization of forecasted project benefits and for a process that tracks and reports on the accomplishment of project benefits. Furthermore, decision makers responsible for a project's implementation can use an analysis of business value to consider the full impact of the project, including the adverse effects on other departments and systems.

During the planning phase, business value should be assessed before the IT project begins. The benefits of the project upon implementation should be assessed in both financial and non-financial domains. The IT project can then be ranked for potential development based on the results of the business value assessment.

Next, the implementation phase should involve an ongoing IT project viability review while the post-implementation phase of the business value assessment would examine whether or not the project has achieved its intended business value for the end users.

The City does not have an overall IT inventory to monitor project status and risks. To record and monitor IT investments a centralized IT project inventory should be developed and utilized. Such an inventory would also facilitate the communication of information regarding IT projects across City departments. The CIO should develop an annual report written to detail a comprehensive list of the ‘major’ or ‘most important’ IT projects in the organization.

BEST PRACTICES: IT INVENTORY

- Fairfax, County VA,
- City of Seattle, WA,
- City of San Jose, CA, all have a listing of IT projects underway and planned throughout their organization.

The report should provide the following information for each project:

- Project description,
- Technology goals,
- Return on investment,
- Progress to date,
- Milestones (completed & projected), and
- Project staffing and budget.

Without a centralized IT project inventory or management function that monitors major IT project status and risks, corporate IT management cannot identify or eliminate duplicate or incompatible systems. Since the City Manager and Chief Information Officer do not have a centralized list of major IT projects, they cannot ensure that IT projects are aligned with City strategies, goals and priorities.

Adopting a common project management methodology can mitigate many risks associated with IT projects. Because IT projects are high-risk endeavors and typically involve significant financial and staff resources, organizations should establish and utilize a common project management methodology. Unlike the City of Austin’s Public Works Department which has established and adopted uniform and consistent guidelines for developing facilities, similar guidelines do not exist for IT projects. Indeed, IT projects we reviewed ranged between \$42,000 and \$57 million with the more complex projects costing as much as some construction projects. Some of the more expensive projects in our sample fell under the Public Work’s methodology as a capital improvement project. A common approach to project management can help ensure that IT projects are aligned with the corporate IT vision and associated goals and objectives while utilizing resources most economically and effectively. Ideally the methodology chosen should address the:

- Nature and sequence of activities to be performed,
- Documentation, including authorizations required for each activity,
- Performance measures and targets, and
- Roles and responsibilities for assigned staff.

As previously noted, IT projects in the City are not managed consistently across the departments. For example, some projects are managed by the ISD Enterprise IT Project Office, some are managed by departmental staff, and others are managed by the Financial Services Department's 911 RDMT project office. The lack of a common project management policy results in a lack of consistency in managing projects throughout planning to implementation. In addition, there is no requirement that IT projects be managed by certified professional IT project managers. While project management activities do occur, currently the function is informal and limited in scope.

<p style="text-align: center;">BEST PRACTICES: PROJECT MANAGEMENT STANDARDS</p> <ul style="list-style-type: none"> • The City of Dallas has a Systems Development Life Cycle Policy that applies to all IT systems developed, acquired, or maintained by the City. • Fairfax County, VA has application life cycle standards that guide all County system development and enhancement projects that are projected to employ significant resources.

When City departments manage IT projects independently and inconsistently, the end result is often that information systems and technologies are incompatible, duplicative, and costly. There is an increased risk of IT project failure without the presence of IT policies and procedures and a project management methodology. Identified risks include:

- Spending scarce resources on projects that have little or no value to the organization,
- Developing and acquiring systems that do not meet user requirements, and
- The production of inaccurate, misleading, or untimely information resulting from a poorly defined or inadequately controlled system.

The absence of minimum project management standards explains the inconsistencies found in the management of individual information technology projects. We found that many individual project managers did not have complete project planning documents, were not prepared to address potential risks, and did not have controls in place to manage changes to the projects.

Many of the City of Austin IT projects were missing one or more critical elements of a comprehensive project plan. A project plan is a formal, approved document used to manage project execution. There are several elements of a project plan that are crucial to a project's success.

We reviewed all of the 33 City IT projects that we identified for evidence of these basic project plan elements, and found that while many projects had some of these elements, only 7 projects had all plan elements. Exhibit 3, below, summarizes the presence or absence of each of the critical elements that should be included in a project plan.

**EXHIBIT 3
Project Plan Elements Identified by OCA**

Elements	All Components	Some Components	No Components
Authority to Assign Resources <i>and</i> Business Need Documented – Does the project manager have the authority to manage resources on the project? Has the business need that the IT project will fulfill been documented?	11	15	7
Key or Required Staff – Have the staff been identified who will be needed to work on the project?	22	--	11
Project Management Approach – Is there a description of the approach the project manager will follow to manage the project?	14	--	19
Scope Statement	26	--	7
Schedule	28	--	5
Budget	24	--	9
Had both Status Reports and Communication Plan – Are status reports provided to stakeholders? Is a plan documented that provides the mechanism for stakeholders to be kept informed?	12	10	11

SOURCE: OCA analysis of elements of a project plan that are crucial to a major IT project's success as of 12/06/01.

The City neither requires nor provides project management guidance or systematic training to stress the importance of developing a project plan before work actually begins. While we were unable to establish a statistically significant correlation between the elements of a project plan and project success, without a project plan, it is difficult for a project manager to:

- Establish a clear picture of the tasks and the participant’s responsibilities,
- Identify performance errors early,
- Institute a means of accountability,
- Ensure product integrity, and
- Promote team participation.

Accepted risk management techniques were not incorporated into the majority of major IT projects reviewed. In the complex, high stakes environment of information technology, risk management serves two key purposes:

- Forecasts potential pitfalls (such as time constraints of contractors or inexperience of key personnel) and identifies mitigation strategies; and
- Provides early warning signs to alert decision makers before problems have progressed beyond acceptable limits.

Documented risk management plans are tools that describe how to manage risks throughout a project’s developmental life cycle by identifying methods to:

- Identify potential risks to the project,
- Rank risks by probability of occurrence and severity of impact, and
- Mitigate project risks by taking immediate action when risks occur or putting a contingency plan in place in case an identified risk materializes.

Documented risk management plans were uncommon in the 33 projects we reviewed. Therefore, other risk management tools were

<p>BEST PRACTICE: RISK MANAGEMENT <u>Project Name:</u> Combined Emergency Communications and Transportation Management Center (CECC) <u>Project Cost*</u> \$35 million <u>Risk Management:</u> Perfect Score - The project had a risk management plan, identified risks and mitigation strategies and included a tracking system. One of the risks identified for the CECC was that the “end users are familiar with workflow...but have no experience on combined center systems.” The response to this risk was to plan and implement an appropriate training program. * See Appendix B</p>
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missing as well.

Specifically, we found:

- Three of the larger projects (9 percent) with an estimated value of \$94 million had a documented risk management plan in place, had identified risks and mitigation strategies, had assessed identified risks for impact and probability and were tracking the status of the risks.
- An additional five projects (15 percent) with an estimated value of approximately \$8 million, had one of the risk management components. For example, they may have identified risks, but did not have a strategy in place to mitigate the risks.
- The remaining twenty-five projects (76 percent) with an estimated value of approximately \$44 million had no documented evidence of risk management. They had no risk management plan, no list of identified risks, no mitigation strategy on how to manage risks, and no tracking of risk mitigation efforts.

The lack of corporate guidance and the absence of uniform project management requirements in the City result in inconsistent use of preferred project management techniques including those for managing project risks. Our analysis did not identify a statistically

IMPROVEMENT NEEDED: RISK MANAGEMENT

Project Name: Computerized Traffic Signalization System Upgrade
Project Cost* \$21 million
Risk Management: Could not find evidence of a risk management plan, identified risks or mitigation strategies. One risk that might have been identified through a risk management plan could have been the condition of the cable conduits in the Central Business District (CBD). Since the cable conduits in the CBD were not suitable for fiber installation, the money was allocated to accomplish other related signalization work. However, funds other than those originally budgeted will need to be allocated to complete the originally planned installation of fiber in the CBD.
* See Appendix B

significant relationship between use of risk management practices and project success due to the small sample size involved. Without methods to identify and mitigate risks, City IT projects are in danger of experiencing delays or failure while consuming limited financial and staff resources if preventable pitfalls are encountered.

Approximately half of the 33 projects we reviewed did not have controls in place to manage changes to the original project design. Changes to IT project design during development are common and are an important

cause in the growth of cost in IT projects. Prior to modifying a project's design or specifications, assessments should be conducted to determine the impact of the changes on the overall system. Therefore, an effective project change control process that allows an impact analysis to be conducted must be established for major IT

projects. A change control process should include methods to document, collect, track, and approve change requests. Without systematic processes to document, assess, and approve project changes, City IT projects face greater risks of experiencing delays, failures, uncontrolled cost growth, or the inability to meet functionality objectives.

We found that about half of the projects did not have a formal change management plan and many did not have methods in place to request, track, and approve project changes. Specifically, we found that 17 projects (51 percent) had change management plans in place and experienced changes during system development, but in only 8 of those cases was the potential impact of the changes on the system assessed prior to implementation.

Of the 12 implemented projects, eight experienced changes. The dollar value of the changes ranged from no cost to \$1,316,982. The average value of the changes to the six projects that experienced changes was approximately \$203,000.

We found no statistically significant correlation between the management of changes and project budgets or schedules. However, the existence of a change management plan and the requirement to use change order forms was statistically correlated with customer satisfaction. This could imply that users are more satisfied when there is a mechanism in place to address changes that they would like made to the system.

More than half of the projects we reviewed were behind schedule. A schedule for all major IT projects should be established and made readily available to high-level stakeholders. The schedule can be used to measure the progress and success of a project and as a tool to hold IT project managers accountable. Our benchmark for testing the project schedule was +/- five percent of the original target timeline. Eighteen of the projects were behind schedule, twelve were on schedule and three were ahead of schedule. Exhibit 4, below, shows a breakdown of the 18 projects that were categorized as behind schedule.

EXHIBIT 4
Time Overruns for Behind Schedule Projects

Time Overruns	Number of Projects	Total Value
<20%	4	\$529,350
21-50%	2	\$57,811,869
51-100%	7	\$48,232,542
101-200%	3	\$12,156,025
201-400%	1	\$313,837
Over 400%	1	\$326,357
Total	18	\$119,369,980

SOURCE: OCA analysis of major IT projects as of 12/06/01.

Note: Total value is the actual expenditures if the project is implemented. For projects that were underway we used the original budget. If an underway project did not have an original budget, we used expenditures-to-date.

Despite the fact that IT project management literature indicates that over schedule projects can be more likely to fail or be challenged, our regression analysis of this relatively small sample of projects found no statistically significant correlation between projects that were over schedule and the existence of key project management elements. However, projects that run over schedule run the risk of negatively impacting the City’s resources by continuing to occupy City staff time, preventing or delaying the design and implementation of other IT systems, and increasing project expenditures.

Project managers in the City of Austin did well in the area of user requirements. Most project managers were able to produce some type of document outlining the requirements for the system. While our statistical analysis did not identify a positive correlation, the strength of

IMPROVEMENT NEEDED: USER REQUIREMENTS

Project Name: City of Austin Reporting and Measurement Analysis System (CARMA)
Project Cost* \$234,400
User Requirements: Mixed score – documentation of user requirements but no evidence of user review or approval of requirements, no process to solicit comments from users, requirements not prioritized.
User Satisfaction Score: 3.36 average (between neutral and disagree)
 * See Appendix B

the impact of identifying the user requirements may be reflected in the positive user survey results that we found for implemented projects.

Almost all of the IT projects we examined had some form of documented user requirements, however key items were missing. IT project management sources state that the design and capabilities of a new IT system should be based, in large part, on the requirements of the end users of the system. Thus, documented “user

requirements” are designed to help ensure that IT systems meet functionality and user satisfaction objectives upon completion. Key elements to assembling informative and effective user requirements include having a documented process to:

solicit end user input, prioritize user requirements, and to obtain user acceptance of the final system. Of the 33 City IT projects we found:

Thirty of the projects had documented user requirements, but only 10 of those were able to demonstrate that the users reviewed and approved the system requirements.

Some of the IT project management research we reviewed found that the lack of user requirements increases the probability that a project will not be implemented with the desired functionality. However, we did not establish a statistically significant correlation between user requirements and project success in our regression analysis of major City IT projects.

BEST PRACTICE: USER REQUIREMENTS

Project Name: Water Distribution Control System (SCADA)

Project Cost* \$11 million

User Requirements:

Perfect Score – had documented and prioritized user requirements, proof of user involvement and acceptance.

User satisfaction score: project underway users not surveyed.

* See Appendix B

Our survey showed that users overall were somewhat satisfied with the newly developed or acquired systems. Upon completion of a project, users of IT systems should be satisfied with the functionality, ease of use, and integration of the system into normal work processes. In order to obtain information about user satisfaction with City IT projects, we surveyed randomly selected users of 12 projects that were recently implemented. The survey, which was conducted via email, contained the following statements:

S1: The system performs the essential functions that I need it to perform:

S2: I am able to use the system easily:

S3: The system was smoothly integrated into my work processes.

Users ranked their satisfaction with the IT system they use by indicating their level of agreement with the statements by using a five-response Likert scale with the following options:

- 1 = Strongly agree
- 2 = Agree
- 3 = Uncertain

USER SATISFACTION

(1=most satisfied, 5= least satisfied)

Most Satisfied Users

Public Network Enhancement (Library)- total average 1.20

Least Satisfied Users

City of Austin Reporting and Measurement Analysis (CARMA) – total average 3.36

- 4 = Disagree
- 5 = Strongly disagree

In general, the survey responses indicate that City users who participated in our survey were somewhat satisfied with the IT systems they use. The average response for all 12 projects and all three statements was 2.45. Results related to system functionality and ease of use were more favorable than those regarding ease of system integration for 11 of the projects. Only one project, which received responses that averaged 3.36 on the rating scale, indicated marginal user dissatisfaction. A detailed analysis of the results of our survey including average response for each statement and each project are provided in Appendix E.

Recommendations and Management Response

01. The City Manager and the Chief Information Officer should require that project managers develop a business analysis and technical viability analysis to provide sufficient information for department directors to authorize the initiation of major IT projects.

MANAGEMENT RESPONSE: CONCUR

There should be a single “Standard” for IT Project initiation City Wide. The methodology for initiation of an IT Project should be developed at the executive level involving the CIO, CFO, and Budget Officer, with final approval of the City Manager. After that definition has occurred, the “Standard” approach should become a fixture in the City IT Plan and the City Budget Preparation Documents. By way of implementation of the new “Standard” methodology, training for all department personnel responsible for initiation of the IT Projects would then be required.

02. In order to establish authority and responsibility for the management of IT projects, the City Manager should issue an administrative bulletin assigning authority to the Chief Information Officer to provide uniform and consistent guidelines for the development of major IT projects.
 - a. The uniform and consistent guidelines should at a minimum include the following requirements that project managers:
 - i. develop a budget (including personnel costs) prior to the start of a project
 - ii. track expenditures throughout the project’s life cycle
 - iii. develop a baseline project schedule with milestones
 - iv. include users in the development of functional requirements
 - v. document a project plan and related documents
 - vi. develop a risk management plan
 - vii. follow a change management system

MANAGEMENT RESPONSE: CONCUR

Review best practices, both internally (RDMT project) and externally.

03. To facilitate budget and financial tracking of major IT projects in the City of Austin, the Budget Officer and the Chief Information Officer should require project managers to use existing capabilities in AFS2 and Banner that would result in easier financial monitoring of project budgets and expenditures.

MANAGEMENT RESPONSE: CONCUR

It is important to distinguish between total cost, which includes existing, budgeted resources and incremental cost which is more important for decision making and follow up.

It is important to eliminate ambiguity in components to be tracked and apply a “Standard” approach, which has been authorized and approved by the City Managers Office.

04. The Chief Information Officer (CIO) should create a team of Executive-level management to develop a Citywide strategic information technology (IT) plan. Once developed, the CIO should oversee the maintenance and updating of the plan annually.

MANAGEMENT RESPONSE: CONCUR

05. After the Citywide IT strategic plan is developed, the City Manager should require department directors to develop departmental IT plans that align department IT objectives with the Citywide IT strategic plan. This could be part of the current annual departmental business planning process.

MANAGEMENT RESPONSE: CONCUR

06. In order to maximize return on investment and ensure alignment with City IT goals, the City Manager and the Chief Information Officer should create a corporate IT steering committee. This steering committee should ensure that major IT projects support the corporate strategic goals, priorities are set for the allocation of IT dollars, and organize resources to leverage technical assistance for challenged projects.

MANAGEMENT RESPONSE: CONCUR

Initially, This activity should be kept to a small number of city leaders. The City Manager, The Deputy City Manager, The CFO, and The CIO. The reason being the establishment of priorities for the allocation of IT dollars, and organizational resources at a City Wide perspective is a change in strategy. This new strategic approach to the evaluation of IT needs and linking them to City of Austin Corporate Strategic Goals will need definition, approval, and support at the highest level of City Management. Upon agreement and definition of the methodology to be deployed, the team could be expanded to include additional City Executives to insure the implementation and execution is carried through.

-
07. The Chief Information Officer should report periodically (at least annually) to the City Manager's Office on major IT projects and related IT priorities. The reported status could be done in conjunction with reporting under the City's Managing for Results Initiative and should at a minimum include for each project: a description, progress to date, budget and milestones, return on investment, and any related performance measures.

MANAGEMENT RESPONSE: CONCUR

ISSUE FOR FURTHER STUDY

City's current e-Government planning process needs to ensure involvement of key stakeholders

The e-Government initiative was included among the IT projects reported to OCA for this audit. Because the project that is currently underway is a strategic plan for future implementation of e-Government solutions, it was not included in our sample of 33 projects analyzed and discussed in the preceding pages. However, e-Government has the potential to impact most or all of the other IT projects underway or planned, as well as the majority of existing (legacy) systems. Accordingly, the planning process must incorporate the views and perspectives of all relevant stakeholders. Presently, neither the Mayor and Council Members, nor members of the public have been involved in the development of issues and identification of opportunities for e-Government solutions.

E-Government has the potential to free up dollars currently spent by the City, while accelerating government response times from weeks down to minutes. E-Government can be characterized as: use of Internet-related technologies to accelerate and streamline service delivery to citizens, reduce paperwork burdens on business, improve management and responsiveness of joint federal-state-local programs, and apply commercial best practices to improve government operating efficiency.

The City of Austin started developing the e-Government strategic plan in the summer of 2001. The project is segmented into three phases, with Phase I nearly complete as of this writing. Phase I, the "Discovery" phase, has interviewed and conducted focus groups with hundreds of City managers and staff to identify e-Government issues, challenges, and opportunities within the organization. Phase II, "Assessment" is intended to assess the City's capabilities to meet e-Government goals. Phase III "Implementation" will complete a plan for optimizing e-Government priorities. The plan is expected to be finished in June 2002.

The process is coordinated by City staff and implemented by Third Wave, a consulting firm with experience in developing e-Government plans and solutions for a number of local governments in the United States.

Excerpts from the e-Government initiative's website indicate its status as of February 2002:

Here's what we've achieved to-date in our e-Gov - Third Wave Partnership...

- Completed executive interviews on e-Gov issues with all ACM's and Directors. Distributed to all interviewees for changes and modifications.
- Completed e-Gov issues & challenges & Rapid Workflow sessions with every city department (only one department chose not to participate !) Each department brainstormed a multitude of e-Government issues, challenges, and opportunities, then selected 2-3 top priority areas for detailed analysis. Results ? Identification of the issues & challenges, opportunities, impacts, solutions, and cost-benefits.
- Completed e-Gov sessions on those enterprise, city-wide areas common to many / most departments: IT, human resources, GIS, Call Center, internet applications & technology, electronic document management systems (EDM), purchasing, budgeting, e-payment, and permits and inspections. Results ? Identification of issues and opportunities, impacts, solutions, and benefits. The draft notes from Third Wave are now available on this site
- We have a preliminary list of 130 potential e-Government, web-enabled opportunities that could transform the way we do business with customers, our community, and each other.
- Assembled an e-Government Director's Advisory Team composed of 17 department Director's. They are offering invaluable advice, direction, and support for the Project.
- We have distributed the outcomes from each department and enterprise-wide session to each Director and the e-Gov participants for any changes, enhancements, or modifications. If there are any new, emerging issues that weren't addressed at those earlier sessions, we want to hear about those too !

The remaining elements to our e-Government Strategic Plan from March through June, 2002 include the following...

- **Phase II - Assess the Capabilities of the COA to Meet e-Government Goals**
 - Benchmark successful e-Government programs around the U.S
 - Identify Best Practices
 - Assess Customer/Stakeholder Ability to Access Services
 - Internal Capabilities - Can COA Meet e-Gov Goals ?
- **Phase III - Develop and provide e-Government Implementation Plan**
 - Inventory of e-Government Services & Information
 - Structure and Processes to Optimize e-Gov Opportunities
 - Alternative Implementation Methods

" Back-end System " Changes
Internet Standards
Cost Estimates to implement e-Government Priorities
Business Case and Cost-Benefit / ROI Analysis

The extent of involvement and communication with City staff has been exemplary. The e-Government project team has covered both intra- and inter-departmental issues and processes.

However, two key stakeholder groups have not been involved to date. According to the project's staff and consultants, despite extensive involvement of hundreds of City employees, participation has not been sought from the public or the Mayor and Council to date. While the Council Committee for Telecommunications Infrastructure has been briefed on the status of the project, this has been the only opportunity for Council input. Clearly, it is a late stage of the project to be identifying new issues, concerns, or opportunities. Nevertheless, considering the scope of impact and potential for e-government, all key stakeholder groups should be fully involved in defining the needs and opportunities to be considered. The Chief Information Officer reports that the project team agrees that receiving input from both citizens and the City Council is important and that there will be opportunities for their input during the final stages of the project.

**APPENDIX A
MANAGEMENT RESPONSES**

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Memorandum

To: Suzanne Nuccitelli, Office of the City Auditor
From: John Stephens, Acting Assistant City Manager
Date: May 20, 2002
Subject: Response to OCA Audit on Citywide Information
Technology Project Management

Attached please find my response to your audit on citywide information technology project management.

Please call me at 974-2076 if you have any questions or concerns about these responses.



John Stephens

Acting Assistant City Manager

xc: Vickie Schubert, Acting Director of Financial and Administrative Services
Brownlee Bowmer, CIO

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ACTION PLAN
CITYWIDE INFORMATION TECHNOLOGY PROJECT MANAGEMENT

Rec. #	Recommendation Text	Concurrence	Proposed Strategies for Implementation	Status of Strategies	Responsible Person	Proposed Implementation Date
1	The City Manager and the Chief Information Officer should require that project managers develop a business analysis and technical viability analysis to provide sufficient information for department directors to authorize the initiation of major IT projects.	Concur	There should be a single "Standard" for IT Project initiation City Wide. The methodology for initiation of an IT Project should be developed at the executive level involving the CIO, CFO, and Budget Officer, with final approval of the City Manager. After that definition has occurred, the "Standard" approach should become a fixture in the City IT Plan and the City Budget Preparation Documents. By way of implementation of the new "Standard" methodology, training for all department personnel responsible for initiation of the IT Projects would then be required.	Planned	CIO, CFO, Budget Officer	January 1, 2003, in time for use in the FY04 Budget Planning Process

Rec. #	Recommendation Text	Concurrence	Proposed Strategies for Implementation	Status of Strategies	Responsible Person	Proposed Implementation Date
2	<p>In order to establish authority and responsibility for the management of IT projects, the City Manager should issue an administrative bulletin assigning authority to the Chief Information Officer to provide uniform and consistent guidelines for the development of major IT projects.</p> <p>a. The uniform and consistent guidelines should at a minimum include the following requirements that project managers:</p> <ul style="list-style-type: none"> i. develop a budget (including personnel costs) prior to the start of a project ii. track expenditures throughout the project's life cycle iii. develop a baseline project schedule with milestones iv. include users in the development of functional requirements v. document a project plan and related documents vi. develop a risk management plan vii. follow a change management system 	Concur	Review best practices, both internally (RDMT project) and externally.	Planned	CIO	October 1, 2002

Rec. #	Recommendation Text	Concurrence	Proposed Strategies for Implementation	Status of Strategies	Responsible Person	Proposed Implementation Date
3	To facilitate budget and financial tracking of major IT projects in the City of Austin, the Budget Officer and the Chief Information Officer should require project managers to use existing capabilities in AFS2 and Banner that would result in easier financial monitoring of project budgets and expenditures.	Concur	It is important to distinguish between total cost, which includes existing, budgeted resources and incremental cost which is more important for decision making and follow up. It is important to eliminate ambiguity in components to be tracked and apply a "Standard" approach, which has been authorized and approved by the City Managers Office.	Planned	Budget Officer and CIO	October 1, 2002
4	The Chief Information Officer (CIO) should create a team of Executive - level management to develop a Citywide strategic information technology (IT) plan. Once developed, the CIO should oversee the maintenance and updating of the plan annually.	Concur		Planned	CIO	October 1, 2002
5	After the Citywide IT strategic plan is developed, the City Manager should require department directors to develop departmental IT plans that align department IT objectives with the Citywide IT strategic plan. This could be part of the current annual departmental business planning process.	Concur		Planned	City Manager	January 1, 2003

Rec. #	Recommendation Text	Concurrence	Proposed Strategies for Implementation	Status of Strategies	Responsible Person	Proposed Implementation Date
6	<p>In order to maximize return on investment and ensure alignment with City IT goals, the City Manager and the Chief Information Officer should create a corporate IT steering committee. This steering committee should ensure that major IT projects support the corporate strategic goals, priorities are set for the allocation of IT dollars, and organize resources to leverage technical assistance for challenged projects.</p>	Concur	<p>Initially, This activity should be kept to a small number of city leaders. The City Manager, The Deputy City Manager, The CFO, and The CIO. The reason being the establishment of priorities for the allocation of IT dollars, and organizational resources at a City Wide perspective is a change in strategy. This new strategic approach to the evaluation of IT needs and linking them to City of Austin Corporate Strategic Goals will need definition, approval, and support at the highest level of City Management.</p> <p>Upon agreement and definition of the methodology to be deployed, the team could be expanded to include additional City Executives to insure the implementation and execution is carried through.</p>	Planned	CIO	October 1, 2002

Rec. #	Recommendation Text	Concurrence	Proposed Strategies for Implementation	Status of Strategies	Responsible Person	Proposed Implementation Date
7	The Chief Information Officer should report periodically (at least annually) to the City Manager's Office on major IT projects and related IT priorities. The reported status could be done in conjunction with reporting under the City's Managing for Results Initiative and should at a minimum include for each project: a description, progress to date, budget and milestones, return on investment, and any related performance measures.	Concur		Planned	CIO, CFO, Budget Officer	January 1, 2003

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**APPENDIX B
IDENTIFIED MAJOR IT PROJECTS AND THEIR ACTUAL
OR EXPECTED COST THROUGH 12/06/01**

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**APPENDIX B
IDENTIFIED MAJOR IT PROJECTS AND THEIR
ACTUAL OR EXPECTED COST THROUGH 12/06/01**

We reviewed the projects that are in bold, below. The projects that are not in bold means that the data was self-reported by project managers and was not audited.

Project Name	Actual or Expected Cost¹	Status	Department that managed project
CARMA City of Austin Reporting & Measurement Analysis	\$234,400	Implemented	Financial Services Department (FSD)
City Clerk's Office Document Imaging and Records Management Project	\$326,357	Implemented	Information Systems Department (ISD)
Customer Information System	\$7,327,641	Implemented	Austin Energy
Downtown Austin Community Court Program/Project (DACCP)	\$9,063	Implemented	Municipal Court
DRA WEB2	\$62,725	Implemented	Library
eCAPRIS Phase I	\$313,837	Implemented	Water & Wastewater Department
Legal Settlements Tracking System	\$79,350	Implemented	Information Systems Department
PIER (Permitting, Inspections, Enforcement and Review)	\$1,284,188	Implemented	Infrastructure Support Services
PIER Imaging	\$539,426	Implemented	Infrastructure Support Services
Public Network Enhancement	\$550,890	Implemented	Library
RecWare, Sierra Digital	\$212,000	Implemented	Parks and Recreations Department & ISD
Upgrade of Hansen Computerized Maintenance Management System	\$489,550	Implemented	Water & Wastewater Department
TRAIN version 3.0	\$14,400	Implemented	Information Systems Department
DRA Self Check Station	\$32,045	Implemented	Library
Metrocall Pager Tracking	\$19,200	Implemented	Office of Emergency Management
3-1-1 Project	\$539,920	Underway	Information Systems Department
AFD EMS Records Management System	\$1,050,000	Underway	FSD-911 RDMT Project Office
Case/Records Management Project	\$52,190	Underway	Law Department

Project Name	Actual or Expected Cost¹	Status	Department that managed project
Combined Emergency Communications and Transportation Management Center	\$35,066,696	Underway	FSD-911 RDMT Project Office
Computerized Traffic Signal System Upgrade	\$21,380,000	Underway	Transportation, Planning and Design
Document & Workflow Management System Pilot - Boot & Tow	\$197,894	Underway	Municipal Court
Drainage Infrastructure GIS Mapping	\$200,000	Underway	Watershed Protection and Development Review
eCAPRIS Phase II	\$376,762	Underway	Water & Wastewater Department
Electronic Ticket Writers	\$98,990	Underway	Municipal Court
Floodplain GIS	\$218,000	Underway	Watershed Protection and Development Review
HHSD Telecommunication Dial Plan Conversion and Networking	\$706,617	Underway	Health and Human Services Department
Lift Station Telemetry Expansion	\$4,620,000	Underway	Water & Wastewater Department
LIMS (Laboratory Information Management System)	\$229,512	Underway	Water & Wastewater Department
NXX - Numbering Plan Changes	\$38,000	Underway	Information Systems Department
Pavement Mgt. Information Syst. For Street & Bridge	\$99,560	Underway	Information Systems Department
Regional Trunked Radio System (RTRS)	\$57,435,107	Underway	FSD-911 RDMT Project Office
Stormwater Discharge Permit Database	\$55,000	Underway	Information Systems Department
SWS Technology Implementation	\$100,630	Underway	Information Systems Department
Telework Pilot Project	\$82,282	Underway	Information Systems Department
Vendor Registration on the Web (VenReg)	\$208,384	Underway	Financial Services Department
Water Distribution Control System SCADA	\$11,980,172	Underway	Water & Wastewater Department
Advanced Metering Technologies	\$160,000	Underway	Austin Energy
Asset Maintenance Project (Replacement of the MCS II - MMS)	\$1,400,000	Underway	Austin Energy
DataOne	\$18,753,000	Underway	Austin Energy
Field Service Automation	\$1,000,000	Underway	Austin Energy

Project Name	Actual or Expected Cost¹	Status	Department that managed project
On-Line Job Application	\$14,400	Underway	Human Resources Department
E-Government Strategic Plan Development	\$700,000	Underway	Information Systems Department
Novell to NT Conversion	\$27,000	Underway	Law Department
Outside Counsel Tracking System	\$19,200	Underway	Law Department
Video Conferencing – Mitigation	\$33,400	Underway	Municipal Court
AFS2 Release 2.2 Upgrade	\$300,000	Planned	Financial Services Department
Asset Management System	\$1,050,000	Planned	Financial Services Department
CMO Agenda Management System	\$350,000	Planned	ISD-Enterprise Project Office
Comprehensive Public Works Informational Database	\$303,050	Planned	Public Works Department
Computer Aided Dispatch (CAD)	\$7,800,000	Planned	FSD-911 RDMT Project Office
Departmentwide Pond Database	\$60,000	Planned	Watershed Protection and Development Review Department
Deregulation Billing Gap Analysis	\$300,000	Planned	Austin Energy
Develop Internet Applications	\$200,000	Planned	Municipal Court
Document & Workflow Management System – Full implementation	\$200,000	Planned	Municipal Court
Drainage Complaint Database	Not Available	Planned	Watershed Protection and Development Review Department
E-Business Strategy Development & Implementation	\$37,087	Planned	Austin Energy
EHS Information Management System	\$40,000	Planned	Health and Human Services
Enhance IVR operation	\$50,000	Planned	Municipal Court
Hansen-GIS Integration	Not Available	Planned	Water & Wastewater Department
Indigent Care Collaboration	\$2,300,000	Planned	Health and Human Services
Information Technology Master Plan Phase I	\$3,000,000	Planned	Water & Wastewater Department
Migrate from OfficeVision to Data Q	\$20,000	Planned	Municipal Court
New Case Management System	\$2,000,000	Planned	Municipal Court

Project Name	Actual or Expected Cost¹	Status	Department that managed project
New Inventory Management and Material Requirements Planning System (IMMRPS)	\$2,500,000	Planned	Austin Energy
New Practice Management System	Not Available	Planned	Primary Care
PIER Project	Not Available	Planned	ISD-Enterprise Project Office
Police Records Management System	\$4,000,000	Planned	FSD-911 RDMT Project Office
RSMP Database	\$2,640	Planned	Watershed Protection and Development Review Department
SCADA/EMS Project	\$6,505,000	Planned	Austin Energy
Scheduled Equipment Replacement	\$175,000	Planned	Municipal Court
Spills and Complaints Database	Not Available	Planned	Watershed Protection and Development Review Department
Wireless Infrastructure	\$700,000	Planned	Aviation
Workforce Development System	\$200,000	Planned	Health and Human Services

¹ Actual or Expected Cost was identified between 4/19/2001 and 12/6/2001. For implemented projects, the cost was based on actual expenditures. For underway projects, the cost was based on the project budget or expenditures-to-date, if the project did not have a budget. For planned projects, the cost was based on the project budget.

APPENDIX C
GLOSSARY OF PROJECT MANAGEMENT MODELS

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APPENDIX C

GLOSSARY OF PROJECT MANAGEMENT MODELS

This glossary is provided to facilitate the reader's understanding of this audit report; it is not intended to be an authoritative source on all terms contained herein.

Commercial Off The Shelf Model - Has four phases that consist of a requirements analysis phase, an architecture definition phase, integration and test phase, and a technology update phase. The City of Austin Project Management Office utilizes the COTS model for software project management. Each phase in the model is an iterative process in that a system requirement review or a system design review must be performed and accepted before the next phase of the IT project can begin.

Incremental Model - This approach supports the progression of multiple phases of the life cycle development process simultaneously. The incremental model allows for the development of medium, large, or constantly evolving IT system in stages or phases. Additionally, this method supports a collaborative approach and is well suited for changing business needs.

Linear Sequential Model – Sometimes called the “classic life cycle” or the “waterfall mode,” the linear sequential model suggests a systematic, sequential approach to software development that begins at the system level and progresses through analysis, design, coding, testing, and maintenance.

Project Management Institute Project Management Body of Knowledge Model - Accomplishes project management through the use of project initiation, planning, executing, controlling and closing processes. This model incorporates nine project management areas within different phases of the project management processes. These areas involve integration, scope, time, cost, quality, human resource, communication, risk, and procurement management.

Prototyping Model – Begins with requirements gathering. Developer and customer meet and define the overall objectives for the software, identify whatever requirements are known, and outlines areas where further definition is mandatory. A “quick design” then occurs. The quick design focuses on a representation of those aspects of the software that will be visible to the customer/user.

Rapid Application Development Model – A linear sequential software development process model that emphasizes an extremely short

development cycle. The RAD model is a “high-speed” adaptation of the linear sequential model in which rapid development is achieved by using a component-based construction approach.

Spiral Model – An evolutionary software process model that couples the iterative nature of prototyping with the controlled and systematic aspects of the linear sequential model. In the spiral model, software is developed in a series of incremental releases.

System Development Life Cycle Model - A process designed for the analysis, selection, acquisition, development, implementation, operation, and maintenance of an IT system from its inception to de-activation. There are several system development life cycle methodologies, and each has several variations. However, all of these models contain similar basic components. The waterfall methodology is one of the oldest and most commonly used types of the system development life cycle model. In this version, the process is sequential in that each step is completed before the next step begins. Completion of each step produces products that are used in the succeeding step.

**APPENDIX D
CITIES AND COUNTIES FOR COMPARISON WITH
AUSTIN, TEXAS BASED ON POPULATION SIZE AND
TOTAL EXPENDITURES AND EXPENSES**

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**APPENDIX D
CITIES AND COUNTIES FOR COMPARISON WITH
AUSTIN, TEXAS BASED ON POPULATION SIZE AND
TOTAL EXPENDITURES AND EXPENSES**

Organization	Population Size ¹	Total Expenditures and Expenses ²	IT Department Budget³
City of Oakland	399,484	\$829,664,000	\$10,039,012 ⁴
City of Las Vegas	478,434	\$481,337,434	\$9,950,833 ⁴
City of Seattle	563,374	\$1,734,241,000	\$35,948,424 ⁴
City of Austin	656,562	\$1,589,299,469	\$27,690,194 ⁴
City of Jacksonville	735,617	\$1,953,638,000	\$20,373,794 ⁵
City of San Jose	894,943	\$1,309,034,000	\$17,711,239 ⁴
Fairfax Co., VA	969,749	\$3,109,392,430	\$40,253,140 ⁴
City of Dallas	1,188,580	\$1,549,832,000	\$32,790,588 ⁴
City of Phoenix	1,321,045	\$1,617,053,000	\$27,118,000 ⁶
Clark County	1,375,765	\$2,791,654,426	\$35,750,000 ⁵

¹ Population based on US Census Bureau-2000 Data.

² From Organization's 2000 Comprehensive Annual Financial Report (CAFR).

³ This data is not directly comparable due to the different source of the data.

⁴ Data from FY 2002 budget for the Information Technology department.

⁵ Data form FY 2001 self reported organization wide IT budget.

⁶ Data from FY 2000 CAFR.

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APPENDIX E
LEVELS OF USER SATISFACTION

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APPENDIX E LEVELS OF USER SATISFACTION

Project Name	Total Mean	Question 1 Mean	Question 2 Mean	Question 3 Mean
Legal Settlements Tracking System	1.00	1.00	1.00	1.00
Public Network Enhancement	1.20	1.10	1.20	1.30
DRA WEB 2	2.00	1.90	2.10	2.00
Recware	2.10	1.97	2.06	2.28
Hansen Maintenance Management System Upgrade	2.11	1.98	2.10	2.25
City Clerk's Document Imaging and Records Management	2.22	2.00	1.89	2.78
Customer Information System	2.37	2.29	2.03	2.79
Overall Mean	2.45	2.31	2.32	2.72
Downtown Austin Community Court	2.47	2.27	2.47	2.67
eCAPRIS Phase 1	2.50	2.41	2.26	2.82
PIER Imaging	2.54	2.36	2.47	2.79
PIER Production	2.65	2.53	2.52	2.90
City of Austin Reporting & Measurement Analysis (CARMA)	3.36	3.08	3.29	3.71

SOURCE: OCA analysis of user satisfaction survey responses.
The desired state is defined as an average response of 1 or "Strongly Agree." Scale was 1-5.

Questions:

- 1) The _____ application performs the essential functions that I need it to perform.
Responses = 1 - Strongly agree
2 - Agree
3 - Uncertain
4 - Disagree
5 - Strongly disagree

- 2) I am able to use the _____ application easily.
Responses = same set listed under question #1

- 3) The _____ application was smoothly integrated into my work processes.
Responses = same set listed under question #1