CITY COUNCIL AGENDA REPORT

Meeting Date: 10/07/2021

From: Stuart Schillinger Assistant City Manager

Subject: Information Technology Strategic Plan

Community Goal/Result

Fiscally Prudent

Safe Community

Community Building

Purpose

Develop an Information Technology Strategic Plan which ensures the ability to use computer based applications throughout the City which provides efficiency for operations and increased accessibility for the public.

Recommendation

Accept the Strategic Plan From ClientFirst.

Background

The City last updated its IT Strategic Plan in 2000. This was done prior to the creation of cloud oriented computing and focused on local networks. The City has begun the process of moving applications to the cloud including our financial system (Tyler Technologies), our Microsoft suite of applications (Office 365, Sharepoint, and Teams), and our website. As we look to further expand the use of the cloud and allowing community members to interact with city operations on a continuous basis staff realized it was time to update our Strategic Plan to take advantage of the latest technology.

The City hired ClientFirst to update the City's IT Strategic Plan. ClientFirst has been working with city staff since August of 2020. ClientFirst worked with the departments to determine what the current and future needs of the departments are as it relates to technology. ClientFirst also reviewed our hardware system to determine what upgrades were needed.

ClientFirst met with the City Council's Technology Committee to review the report on September 13, 2021.

Discussion

David Krout and Tom Jakobsen of ClientFirst will be at the meeting to present the findings of their study and review the Strategic Plan with the City Council. The plan calls for upgrades to the City's network and wiring in City Hall to allow for newer software to be used more

efficiently by City employees. It reviews the need for a number of new software applications to increase the efficiency of city staff and to allow more interaction between the community and city information and processes.

The Strategic Plan is attached for your review.

Fiscal Impact

During the midyear budget review process in May staff informed City Council of this project and the projected first year cost of $500,000 which was included in the FY 21/22 budget. Future year expenditures would come back to City Council as they were needed.

Measure of Success

The City has a computer infrastructure which enables it use applications which create efficiency for staff and allows for additional interactions with the public.

Stuart Schillinger

Stuart Schillinger, Assistant City Manager

Clayton Holstine

Clay Holstine, City Manager

Technology Master Plan

April 2021

Optimal Technology Guidance

Client Locations
Coast-to-Coast

Practice Locations
California
Illinois
Texas
North Carolina

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CLIENTFIRST
TECHNOLOGY CONSULTING

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Engagement Purpose and Background

Technology Master Plan Objective

The objective of the Technology Master Plan is to develop and articulate a vision for the effective use of technology to support the work of the City, assuring the proper technical resources and organization structure to effectively manage the information technology, enterprise applications and data management in use by the departments. The plan also identifies strategies for developing and implementing technology initiatives/projects in support of the organization's operational needs. We also focused efforts on planning and recommending improvements in the City's business applications and systems to make technology more effective in supporting the departments and goals of the organization.

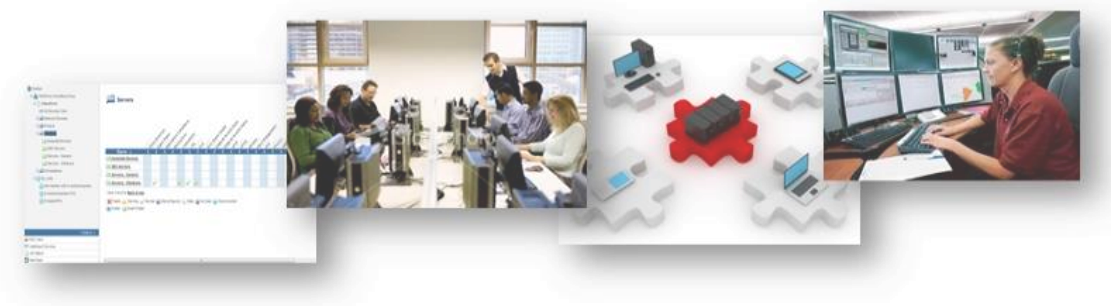
A well-documented Plan will also guide the IT support function and the City's operational departments over the next several years in planning, procuring, implementing, and managing current and future technology investments, as well as resources related to operational technology and information technology service delivery. The plan is the result of a thorough analysis of the following:

- Interviews and workshops involving all levels of the City's operational staff, including the management team, end-users, and other stakeholders, while recognizing limited staff availability
- Existing hardware and network infrastructure, staffing, funding, applications, business systems, projects, processes, telecommunications, training, and other investments and resources currently in use by the City
- Identification and prioritization of initiatives and projects to undertake over the next seven years
- Identification of needs to accommodate current and future technology requirements, such as IT operations and management, legal requirements, cybersecurity requirements, service delivery, cloud computing, et cetera.

Deliverables

The assessment includes:

- Project Purpose and Background
- Methodology for Implementation and Maintenance of the Assessment
- Current Technology Environment Summary
- Key Benchmarking Metrics
- Strategies, Goals, and Objectives
- IT Initiatives (Projects) by Priority
- Key Issues
- Timelines
- IT Plan Budgets



Methodology and Approach

The project adopted a five-phase methodology for Technology Master Planning. The phased approach served as the cornerstone of the project, allowing a collaborative process to shape and develop the recommendations.

Technology Assessment Summary

Overview

A planned major development and associated population growth is expected to increase the demand for City services over the next several years. In addition, citizens increasingly desire efficient interaction with staff, online 24/7 transaction capabilities, and more transparent information availability. The City realizes that it will not be able to manage these changes without updating and improving business applications and business processes. An increased desire to leverage business applications to serve constituents has resulted in a desire to increase investment in technology, leading to the creation of this plan.

COVID-19 has increased the demand for flexible communications, technology, and mobile computing. The City has moved to Office 365 for electronic mail and is implementing cold-based file storage and collaborative file sharing through Microsoft Teams. The City also plans to expand the use of Teams to provide additional communications tools.

The City has under-invested in technology in recent years, additional investment in foundational IT infrastructure is now necessary to support increased communications, applications and data sharing needs. Investments include enterprise-level structured cabling, data network and wireless improvements for staff and visitors to City facilities.

COVID-19 has caused an increase in cybersecurity threats, requiring agencies to increase spending on cybersecurity and risk mitigation measures. Increased cybersecurity spending is included in the initial years of the Plan.

Based on expected growth, the plan recommends the selection and implementation of Land Management (planning, permits, code enforcement and GIS integration), Asset Management (work orders, maintenance and asset management) systems, replacement of the Marina Management system, improvements to ERP (financials, HR) and other application systems. Staff currently have created numerous manual workarounds that force users to rely on external shadow systems to bridge current application functionality shortcomings.

The goal of the plan is to affect a Digital Transformation at the City, reducing the reliance on paper and shadow systems while increasing automation and efficiency.

Current Technology Environment

The City does not have a computer equipment replacement plan, resulting continued reliance on technology components that are beyond their useful life. Additional investment IT infrastructure, cybersecurity mitigation efforts, disaster recover planning and system resiliency are outlined in the below plan.

The table below summarizes the current technology environment at the City:

Item	Quantities
IT FTE	1.0
IT – Outsourced	0.4
Number of Employees (80 FT, 96 PPT)	116 FTE
PCs/Laptops	102
Printers	125
Physical Servers	7
Virtual Servers	3

The City currently utilizes nearly 170 application systems and software modules. Major enterprise application systems include:

Application Functionality	Vendor-Application Name
Financial Management	Tyler Incode Version 10
Human Resources	Tyler Incode Version 10
EAM (Enterprise Asset Mgmt./Work Orders & Maintenance Management)	None, however, use Mobile MMS to track Work Order elements Nautical Software – Marina Management
Land Management/Community Development (The system is a custom application provided by the City Community Development vendor, CSG Engineering)	Greenvue Permit Suite
Police Dispatch and Records	Sun Ridge - RIMS
Parks and Recreation	ActiveNet
Electronic Document and Records Management	Filemaker Pro and Versatile

Key Statistics and Metrics

The following analysis provides feedback on key measurements regarding technology investments and IT support operations:

IT Budgeting/Expenditures	IT Spending vs. Operating Fund Expenditures
IT Staffing Resources	Overall IT Staffing vs. Key Equipment Counts
Server Virtualization	Percentage of Virtualized Servers

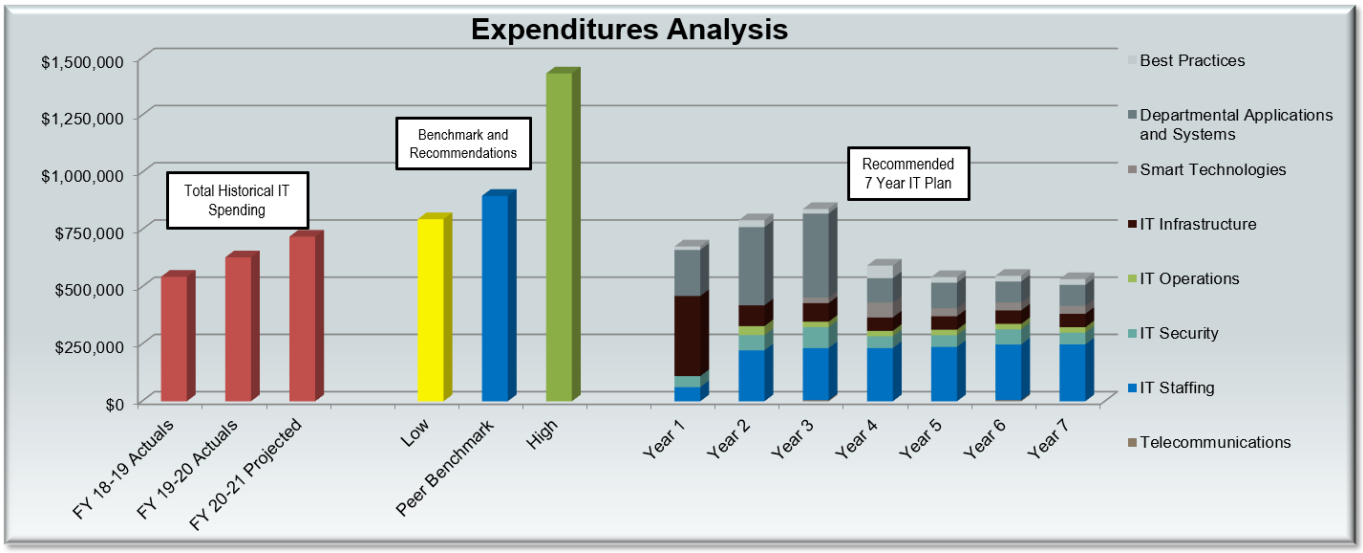
These measurements provide an indication of issues that may affect the organization's technology effectiveness as it relates to providing IT support of the departments systems and application solutions.

IT Spending versus Operating Fund Budgets

Technology Spending versus Operating Budgets provides an overall indication of whether the technology systems and IT support function receive a sufficient level of organizational resources to provide the necessary services. Over time, underfunding typically reduces the IT Department's ability to respond to requests, reduces system availability, and negatively impacts organization-wide productivity.

The following table depicts Brisbane's *Technology Spending versus Recommended Best Practices* and a municipal benchmark of 52 agencies.

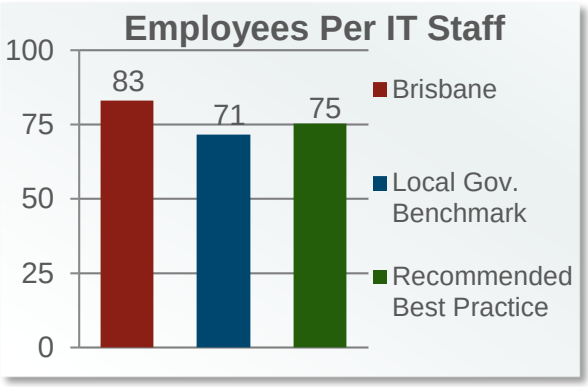
Brisbane FY18 Actuals	Brisbane FY19 Actuals	Brisbane FY20 Projected	Recommended Low	Benchmark	Recommended High
1.74%	1.92%	2.26%	2.50%	2.8%	4.5%

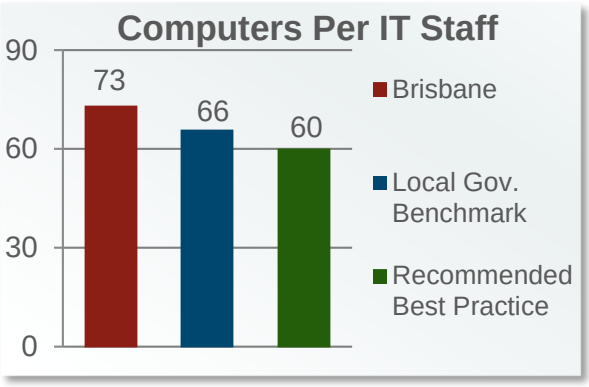


IT Staffing Ratios

The following table depicts Brisbane's IT Staffing Ratios per employee and computer equipment versus a municipality benchmark of 68 similar agencies. These are commonly used measures in the industry to validate staffing levels. As the number of individuals served and the amount of equipment increases, staffing levels should also increase.

	Brisbane	Municipality Benchmark	Recommended Best Practice
Employees per IT Staff	83	72	75
Computers/Laptops per IT Staff	73	66	60



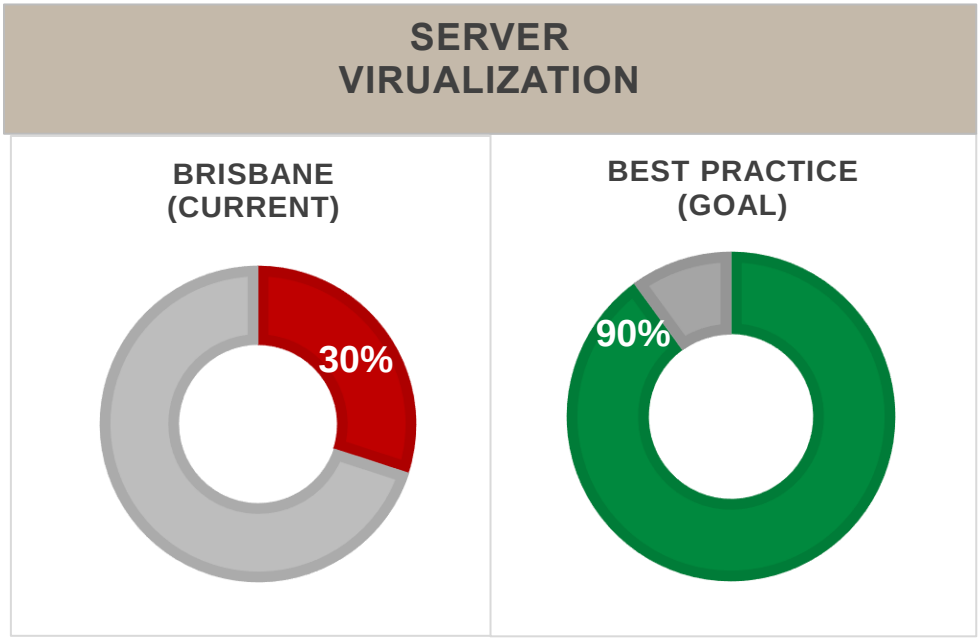


In this comparison, the City's IT staff supports more employees and computers than recommended or compared to peer agencies. We were impressed by the productivity of the IT staff and believe that technical staffing levels are appropriate for the City in the near-term. We recommend the City consider expanding utilization of the Managed Services provider to improve customer service.

These benchmarks do not take into account City needs related to departmental business applications or GIS. This report recommends procurement of several new applications and improvements to existing application systems. Adding a Business Systems Analyst to the IT team is recommended to support the expanded need for business applications as the City grows (see the *Enterprise Applications Support* initiative).

Server Virtualization

The percentage of virtualized servers is an important measure that shows the extent an Agency continues to rely on physical servers. For the City of Brisbane, the lack of virtualization is a symptom of limited investment in IT. This report recommends funding virtualization of existing servers while continuing to move applications to the cloud.



IT Strategies, Goals, and Objectives

Strategies for leveraging and maximizing information system utilization in delivering City services are listed below. Within each strategy, initial goals and objectives are identified for the City. The goals and objectives have been translated into specific initiatives later in the Technology Current State Assessment section of the report. Additionally, outlined in the report are the budgetary costs for each initiative, prioritization, and implementation time frame.

Adopt a Best Practice Approach to Software Selection

Goals and Objectives

- Utilize best practices for the selection, implementation project management, and ongoing management of all software application systems.
- Focus on reducing the number of disparate departmental systems to eliminate the need for custom interfaces.
- Prepare the City to select new and critical enterprise applications.

Expand Citizen Communication and Online Customer Service

Goals and Objectives

- Expand the City website to increase the availability of information and online payment options as new systems are implemented or enhanced.
- Incorporate departmental and other existing online services into the website to maintain a consistent City brand.
- Expand the use of graphics and maps to increase website ease of use and readability.
- Enhance ability to share financial information and key City performance indicators.

Maximize Utilization of Application Systems

Goals and Objectives

- Maintain a complete Application and User License Inventory to ensure those that need access to inquiry and reporting from various system, have that access.
- Plan for and fund adequate user training and support for all applicable systems.
- Implement application management best practices, including:
  - Maintain a culture of departmental enterprise application ownership for core applications.
  - Continue to work with departments to increase efficiency by leveraging application software functionality to streamline and automate processes.
- Commit all levels, from management to staff, to taking responsibility for adapting and improving processes and data availability, and integrating them with core application software applications.

Modernize IT Infrastructure

Goals and Objectives

- Upgrade obsolete core infrastructure systems to current generation infrastructure.
  - Assess structured cabling and implement improvements.
  - Replace aging data network and server equipment.
  - Replace older desktops and laptops.
- Improve resiliency and uptime of IT infrastructure.
  - Expand redundant Internet access to provide full resiliency
  - Reduce security risks through improved network management capabilities.
  - Design infrastructure to include cost-effective redundancies to reduce downtime.
- Provide wireless for City facilities guests, staff, and other constituents.

Strengthen Infrastructure Resilience and Disaster Recovery Capabilities

Goals and Objectives

- Expand current information technology security efforts to include additional monitoring and advanced threat-protection tools.
- Implement an Electronic Mail archiving solution.
- Consolidate backups to improve management and off-site restoration capabilities.
- Develop and test a Disaster Recovery Plan.
- Identify high-priority systems and recovery time frames.
- Exercise and test Plan regularly.

Expand GIS Capabilities

Goals and Objectives

- Complete GIS Assessment and Plan.
- Utilize results of Assessment to staff a GIS function at the City.
- Expand GIS integration between core systems.
- Leverage GIS integration with the City's systems to better utilize these core applications and data sharing.
- Leverage GIS as a repository for geospatial data and Smart City application data.
- Utilize Esri's analytical capabilities to inform reporting and decision-making.

Digital Transformation

Goals and Objectives

- Replace and/or procure new application systems to automate and streamline departmental business operations that currently rely on manual processes.
- Improve utilization of existing and new enterprise application systems.
- Improve business application access and training for all users.
- Inventory all unmet reporting needs by department and application system.
  - Include currently maintained/created manual and shadow system (e.g., Excel) data tracking and reporting.
  - Develop plan to automate reporting.
  - Create dashboards to assist in ongoing management and decision-making.
- Obtain vendor report writing training for applicable systems and City staff.
- Consider creating summary data stores that can be mined for information and decision-making.

Additional IT Staffing

Goals and Objectives

- Add a Business Application Analyst to assist departments in the implementation and utilization of improved business applications.
  - Assist with the selection and implementation of recommended systems
  - Work with the departments to improve business processes
  - Develop dashboards, reports and information sources for staff and constituents
- Expand use of IT Managed Services to improve service levels.
  - Improve internal customer service levels
  - Reduce burden of Help Desk tickets on staff
  - Expand Managed Services to include data network and cybersecurity

Technology Decision-Making Principles

Vision / Mission Statement

The City of Brisbane is dedicated to providing the highest quality technology-based services in the most cost-effective manner to deliver services effectively and efficiently on a sustained basis that reflects the organization's dedication to excellent customer service. The City will ensure its information systems are maintained in a secure environment, are capable of supporting information technology advancements made by the City, and will exist in an integrated environment that fosters an open, collaborative, and unifying culture.

- Technology is committed to the values of:
  - Reliability
  - Professionalism and Integrity
  - Efficiency and Effectiveness
  - Innovation
  - Excellence
  - Collaboration and Teamwork
- Given **Limited IT Resources**, the City will focus these resources on the most productive and cost-effective projects.
- City departments will agree on a **Collaborative Long-Term IT Vision and Strategies**, which requires active participation in setting IT priorities through an IT Committee consisting of department leadership.
- The City will strive to **Maximize Utilization of Existing Systems** and prior investments in application software, as well as to expand functionality and seek enhancements to existing applications.
- The City is committed to ensuring **Sufficient Staff Training and Application Software Knowledge** of existing vendor systems.
- **Department Ownership** is fundamental to achieving maximum return-on-investment of applications. Departments recognize the importance of assuming responsibility for managing and implementing their specific core business applications, with the support of IT staff. City departments are committed to taking responsibility for adapting and improving processes to best integrate them with the application software.

IT Initiative Summaries

Introduction

Technology Planning is a process to assess, research, prioritize, budget, and plan future technology initiatives. Some of the following initiatives are ready for approval and implementation, while others require further assessment and research before the City can make a final determination of priority, resource requirements, and cost-benefit.

Productivity Improvement – Many of the following initiatives will have a direct impact on overall productivity within the organization. Some of these initiatives will significantly impact specific processes, reducing staff time required to complete certain tasks, while others will ease or speed up delivery of services to City residents.

Reporting and Data Availability – Many of the initiatives outlined will have direct impact on the data that is available for reporting and management decision-making. New application systems and in some cases improvement of existing software systems are necessary before certain can be made available.

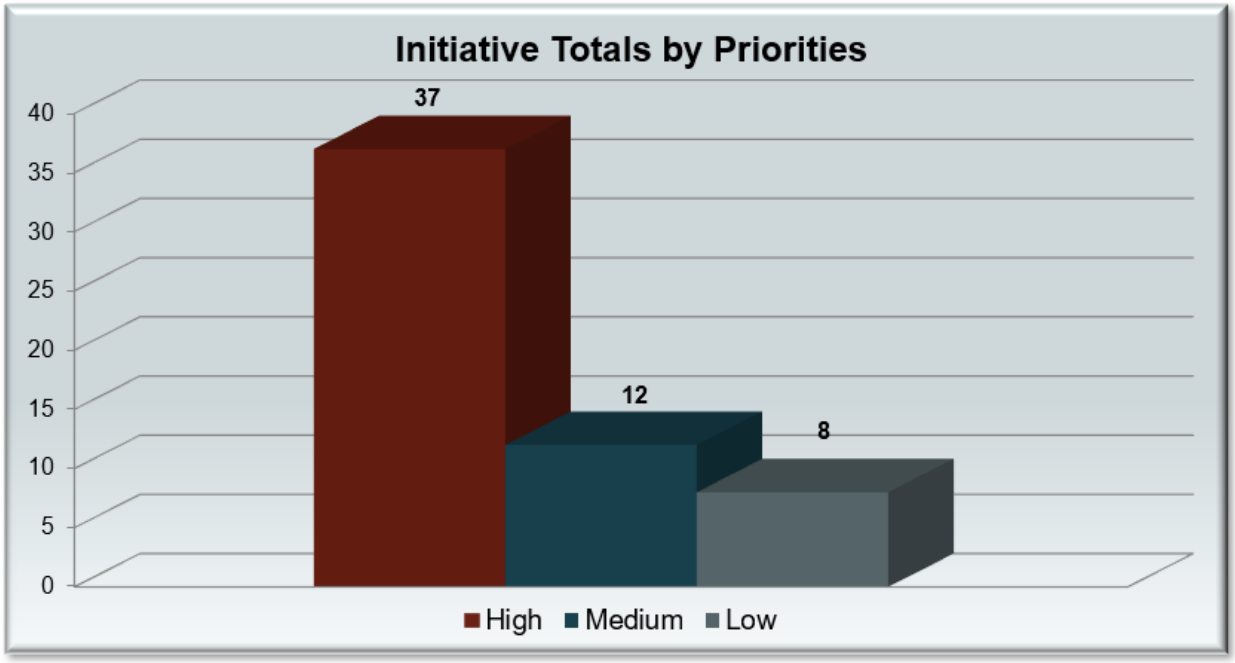
IT Initiative Categories

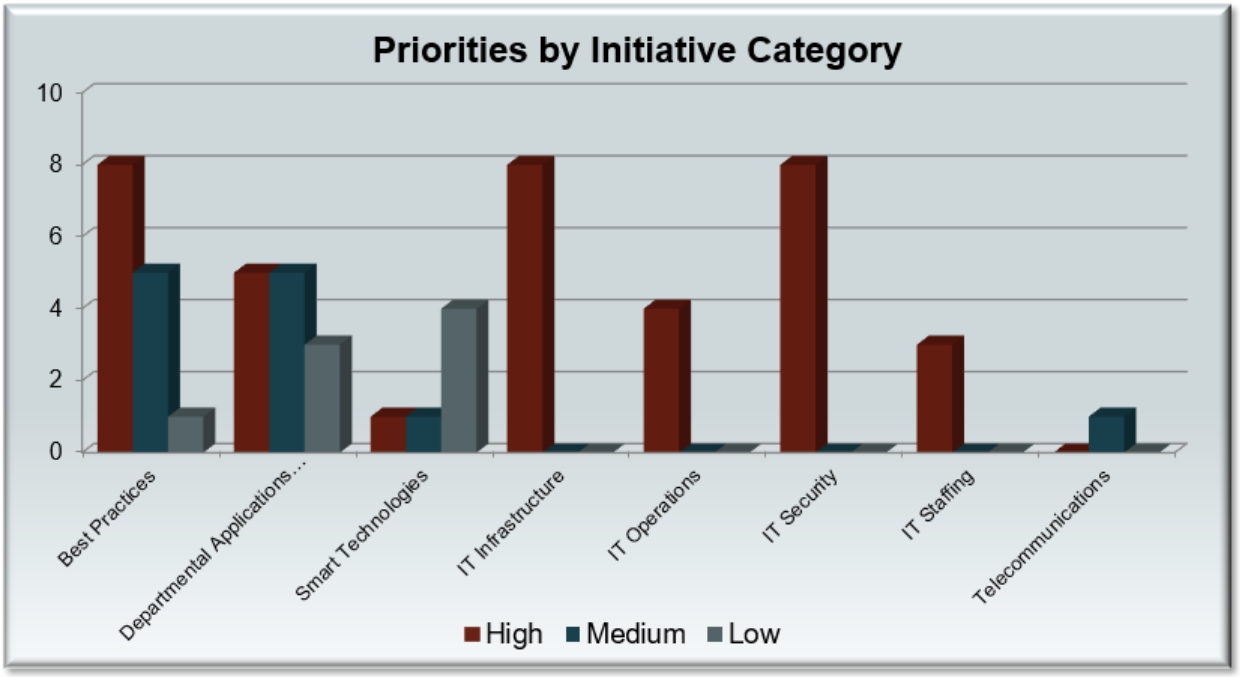
The assessment process resulted in 59 major initiatives and projects and hundreds of recommendations. Combined, there are hundreds of findings and recommendations throughout the report. ClientFirst classified the major initiatives into eight categories, including:

Best Practices	**Departmental Applications and Systems**	**Smart Technologies**	**IT Infrastructure**
IT Operations	**IT Security**	**IT Staffing**	**Telecom**

The following are the total initiatives by priority and initiative category.

Categories	Priority			
	High	Medium	Low	Total
Best Practices	8	5	1	**14**
Departmental Applications and Systems	5	5	3	**13**
Smart Technologies	1	1	4	**6**
IT Infrastructure	8	0	0	**8**
IT Operations	4	0	0	**4**
IT Security	8	0	0	**8**
IT Staffing	3	0	0	**3**
Telecommunications	0	1	0	**1**
Total	**37**	**12**	**8**	**57**




Priorities by Initiative Category
10
8
6
4
2
0
Best Practices
Departmental Applications ...
Smart Technologies
IT Infrastructure
IT Operations
IT Security
IT Staffing
Telecommunications
High
Medium
Low

Key Issues and Initiatives

The following are a list of key issues and initiatives that were identified during the planning process. These initiatives could also be considered high priority. The key initiatives listed below either provide long-term building blocks for the success of the plan, or mitigate risk. The City has made note of these as the initiatives from this plan that should be kept in the forefront during future implementation of this Plan.

Software Selection Best Practices	• Selecting the right system and technology is critical today to improve operating efficiency. • A properly selected system has significant to automate and streamline processes, as well as enhance data availability, constituent services and information transparency. • Ensure industry best practices assessment and process reviews are completed and detailed feature/function specifications are documented as part of procurement and RFP's. • Include all stakeholders in each software evaluation and implementation project.
New Land Management System	• The City does not have a modern, fully functional land management system. • Due to the limitations of the current system, the land management activities in the City are largely conducted manually. • The City should adhere to the principles identified in the *Software Selection Best Practices* initiative to ensure that a new system that meets the City's needs is acquired. • The implementation of a new system should follow the principles identified in the *Project Planning and Implementation Best Practices* initiative.

New EAM (Enterprise Asset Management)	• An *enterprise asset management* (EAM) system comprises a suite of modules in a software application that manages work orders, preventative maintenance, and asset management of City infrastructure, facilities, streets, sidewalks, parks, trails, bridges, drainage, culverts, etc. • The City does not have a modern, fully functional enterprise asset management system. • Many key business processes continue to be manual. • It is recommended that the City undertake the process for acquiring a new modern enterprise asset management system. • The process should follow the guidelines that are identified in the *System Selection Best Practices* initiative. • The implementation of a new system should follow the principles identified in the *Project Planning and Implementation Best Practices* initiative.
GIS Master Plan and Systems Implementation	• GIS and spatial maps are a key component in the management of the City's assets and development. • GIS also provides critical information and data elements that benefit many of the City's operations, including Smart City initiatives, in the future. • GIS systems are integrated with Land Management, EAM and document management applications to improve field-based information storage and retrieval. • GIS and maps also provide a data visualization for citizens to access services and information. • Having a citywide approach to GIS will set the City on a course to meet Smart City, address management, geospatial, and mapping needs.
Help Desk Expansion	• Staff rely on IT Support for most day to day issues • Expand use of IT Managed Services to include Help Desk services as a supplement to staff • Track all Help Desk tickets through a single system

Computer Equipment Replacement Planning	• Many City computer systems are now obsolete and no longer supported. • Limited investment has caused this Plan to recommend significant capital expenditures to reach current levels of technology. • Development of a long-term Computer Equipment Replacement Plan, and funding that Plan through an Internal Service Fund or some other annual funding mechanism, can reduce spikes in capital costs for technology. • Expand Computer Equipment Replacement to include all electronics and software with a fixed life cycle.
Network Redesign	• Network equipment from several vintages and vendors is in use at the City. • Several small unmanaged switches are installed at City facilities, increasing the risk of downtime • Redesign the current data network to replace obsolete equipment and improve resiliency
IT Operations	• IT operations are jointly managed by staff and the Managed Services provider • We recommend expanding use of Managed Services to include network and wireless management. • Add a Business Application Analyst position to assist departments in the implementation and utilization of improved business applications.

Disaster Recovery Panning	• The City does not have a citywide cybersecurity Incident Response Plan or Disaster Recovery Plan. • Incident Response Planning can reduce the time required to response to a cybersecurity issue, potentially reducing its impact. • Incident Response Planning and Disaster Recovery Planning can provide departments with an understanding of priorities and expected time frames. • We recommend the City develop an Incident Response Plan as soon as practical. • Development of a Disaster Recovery Plan is dependent on consolidated backups and expanded network resiliency.

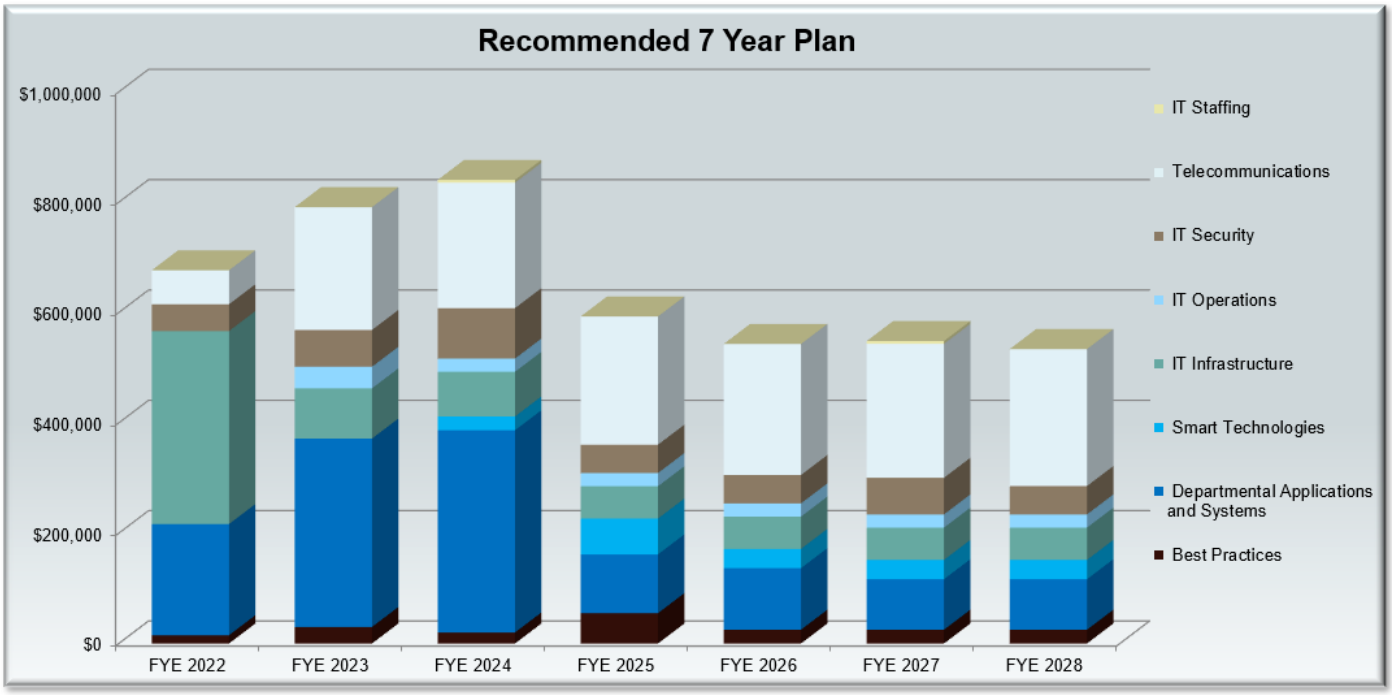
Security Awareness Training	• The City has not implemented a Security Awareness Training program.
	• Training and testing are recommended to be an ongoing process with metrics that are tracked versus local government benchmarks.
	• A minimum of quarterly training and testing for all staff is recommended.
	  ◆ Quarterly training can be as brief as a 10- or 15-minute video course.
	  ◆ Testing metrics should be reported quarterly, focusing on trends.

Summary Plan Budget Analysis

The Technology Assessment budget is not an entirely new set of spending requirements. The Plan encapsulates all information technology issues and needs of all departments in the City. Some initiatives are normally funded by departments themselves, and some may already have capital reserves set aside, while others are part of normal annual IT budgeting process.

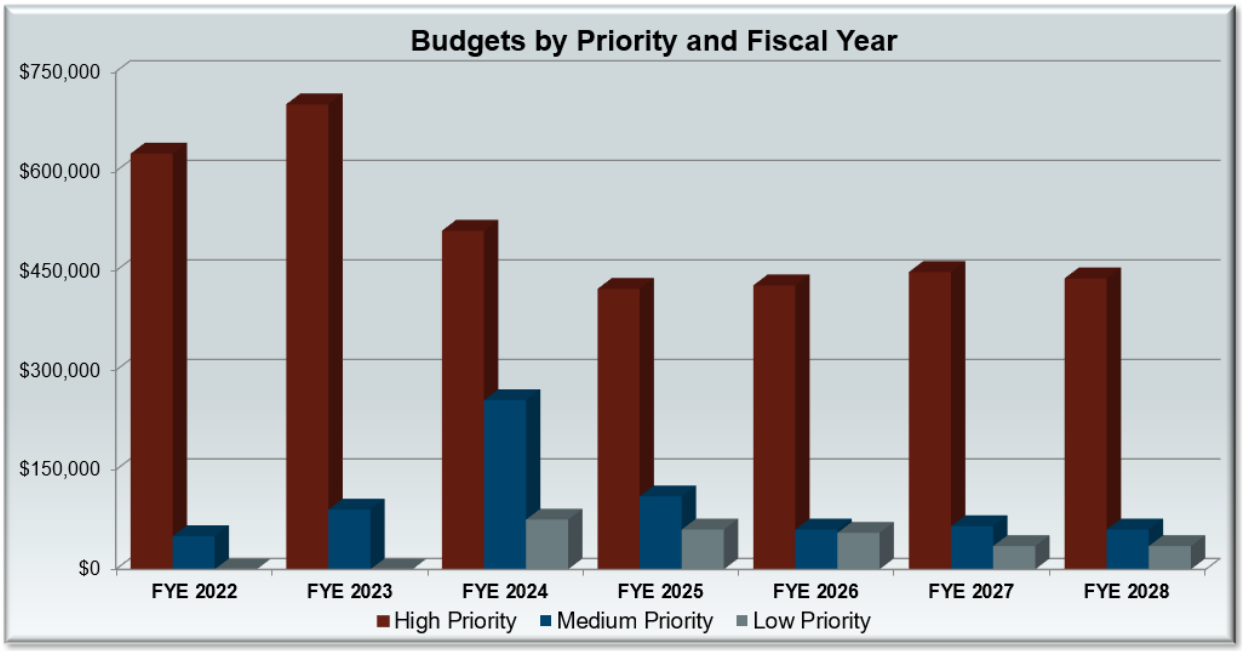
Budgets by Initiative Category

Categories	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026	FYE 2027	FYE 2028	Totals
Best Practices	$ 15,000	$ 30,000	$ 20,000	$ 55,000	$ 25,000	$ 25,000	$ 25,000	$ 195,000
Departmental Applications and Systems	$ 201,500	$ 341,500	$ 366,500	$ 106,500	$ 111,500	$ 91,500	$ 91,500	$ 1,310,500
Smart Technologies	$ -	$ -	$ 25,000	$ 65,000	$ 35,000	$ 35,000	$ 35,000	$ 195,000
IT Infrastructure	$ 349,900	$ 91,000	$ 81,000	$ 58,500	$ 58,500	$ 58,500	$ 58,500	$ 755,900
IT Operations	$ -	$ 39,160	$ 24,000	$ 24,000	$ 24,000	$ 24,000	$ 24,000	$ 159,160
IT Security	$ 48,500	$ 66,700	$ 91,400	$ 51,400	$ 51,400	$ 66,400	$ 51,400	$ 427,200
IT Staffing	$ 61,600	$ 222,600	$ 227,430	$ 232,405	$ 237,529	$ 242,807	$ 248,243	$ 1,472,614
Telecommunications	$ -	$ -	$ 5,000	$ -	$ -	$ 5,000	$ -	$ 10,000
Totals	$ 676,500	$ 790,960	$ 840,330	$ 592,805	$ 542,929	$ 548,207	$ 533,643	$ 4,525,374



Budgets by Priority and Fiscal Year

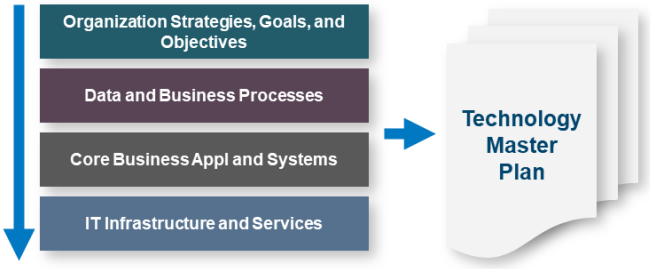
	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026	FYE 2027	FYE 2028	Totals
High Priority	$626,500	$700,960	$510,330	$422,805	$427,929	$448,207	$438,643	$3,575,374
Medium Priority	$50,000	$90,000	$255,000	$110,000	$60,000	$65,000	$60,000	$690,000
Low Priority	$0	$0	$75,000	$60,000	$55,000	$35,000	$35,000	$260,000
Totals	$676,500	$790,960	$840,330	$592,805	$542,929	$548,207	$533,643	$4,525,374



Conclusion

Moving Forward

Moving forward, over the next 18 to 24 months, the key areas of focus for information technology include a complete network upgrade, Land Management and Marina Management software replacements, new EAM (Work Order/Maintenance Management) system and GIS system development.



Developing an Incident Response Plan, expanding City wireless for guests and staff and replacing obsolete technology are key technology projects.

The above paragraphs contain ambitious and costly technology objectives for the City. If the City chooses to implement these systems rapidly, organizational change management and strategic oversight will be critical to the City's success. In many cases, we continue to work with agencies on these issues during assessment, planning, and implementation. We have found slow and steady progress following best practice methodologies leads to improved likelihood of success, higher quality implementations, and improved staff utilization and data management of new systems.

The City should position itself in the following ways:

IT Infrastructure –Expand Computer Equipment Replacement to include all electronics and licensing. Follow IT Best Practices in upgrading the Structured Cabling system, redesigning the data network, replacing obsolete servers and expanding wireless. Focus on IT operational and cybersecurity improvements over time, using third parties to assist with implementation and management.

IT Staffing – City IT staff have many responsibilities. Expanding supplemental resources for staff will assist in improving customer service. Creating a Business Applications Analyst position will provide a focal point for business application implementation and improvement at the City. Utilizing the Business Applications Analyst to assist in project management will also reduce third-party consulting costs.

Application Utilization – City departments want to improve their core business processes and fully utilize their applications. The City should work to encourage a sense of application ownership and continuous improvement by the departments. Improved application utilization is the most effective way to increase data availability, staff productivity and improve customer service.

Land Management and EAM Replacements – The entire effort to select and implement a new Land Management and Enterprise Asset Management system, will logistically require 2-3 years. The City needs to ensure all its applications needs have been identified and appropriate funding has been budgeted for a replacement by conducting a comprehensive assessments, process reviews, detailed application feature/function specifications and developing a Request for Proposals (RFP). Additionally, because the City has not conducted this type and complexity of project with these specific business analysis, documentation, and negotiation requirements, the City should obtain assistance from qualified municipal Land Management and EAM Application Subject-Matter Experts.

Governance – The formation of the internal Technology Steering Committee will foster cooperation and collaboration in setting priorities and executing multi-department initiatives. Over the long run, the Technology Steering Committee will oversee and maintain the execution and occasional modification of this Plan.

It is expected that the projects outlined in this report to result in improved productivity and customer service, as well as improved resiliency and sustainability.

Third-party subject-matter experts will be helpful for projects that are (1) high priorities, (2) beyond the scope of City skill sets, and/or (3) lacking internal resource availability.

The City should review and update the plan annually, using an abbreviated version of this assessment and planning methodology. In this way, the plan will be a vehicle to continuously guide the information technology activities of the City. The annual plan update should be synchronized with the City's annual budget process, so the City's technology initiative costs can be properly represented in the City's annual budget.

Benefits

The completed plan should not be viewed as static, but rather as a dynamic tool that is revised and updated as business conditions and requirements change. If the planning function is not an ongoing process, certain objectives and benefits will not be realized, because the objectives themselves may change as the organization and its environment evolves.

Major benefits that are (or should be) realized through the implementation of this Technology Assessment and Plan include:

- Increased collaboration and communication between the departments and IT
- Transformation of the organization's overall understanding, knowledge, and stewardship of information technology
- Clear direction for IT operations and technology projects for the next seven years, focused on meeting the organization's needs
- Citywide department consensus and understanding of all technology initiatives and their priorities
- A roadmap for the selection, implementation and improvement of business applications to better serve residents and staff

Immediate Next Steps

It is recommended the Technology Steering Committee begin work by reviewing the plan and priorities, including the ranking and sequencing of the Key Initiatives. Next, assign lead and participatory resources to the top priority technology initiatives, as well as to all other high-priority initiatives. This should include the finalization of target due dates for immediate next steps of those initiatives. Initiative leaders should then report status updates for active initiatives to the Technology Steering Committee as part of each meeting agenda.

Major issues for each initiative should be discussed among the Committee and/or sub-committees for general feedback, collaboration, and lessons learned, as many of the initiatives cross departmental boundaries.

In order to improve the culture of application utilization, management, and support, it is also recommended a series of training seminars be developed for key department stakeholders and enterprise business application users. This is an effective way to maintain momentum and kick off the tremendous change that is to occur in improving operations and constituent services.

Technology Master Plan Capital Budget

The following section provides the seven-year master planning budget detail by categories and priority.

CLIENTFIRST TECHNOLOGY CONSULTING

Technology Master Plan
Budget

Initiative No.	Brisbane Technology Initiatives	Comments	Priority	Budget Range		Funding Source(s)	Depts.	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026	FYE 2027	FYE 2028
				Low	High									
Best Practices														
1	**Technology Governance**	Best Practice for managing and prioritizing the limited resources of the IT function and implementation plan implementation oversight.	H	$0	$5,000		City Manager/Admin							
2	**Applications Management Best Practices**	Identify process owners, power users, analysts and module/functional leads within the Departments to lead improvement efforts.	H	N/A	N/A		City Manager/Admin							
3	**User Access Controls**	Integrate applications with Active Directory to ease administration and sign-on processes, and getting user licenses across application systems for anyone that needs access.	H	N/A	N/A		IT							
4	**User Training and Support**	Ongoing Departmental application system training budget year-over-year.	H	$75,000	$125,000		All Depts- City Manager/Admin to coordinate	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000	$ 15,000
5	**Software Selection Best Practices**	Best Practice focused on reducing risk and improving software selection outcomes while maximizing value through a competitive selection process. Done properly and then implemented well, will result in higher utilization of systems and reduction in manual processes.	H	N/A	N/A		All Depts- City Manager/Admin to coordinate							
6	**Project Planning and Implementation Best Practices**	Follow PMI based project management principles for all larger or complex projects.	H	N/A	N/A		All Depts- City Manager/Admin to coordinate							
7	**Enterprise Reporting Best Practices**	Ongoing application support and continued assistance with enterprise system reporting will be critical for implementation of these practices.		N/A	N/A		All Depts- City Manager/Admin to coordinate							
8	**Dashboard Preparation Improvement and Automation**	Tool(s) to streamline the preparation of the dashboard type reporting.	M	$25,000	$75,000		City Manager/Admin to coordinate				$ 40,000	$ 10,000	$ 10,000	$ 10,000
9	**Maintaining Software Updates**	Establishment of standard operating procedures per best practice methodologies and approaches.	H	N/A	N/A		IT/Endsight							
10	**Centralized Land and Parcel Data Management**	GIS becoming the master and enterprise repository for all Land and Parcel data/information for the City.	H	Included in GIS Assessment	Included in GIS Assessment		DPW, CDD, Finance, P&R, Admin							

Technology Master Plan
Budget

Initiative No.	Brisbane Technology Initiatives	Comments	Priority	Budget Range		Funding Source(s)	Depts.	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026	FYE 2027	FYE 2028
				Low	High									
11	**Data Integration and Management Strategies**	Options for integration citywide data and availability.	L	TBD	TBD		City Manager/Admin to coordinate							
12	**Cloud Computing**	Options for Cloud/hosted solutions vs. a traditional license model.		N/A	N/A		City Manger/Admin, IT/Endsight							
13	**Cost Allocation Best Practices**	Third party services to develop Internal Service Fund to distribute IT Costs.	M	$0	$15,000		CIty Manager/Admin		$ 15,000					
14	**IT Project and Services Portfolio**	Develop and maintain a IT project portfolio and Service Level Agreements for IT systems.	M	$0	$5,000		City Manager/Admin, IT			$ 5,000				
Departmental Applications and Systems														
15	**New Land Management System**	New software solution to support the Community Development functions in the City such as planning, permitting, inspections, code enforcement and parcel/address management.	H	$175,000	$500,000		CDD, DPW, PD, Finance	$ 50,000	$ 200,000	$ 50,000	$ 20,000	$ 20,000	$ 20,000	$ 20,000
16	**New Enterprise Asset Management (EAM) System**	Software solution exclusively focused on work orders and maintenance of City's physical and infrastructure assets.	M	$150,000	$350,000		DPW, Marina, Finance		$ 50,000	$ 150,000	$ 15,000	$ 15,000	$ 15,000	$ 15,000
17	**New Marina Management Software**	Software to manage boat slips use/rental and payments processing. Does not include hiring 3rd party to assist in vendor selection/implementation (in-house only)	H	$25,000	$150,000		Marina, Finance	$ 50,000	$ 25,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000
18	**Enterprise Resource Planning (ERP) Improvement**	Budget for additional vendor support to close functional gaps, implement new modules (e.g., budget), and end-user training	H	$35,000	$100,000		Lead: Finance, plus all depts for training	$25,000	$25,000					
19	**ActiveNet Parks and Recreation System Improvements**	Improvements and additional functionality for existing system. Includes assessment work to determine the GAP in the system capabilities and what they are not doing in the software now, & getting additional vendor assistance and training to improve the system. Tyler integration might fit in the provided budget #s. $15k ongoing payments assume training or additional integration costs.	H	$25,000	$100,000		P&R, Finance	$ 25,000	$ 15,000	$ 15,000	$ 15,000	$ 15,000	$ 15,000	$ 15,000

Technology Master Plan
Budget

Initiative No.	Brisbane Technology Initiatives	Comments	Priority	Budget Range		Funding Source(s)	Depts.	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026	FYE 2027	FYE 2028
				Low	High									
20	**Time and Attendance System**	Potential new timekeeping system and/or improvements or implementation for Police and Fire.	L	$40,000	$80,000		Finance, PD, NCFA			$50,000	$5,000	$5,000	$5,000	$5,000
21	**Police RMS Improvements**	Improve police records management system and obtain additional vendor provided end-user training.	M	$15,000	$40,000		PD			$ 5,000	$ 5,000			
22	**Electronic Ticketing and Citation System**	Provide a full standalone systems with online payments capability.	M				PD							
23	**Electronic Content Management System (ECMS)**	Citywide document management and records management system, including workflow automation. $25k in 2022-2023 includes assessment and GAP analysis & education on what "Enterprise" ECMS systems are fully capable of.	M	$50,000	$200,000		Lead: City Clerk. All other depts for implementation and training	$ 25,000	$ 25,000	$ 75,000	$ 25,000	$ 25,000	$ 25,000	$ 25,000
24	**Project Management and Collaboration**	Enterprise-based project management, tracking, and collaboration tools can foster collaboration on inter- and intra-department projects. These tools are most often provided on a yearly subscription basis.	H	$4,500	$12,500		All depts	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500
25	**Legislative Management System**	Software for managing and tracking council meeting activities. Existing systems (Municode Meetings; Versatile Pro) have capabilities to enhance certain aspects of leg management without upgrading/getting new system.	L	$15,000	$40,000		City Clerk					$ 25,000	$ 5,000	$ 5,000
26	**Door / Gate Access Control**	Gate access software due to limitations of current solution at the Marina. Marina gate access upgrade higher priority; City Hall/other facilities low priority.	H/L	$25,000	$75,000		DPW, PD, City Manager/Admin	$25,000		$15,000				
27	**Learning Management Software**	Software to track training and certifications, as well as creating customized courses.	L	$10,000	$25,000		HR, Finance				$ 15,000			

Technology Master Plan
Budget

Initiative No.	Brisbane Technology Initiatives	Comments	Priority	Budget Range		Funding Source(s)	Depts.	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026	FYE 2027	FYE 2028
				Low	High									
Smart Technologies														
28	**Website Improvement**	Needs assessment to review citywide requirements, to close functional gaps, and provide training. Needs assessment cost shown in first year	L	$20,000	$50,000		Communications				$ 30,000	$ 20,000	$ 20,000	$ 20,000
29	**Online Civic Transparency (Government Transparency)**	Online public access information such as financials and key performance indicators.	M	$15,000	$30,000		Lead: City Manager/Admin. All depts for implementation and training				$ 25,000	$ 10,000	$ 10,000	$ 10,000
30	**GIS Plan and Improvements**	Implementation of a new GIS system and ongoing improvements.	H	$42,500	$57,500		Leads: DPW & CDD. All Depts potentially impacted							
32	**Mass Outbound Communication**	Typically an ongoing annual subscription pricing model, based on estimated volume of use. Can be used for citywide multi-communication types such as outbound calls, text, email, social media and website RSS feeds. Per Communications/Emergency Services, SMC Alert allows the City to send messages to residents (must opt in) at no charge to the City. This option will be utilized first before determining if augmentation/replacement service needed. If we augment/replace, must	L	$10,000	$25,000		Emergency Services, PD, NCFA, Communications				$ 10,000	$ 5,000	$ 5,000	$ 5,000
33	**Intranet**	Implementation of an intranet system and/or improvements to existing tools. Technical assistance and training for SharePoint setup and configuration beyond Endsight's current scope of work as City staff grows.	L	$15,000	$25,000		City Manager/Admin, IT/Endsight			$25,000				
34	**Smart Water Meter Solution**	Customer self service portal to monitor water usage and detect potential leaks. This item is already funded via a dedicated account fund and is moving on its own existing timeline.	n/a	$50,000	$60,000		DPW-Utilities							

Technology Master Plan
Budget

Initiative No.	Brisbane Technology Initiatives	Comments	Priority	Budget Range		Funding Source(s)	Depts.	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026	FYE 2027	FYE 2028
				Low	High									
IT Infrastructure														
35	**Computer Equipment Replacement Plan**	Initial investment will "catch" City up.	H	Ongoing	Ongoing		City Manager/Admin, IT/Endsight	$74,900	$25,000	$40,000	$40,000	$ 40,000	$ 40,000	$ 40,000
36	**File Servers and Disk Storage**	Need to replace core servers and upgrade.	H	$40,000	$40,000		IT/Endsight	$25,000						
37	**Internet Bandwidth**	Expand internet bandwidth and build redundancy	H	Ongoing	Ongoing		IT/Endsight	$27,500	$18,500	$18,500	$18,500	$ 18,500	$ 18,500	$ 18,500
38	**Network Redesign**	Cisco routers end of life, network equipment various manufacturers	H	$75,000	$75,000		IT/Endsight	$75,000						
39	**Office 365 – Full Implementation**	Expand OneDrive/SharePoint usage	H	$50,000	$50,000		IT/Endsight	$25,000	$25,000					
40	**Wireless Expansion**	Expand wireless networks to cover all City facilities, including guest wireless access. New Pt. to Pt. wireless - remote site.	H	$70,000	$70,000		IT/Endsight, PD	$25,000	$22,500	$22,500				
41	**Remote Access – VPN**	Improve remote access experience	H	$15,000	$15,000		IT/Endsight	$15,000						
42	**Structured Connectivity System**	Assessment and improvements in FYE2022.	H	$82,500	$82,500		Lead: City Manager/Admin. IT/Endsight possible to assist	$82,500						
IT Operations														
43	**Service Desk Ticketing System**	New helpdesk software solution - managed by City	H	Ongoing	Ongoing		IT/Endsight		$12,000	$12,000	$12,000	$ 12,000	$ 12,000	$ 12,000
44	**IT Policies and Procedures**	Develop IT policies and procedures.	H	$5,160	$5,160		IT/Endsight, PD		$5,160					
45	**Mobile Device Management**	Best Practice, implementation to follow other critical needs. Per CF, better from a cybersecurity standpoint to accomplish in 2022	H	Ongoing	Ongoing		City Manager/Admin, IT/Endsight		$22,000	$12,000	$12,000	$ 12,000	$ 12,000	$ 12,000
46	**Network Management Tools**	Network Alerts/Alarms to be incorporated into Managed Services contract.		Included in IT Staffing	Included in IT Staffing									

Technology Master Plan
Budget

Initiative No.	Brisbane Technology Initiatives	Comments	Priority	Budget Range		Funding Source(s)	Depts.	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026	FYE 2027	FYE 2028
				Low	High									
IT Security														
47	**Audit Logs and Log Management**	Additional Active Directory logging for changes Microsoft does not track. Separate project to consolidate and manage system device logs in future year.	H	$15,000	$50,000		IT/Endsight	$5,000		$25,000				
48	**Backups**	Consolidate disparate backup systems into recommended platform. No net cost increase.	H	N/A	N/A		It/Endsight, PD							
49	**Disaster Recovery Planning**	Develop a Disaster Recovery Plan to outline steps required to recover from significant system loss.	H	$10,000	$25,000		IT/Endsight, Emergency Services	$15,000						
50	**IT Security Assessment**	External penetration test first, then internal, followed by Security Assessment	H	$95,000	$95,000		City manager/Admin , IT/Endsight	$7,500	$7,500	$25,000	$10,000	$ 10,000	$ 25,000	$ 10,000
51	**Security Awareness Training**	KnowBe4 or similar security awareness training	H	Ongoing	Ongoing		City Manager/Admin , IT/Endsight	$6,000	$1,800	$1,800	$1,800	$ 1,800	$ 1,800	$ 1,800
52	**Two-Factor Authentication**	Initially, implement Password complexity, then MFA for O365, then MFA for all. Recommend additional O365 security license.	H	$58,200	$58,200		IT/Endsight	$15,000	$7,200	$7,200	$7,200	$ 7,200	$ 7,200	$ 7,200
53	**Windows Active Directory**	Active Directory upgrades from 2012 to 2016/2019 in FYE2022. Azure AD in FYE2023	H	$61,000	$61,000		IT/Endsight		$25,000	$7,200	$7,200	$ 7,200	$ 7,200	$ 7,200
54	**Next-Generation Antivirus**	Implement Artificial Intelligence based anti-virus, anomaly detection	H	Ongoing	Ongoing		IT/Endsight		$25,200	$25,200	$25,200	$ 25,200	$ 25,200	$ 25,200
IT Staffing														
55	**IT Staffing**	Expand Managed Services - Annual Cost	H				City Manager/Admin	$36,600	$36,600	$36,600	$36,600	$ 36,600	$ 36,600	$ 36,600
56	**Enterprise Applications Support**	Annual cost for new business analyst position in IT Dept	H				City Manager/Admin		$161,000	$165,830	$170,805	$ 175,929	$ 181,207	$ 186,643
	IT Plan Management	Third party to manage implementation of the Technology Master Plan.	H				City Manager/Admin	$25,000	$25,000	$25,000	$25,000	$ 25,000	$ 25,000	$ 25,000

Technology Master Plan
Budget

Initiative No.	Brisbane Technology Initiatives	Comments	Priority	Budget Range Low	Budget Range High	Funding Source(s)	Depts.	FYE 2022	FYE 2023	FYE 2024	FYE 2025	FYE 2026	FYE 2027	FYE 2028
Telecommunications														
58	**VoIP Phone System Improvements**	Additional phone system training.	**M**	$10,000	$10,000		City Manager/Admin, PD			$5,000			$ 5,000	
								$676,500	**$790,960**	**$840,330**	**$592,805**	**$542,929**	**$548,207**	**$533,643**

***Other Funding Sources** (Funded, Planned and/or Estimated)							***Other Funding Sources (Funded, Planned and/or Estimated)**						
							$0	$0	$0	$0	$0	$0	$0
							$0	$0	$0	$0	$0	$0	$0
							$0	$0	$0	$0	$0	$0	$0
							$0	$0	$0	$0	$0	$0	$0
							$0	$0	$0	$0	$0	$0	$0
							$0	$0	$0	$0	$0	$0	$0
							$0	$0	$0	$0	$0	$0	$0
							$0	$0	$0	$0	$0	$0	$0
						Subtotal - Other Funding Sources	$0	$0	$0	$0	$0	$0	$0
							$676,500	**$790,960**	**$840,330**	**$592,805**	**$542,929**	**$548,207**	**$533,643**
											7-Year Grand Total		**$4,525,374**

Technology Current State Assessment (Initiatives)

The following section contains the *Technology Current State Assessment* documentation in its entirety. The assessment resulted in 60 major technology initiatives and projects with hundreds of additional recommendations.

Technology Current State Assessment

April 2021

Optimal Technology Guidance

Client Locations
Coast-to-Coast

Practice Locations
California
Illinois
North Carolina
Texas

800.806.3080
www.clientfirstcg.com

CLIENTFIRST
TECHNOLOGY CONSULTING

Table of Contents

Best Practices

Best practices are methods that are recognized as consistently providing better results than those achieved with other methods. We believe that the following best practices will enhance the City's ability to select, procure, and maintain solutions that are more effective in the future, as well as improve overall productivity of staff.

1. Technology Governance
2. Applications Management Best Practices
3. User Access Controls
4. User Training and Support
5. Software Selection Best Practices
6. Project Planning and Implementation Best Practices
7. Enterprise Reporting Best Practices
8. Dashboard Preparation Improvement and Automation
9. Maintaining Software Updates
10. Centralized Land and Parcel Data Management
11. Data Integration and Management Strategies
12. Cloud Computing
13. Cost Allocation Best Practices
14. IT Project and Services Portfolio

1. Technology Governance

Background

Technology Governance

Traditionally, key technology decisions are made by IT professionals and a select few organization managers. This approach does not always ensure the most effective delivery of technology to stakeholders (all departments and constituents). Technology governance can provide a collaborative forum for major decisions, planning, internal communication, and department and staff training. Technology governance can also provide a methodology for stewardship of technology resources on behalf of the stakeholders who demand a benefit.

Steering Committee

A Technology Steering Committee is composed of a group of employees and managers representing a cross section of the organization's leadership, departments, and disciplines who assist in providing long-term direction for an organization's technology resources. This committee can assist and facilitate with the prioritization and the focus for the development of organizational concepts and planning. Some specific responsibilities may include:

- Identifying and developing technology initiatives and projects
- Assisting in prioritizing technology initiatives
- Monitoring the Technology Master Plan and projects' progress
- Providing a forum for lessons learned during implementation of technology projects
- Providing an initial review process of technology-related projects requested by individual departments
- Reviewing and providing feedback on long-term, unresolved Help Desk issues
- Reviewing and assisting with the implementation of technology standards and policies
- Providing support for technology across the organization
- Discussing internal customer service concerns
- Acting as a sounding board for management and staff

Implementation of a technology governance methodology can be an effective forum for departments to become more knowledgeable about technology, how it can be used to enhance customer service, ensure the effective use of technology and the organization's technology budget, and create efficiencies throughout the City's business processes.

Findings and Observations

- The City does not currently use a formalized Technology Steering Committee format.
- The creating and implementation of the Committee structure will provide a great opportunity for City departments to collaborate on future technology use and application needs that will improve their day-to-day operations and constituent services.

Recommendations

- Assemble and formally implement a Technology Steering Committee, including a Technology Steering Committee Charter, to discuss technologies and recommend priorities, assist in policy implementation, and increase communication within the City and department staff.
- Utilize the Technology Steering Committee as the initial forum for departments to propose and present new technology-related projects.
    - Assure best practices are followed and applied to the review, selection, approval, procurement, and implementation project management of approved projects.
    - Assure ongoing application maintenance and support meets department needs.
    - Discuss ongoing security concerns and security awareness initiatives.

Recommended Next Steps

- Develop a Technology Steering Committee charter.
- Determine potential Technology Steering Committee members who are:
    - Represent a cross-section of the organization, including leadership, departments, and line-level staff
    - Interested in participating on the committee
    - Able to speak for Department Heads
- Develop and implement a Technology Steering Committee focused on:
    - Adjusting priorities, based on limited IT resources
    - Annual IT initiative/project review and prioritization
    - IT policy implementation and security awareness
    - New project reviews and feedback
    - Lessons learned from ongoing projects
- Determine representation of all departments on the Steering Committee for regular technology-based communication, ongoing education, and continued collaboration.
- Monitor and discuss active initiatives and projects at each Committee meeting.
- Form sub-committees, as appropriate.
    - Consider a GIS sub-committee to focus on developing a strong citywide GIS program.

Benefits

- Increased transparency, responsibility, and accountability
- Prioritization of initiatives
- Improved compliance and consistency
- Enhanced communication and collaboration
- Higher degree of business and technology alignment
- Widespread personal and professional growth

2. Applications Management Best Practices

Background

The City does not currently have a Best Practices process in place for acquiring, managing, and supporting its software applications across the organization. Studies and ClientFirst's direct experiences over two decades show that the most common reason for the failure of an enterprise application system implementation is choosing a system that is not the right fit for the needs of the organization. A lack of fit results in enterprise application systems that are not fully utilized or have significant functional gaps. The gaps result in loss of productivity due to inefficient workarounds, continued reliance on manual processes, and ineffective or unnecessary reconciliations. In addition to wrong fit, underutilization of applications are attributable other factors. Those factors may include inadequate implementation of the applications, the lack of sufficient end-user training, or a fragmented support approach between the IT Department and end users.

Like many municipalities, the City does not have sufficient resources in its IT Department to document practices, procedures, and functional and technical requirements for technology applications or business processes. Improving and achieving full utilization of software applications require a structured approach for prioritizing and evaluating alternative solutions, identifying insufficient implementation results, and ongoing management and support resources. Achieving this outcome requires application roles, responsibilities, and support be blended between departmental users and the IT Department.

The following table is an unofficial inventory of the City's different software applications or modules throughout all departments. The City currently utilizes over 170 applications modules and systems. Major systems include:

Application Functionality	Vendor-Application Name
Financial Management	Tyler Incode Version 10
Human Resources	Tyler Incode Version 10
EAM (Enterprise Asset Mgmt./Work Orders & Maintenance Management)	None, however, use Mobile MMS to track Work Order elements Nautical Software – Marina Management
Land Management/Community Development (The system is a custom application provided by the City Community Development vendor, CSG Engineering)	Greenvue Permit Suite
Police Dispatch and Records	Sun Ridge - RIMS
Parks and Recreation	ActiveNet
Electronic Document and Records Management	Filemaker Pro and Versatile
Geographic Information System (GIS)	ArcGIS

A sample listing of City applications is included below. This list is not intended to be the City's official inventory.

Category	Application/Module	Function	Department											
			General/ Admin.	Clerk	Comm. Dev.	Econ. Dev.	Fin.	Fire	HR	IT	Parks/ Rec.	PD	PW	PW - Marina
Recreation	ActiveNet	Customer management database, registrations, rentals, etc.									X			
Recreation	ActiveNet Connect App	Participant check in on iPads									X			
Creative	Acrobat Pro	Plan review, staff report submittal	X				X						X	
Creative	Adobe Creative Suite	PDF/Form Creation/Editing									X			
Creative	Adobe Illustrator	Marketing, graphic design, fillable PDF forms, etc.											X	X
Creative	Adobe Photoshop	Presentations / Promotions			X								X	X
Document/Records Management	Adobe Reader	PDF manipulation, signing documents	X											
Creative	Adobe Spark	Internal and External e-Newsletter Creation and Publishing	X								X			
Facility Access	ALX Technology	Gate fob controller											X	X
Mobile	Apple- Facetime	Virtual building inspections (introduced during Shelter in Place	X											
GIS	ArcGISDesktop	GIS/mapping											X	X
GIS	ArcGIS Map	Utility Mapping			X									
GIS	ArcGIS Online	Utility Mapping											X	X
GIS	ArcGIS Pro	Utility Mapping											X	X
Document/Records Management	Archive website	Search minutes (archives)		X										
Cashiering	Authorize.net (Marina)	Credit Card Processing					X							
Land Management	AutoCAD	Plan preparation, Utility Mapping, Standard Details											X	X
GIS	Maps 3D	Utility Mapping											X	X
Land Management	Avenu (Business License)	On-Line Processing of Business Licenses			X		X							

Category	Application/Module	Function	Department										
			General/ Admin.	Clerk	Comm. Dev.	Econ. Dev.	Fin.	Fire	HR	IT	Parks/ Rec.	PD	PW	PW - Marina
Land Management	Bluebeam Revu	Permit processing, plan review			X								X	
Land Management	Bluebeam Stapler	Combine single PDFs into one PDF			X									
Cashiering	Bridge Pay/Muni On-Line Payments	On-Line Credit Card Payments					X							
Human Resources	CalOpps	Recruitment Tracking							X					
Human Resources	CalPERS	Employee Benefit/Pension Information System							X					
Creative	Canva	Design and Marketing	X										X	X
Creative	Circuit Design Space	Creating branding and marketing materials with Cricut Machine									X			
Web Conferencing	Cisco Webex													
VPN	Citrix	DPW file share											X	
Recreation	ClassDojo	Preschool parent-teacher communication									X			
IT	Command Line Interface									X				
IT	Computer Management													
IT	Local Users and Groups									X				
IT	Disk Manager									X				
IT	Event Log									X				
IT	Control Panel													
IT	Network									X				
IT	System									X				
IT	Advanced System Settings									X				
Land Management	CSG Engineering													
Land Management	CSG Plan Check System	Access informational status of building permit plan checks within consultant CSG's system			X									

Category	Application/Module	Function	Department										
			General/ Admin.	Clerk	Comm. Dev.	Econ. Dev.	Fin.	Fire	HR	IT	Parks/ Rec.	PD	PW	PW - Marina
Land Management	Greenvue (Community Development)	Building permit application submittal and plan check review			X								X	
Public Safety	Data Ticket (Other Citations)	Database for outstanding citations					X							
Document/Records Management	Digital Reel	Digitized microfilm			X									
Human Resources	Discover Benefits	FSA (Benefit) Tracking System							X					
Human Resources	DMV Pull Program	Notification System							X					
Document/Records Management	DocuSign	Processing of Employee Changes for Payroll					X		X					
Public Safety	DOJ Portal	Looking up backgrounds/submitting NLI							X					
Document/Records Management	Dropbox				X		X						X	
Public Safety	Emergency Reporting System (ERS)	Incident Records Management						X						
Recreation	Eventbrite	Event ticketing									X			
Public Safety	Everbridge	San Mateo County-owned mass outbound communications system for emergencies/disaster												
Document/Records Management	File Maker Pro	Search resolutions and ordinances		X										
Internet	FireFox									X				
Social Media	Flickr	Childcare participant photo sharing									X			
Document/Records Management	FPPC eFiling System	Form 700												
Internet	Google Chrome						X			X				
Document/Records Management	Google Docs / Sheets													X

Category	Application/Module	Function	Department											
			General/ Admin.	Clerk	Comm. Dev.	Econ. Dev.	Fin.	Fire	HR	IT	Parks/ Rec.	PD	PW	PW - Marina
Document/Records Management	Google Drive				X									
Land Management	Google Earth Pro												X	
Document/Records Management	Google Suite						X						X	
Social Media	Google YouTube	Public Meeting Videos, Internal/External Collaboration, Surveys			X									
Work Order/Asset Management	GoRequest	Citizen and employee service requests		X									X	X
Human Resources	GovInvest (OPEB and PERS Liability)	OPEB and PERS Liability Projections					X							
Human Resources	Greatland	ACA 1095 Reporting System							X					
Creative	Handbrake	Open-source software used for ripping DVDs into MP4 files			X									
Document/Records Management	Hightail				X									
Work Order/Asset Management	iCentral Rain Master	Remote irrigation controls at Community Park											X	X
Work Order/Asset Management	ID Flow	Identification System							X					
Creative	iMovie	Video editing for social media									X			
Creative	InShot	Short Video Creation	X	X										
Document/Records Management	Iron Mountain	Iron Mountain Storage - Online Customer Request Form to retrieve/pickup storage boxes		X										
Security Camera	iVMS 4200	Security camera system											X	X
Creative	Kaseya Remote Control /Focus									X				

Category	Application/Module	Function	Department											
			General/ Admin.	Clerk	Comm. Dev.	Econ. Dev.	Fin.	Fire	HR	IT	Parks/ Rec.	PD	PW	PW - Marina
IT	LogMeIn Web Admin Interface			X			X		X	X	X			
IT	LogMeIn client installation & configuration				X					X				
Telecom	MaxUC	Digital call routing to other extensions or city cell phones; chat using city hall extensions between employees			X									
Work Order/Asset Management	Mobile MMS	Time tracking, asset inventories, daily COVID checks, facility checks											X	X
Finance	MoM(Legacy Financial System for Successor Agency)	General Ledger Accounting, Payables, Cashiering					X							
Business Productivity	Microsoft Access	Personnel Records			X			X					X	
Internet	Microsoft Edge browser									X				
Business Productivity	Microsoft Excel		X	X	X	X	X	X	X	X	X	X	X	X
Business Productivity	Microsoft File Explorer		X	X	X	X	X	X	X	X	X	X	X	X
Internet	Microsoft Internet Explorer						X			X				
Business Productivity	Microsoft Office 365		X	X	X	X	X	X	X	X	X	X	X	X
IT	Microsoft Exchange - Admin Center									X				
Business Productivity	Microsoft OneDrive				X									
Business Productivity	Microsoft Outlook		X	X	X	X	X	X	X	X	X	X	X	X

Category	Application/Module	Function	Department											
			General/ Admin.	Clerk	Comm. Dev.	Econ. Dev.	Fin.	Fire	HR	IT	Parks/ Rec.	PD	PW	PW - Marina
Creative	Microsoft Paint									X				
Business Productivity	Microsoft PowerPoint	Create presentaitons	X	X	X	X	X	X	X	X	X	X	X	X
Creative	Microsoft Publisher	Simple marketing/graphics									X		X	X
Business Productivity	Microsoft SharePoint		X											
Web Conferencing	Microsoft Skype													
Project Collaboration	Microsoft Teams	Project Management/Collaboration	X	X	X		X				X		X	X
Business Productivity	Microsoft Windows 10													
IT	Microsoft Windows RDP (Remote Desktop)									X				
Document/Records Management	Microsoft Windows/File Explorer	File & network management	X	X	X	X	X	X	X	X	X	X	X	X
Business Productivity	Microsoft Word		X	X	X	X	X	X	X	X	X	X	X	X
Business Productivity	Microsoft Visio						X							
Document/Records Management	Municode													
Website	Municode Website Host	Website hosting	X	X	X									
Web Conferencing	Municode Web Meetings	Planning Commission meeting agenda management and archive		X	X									
Document/Records Management	Municode Ordinances	City Municipal Code – emailing approved ordinances to Municode for update to codes	X											
Marina Management	NauticaL (Marina Management Software)	Client data, electrical usage input, and invoicing											X	X

Category	Application/Module	Function	Department											
			General/ Admin.	Clerk	Comm. Dev.	Econ. Dev.	Fin.	Fire	HR	IT	Parks/ Rec.	PD	PW	PW - Marina
Human Resources	Navrisk (ventiv claims) Web Portal	Entering workers comp claims							X					
Finance	Nvision (Payable processing)	Payments to Vendors					X							
Cashiering	Open Edge View (web-based)	Credit card processing by staff. Not integrated into permit system or available on city website for users to use			X		X						X	X
IT	Parallels Admin Portal									X				
Creative	Photoshop (personal license on personal computer of one staffer)	Mapping												
Recreation	Playpass	Schedule maker for adult sports									X			
Work Order/Asset Management	POSM (Sewer Video Inspection)	Sewer Video Inspection software											X	X
IT	PowerShell ISE	host application for Windows PowerShell to run commands and write, test, and debug scripts					X			X				
Finance	ResourceX	Priority Based Budgeting												
IT	Ruckus	Wi-Fi hardware controller											X	X
GIS	San Mateo County GIS (web-based)	Limited GIS mapping												
Work Order/Asset Management	SewerCAD (static model)	Hydraulic Modeling											X	X
Social Media	Shutterfly	Childcare participant photo sharing									X			
Business Productivity	Slack	Dept and citywide communications			X		X				X		X	X
Recreation	Sling (getsling.com)	Childcare staff scheduling website/app									X			

Category	Application/Module	Function	Department											
			General/ Admin.	Clerk	Comm. Dev.	Econ. Dev.	Fin.	Fire	HR	IT	Parks/ Rec.	PD	PW	PW - Marina
Creative	Snip and Sketch	Cutting information from various applications to integrate into other applications					X							
Social Media	Social media	Community engagement/external communications									X			
Social Media	Social media Nextdoor		X		x									
Social Media	Social media Facebook		X		x									
Social Media	Social media Instagram		X		x									
Social Media	Social media Twitter		X		x									
Social Media	Social media Brisnet				x									
Creative	Splice	Video editing for social media									X			
Work Order/Asset Management	SPMR	Meter reading					X							
Cashiering	Square	Credit Card processing for events									X			
Work Order/Asset Management	Streetsaver	Pavement management system											X	X
Public Safety	Sun Ridge Systems Mobile Rims	Patrol incident reporting system										X		
Public Safety	Sun Ridge Reports	Administrative data gathering										X		
Public Safety	Sun Ridge Systems RIMS	Patrol and Administrative										X		
Public Safety	Sun Ridge Systems Prop Room	Property Inventory										X		
Document/Records Management	SyncBack Free									X				
Document/Records Management	SyncBack Pro									X				
Recreation	Team Snap										X			
Project Collaboration	Trello	Project Management/Checklist	X											

Category	Application/Module	Function	Department											
			General/ Admin.	Clerk	Comm. Dev.	Econ. Dev.	Fin.	Fire	HR	IT	Parks/ Rec.	PD	PW	PW - Marina
Marina Management	True Read	Monitor Electrical usage at slips											X	X
Public Safety	Turbo Data (Parking Citations)	Processes Parking citations, Report for County					X				X			
Finance	TYLER Incode v. 10 SaaS	Financials, accounting, utility billing	X	X	X	X	X	X	X	X	X	X	X	X
Finance	TYLER Incode General Ledger													
Finance	TYLER Incode Budget Preparation		X	X	X	X	X	X	X	X	X	X	X	X
Finance	TYLER Incode Accounts Payable		X	X	X	X	X	X	X	X	X	X	X	X
Finance	TYLER Incode Positive Pay													
Finance	TYLER Incode Purchasing		X	X	X	X	X	X	X	X	X	X	X	X
Finance	TYLER Incode Fixed Assets													
Finance	TYLER Incode Project/Grant Accounting													
Finance	TYLER Incode Personnel Management		X	X	X	X	X	X	X	X	X	X	X	X
Finance	TYLER Incode Employee Self Service		X	X	X	X	X	X	X	X	X	X	X	X
Finance	TYLER Incode Time & Attendance		X	X	X	X	X		X	X	X		X	X
Finance	TYLER Incode Benefits Administration						X							
Finance	TYLER Incode Utility CIS System						X							
Finance	TYLER Incode Cashiering						X							

Category	Application/Module	Function	Department											
			General/ Admin.	Clerk	Comm. Dev.	Econ. Dev.	Fin.	Fire	HR	IT	Parks/ Rec.	PD	PW	PW - Marina
Finance	TYLER Incode Accounts Receivable/Misc. billing						X							
Finance	TYLER Incode Document Management Suite		X	X	X	X	X	X	X	X	X	X	X	X
IT	Incode v. 10 Admin Interface						X			X				
Telecom	Utility Telecom System/Max UC app	Phone System	X	X	X	X	X	X	X	X	X	X	X	X
Creative	Varitronics	Sign board printing software									X			
Document/Records Management	Versatile Express	Filemaking- planning and building address files, code enforcement files; remote archival storage database		X	X		X		X				X	X
Human Resources	VSP	Vision Benefit Tracking System							X					
Work Order/Asset Management	WaterCAD (static model)	Hydraulic Modeling											X	X
Website	Web TMS	USA Tags											X	X
Web Conferencing	Webex	Remote conferencing											X	
Finance	Wells Fargo (CEO Portal)	Banking, Wires, ACH, Positive Pay, Tax Payments					X							
Work Order/Asset Management	XP-SWMM2000	Hydraulic Modeling											X	X
Human Resources	Yearli	W-2 and 1099 processing					X							
Social Media	YouTube (web-based)	Archive of public meeting videos and video editing.												
Web Conferencing	Zoom	Online meetings		X	X		X				X		X	

Findings and Observations

- Ongoing training is needed for many existing and future software applications throughout the City (see *User Training and Support* initiative).
- The City lacks sufficient IT resources to support critical enterprise applications, document business processes, develop needs for applications systems, prioritize needs, evaluate solutions, or identify sufficient implementation and ongoing management and support resources for these all these software solutions.
- Greater utilization of application software systems is vital to significant increases in staff productivity and to increase data sharing goals throughout the City. However, achieving this goal in the current environment will require additional resources to address.

Future Applications Roles and Responsibilities

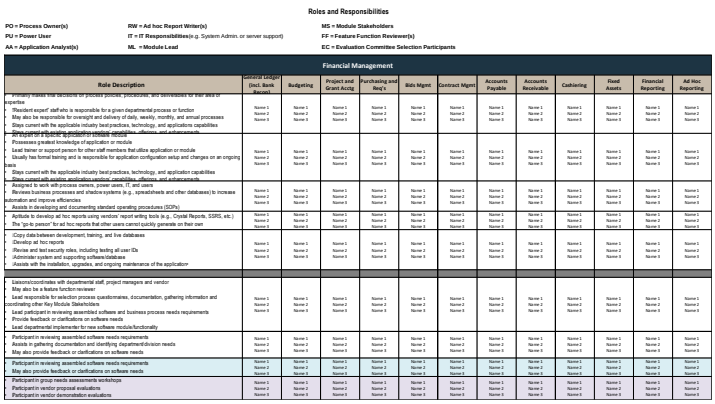
Applications support and management roles and responsibilities should be identified and assigned to each department's operational application modules. We recommend starting with:

- ERP
- Land Management
- EAM
- ECMS
- Other major enterprise application systems

Identifying capable staff resources to fulfill the roles and responsibilities for applications will help the City achieve the goals of the *Applications Management Best Practices* initiative in the future. Examples include:

Process Owner

- Primarily makes final decisions on process policies, procedures, and deliverables for their area of expertise
- "Resident expert" staff member who is responsible for a given departmental process or function
- May also be responsible for oversight and delivery of daily, weekly, monthly, and annual processes
- Stays current with the applicable industry best practices, technology, and applications capabilities
- Stays current with existing application vendors' capabilities, offerings, and enhancements



Roles and Responsibilities

PO = Process Owner(s) | RW = Ad hoc Report Writer(s) | MS = Module Stakeholders
PU = Power User | IT = IT Responsibilities (e.g. System Admin. or server support) | FF = Feature Function Reviewer(s)
AA = Application Analyst(s) | ML = Module Lead | EC = Evaluation Committee Selection Participants

Financial Management												
Role Description	General Ledger (incl. Bank Recon)	Budgeting	Project and Grant Acctg	Purchasing and Req's	Bids Mgmt	Contract Mgmt	Accounts Payable	Accounts Receivable	Cashiering	Fixed Assets	Financial Reporting	Ad Hoc Reporting
Primarily makes final decisions on process policies, procedures, and deliverables for their area of expertise "Resident expert" staff who is responsible for a given departmental process or function May also be responsible for oversight and delivery of daily, weekly, monthly, and annual processes Stays current with the applicable industry best practices, technology, and applications capabilities Stays current with existing application vendors' capabilities, offerings, and enhancements	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3
Power User Department expert on application/module Possesses greatest knowledge of application/module Lead trainer or support person for other staff members that utilize application or module Usually has formal training and is responsible for application configuration setup and changes on an ongoing basis Stays current with the applicable industry best practices, technology, and application capabilities Stays current with existing application vendors' capabilities, offerings, and enhancements	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3
Assigned to work with process owners, power users, IT, and users Reviews business processes and shadow systems (e.g., spreadsheets and other databases) to increase automation and improve efficiencies Assists in developing and documenting standard operating procedures (SOPs)	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3
Aptitude to develop ad hoc reports using vendors' report writing tools (e.g., Crystal Reports, SSRS, etc.) The "go-to person" for ad hoc reports that other users cannot quickly generate on their own	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3
Copy data between development, training, and live databases Develop ad hoc reports Review and test security roles, including testing all user IDs Administer system and supporting software/database Assists with the installation, upgrades, and ongoing maintenance of the application	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3
Liaison/coordinates with departmental staff, project managers and vendor May also be a feature function reviewer Lead responsible for selection process questionnaires, documentation, gathering information and coordinating other Key Module Stakeholders Lead participant in reviewing assembled software and business process needs requirements Provide feedback or clarifications on software needs Lead departmental implementer for new software module/functionality	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3
Participant in reviewing assembled software needs requirements Assists in gathering documentation and identifying department/division needs May also provide feedback or clarifications on software needs	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3
Participant in reviewing assembled software needs requirements May also provide feedback or clarifications on software needs	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3
Participant in group needs assessments workshops Participant in vendor proposal evaluations Participant in vendor demonstration evaluations	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3	Name 1 Name 2 Name 3

Power User

- Department expert on application/module
- Possesses greatest knowledge of application/module
- Lead trainer/support person for other departmental staff that utilizes application/module
- Usually has formal training and is responsible for application configuration setup and changes on an ongoing basis
- Stays current with the applicable industry best practices, technology, and application capabilities
- Stays up to date with current application vendors' capabilities, offerings, and enhancements

Application Analyst Skills

- Assigned to work with process owners, power users, report writers, and users
- Reviews business processes, current utilization of application, manual processes, and shadow systems (e.g., workarounds, spreadsheets, and other databases) to increase automation, improve efficiencies, and increase utilization of the core business application
- Assists in developing and documenting standard operating procedures (SOPs)

Report Writer

- Aptitude to develop ad hoc reports using vendors' report writing tools, which may include third-party tools such as Crystal Reports, Cognos, or Microsoft SQL Server Reporting Services (SRSS)
- Assigned as the go-to person for ad hoc reports that other users cannot quickly generate on their own

IT Roles and Responsibility

- The objective is to identify the future role of IT for a given application/module.
  - The IT Services does not have the resources to effectively fulfill all applications management support and maintenance roles for the entire City.
  - For some applications, it is appropriate for IT to fulfill many of the above roles if not available within a department. However, an IT staff member can never be a process owner or power user.
  - The overall objective is for the departments to take as much responsibility as possible for the application management and support of the modules utilized by their primary business process functions.
- Copy data between development, training, and live databases
- Develop ad hoc reports
- Implement and test security roles, including testing all user IDs
- Administer system and supporting software/database
- Assist with the installation, upgrades, and ongoing maintenance of the application

Multiple Roles

Please note the organization may not have an identified resource in some instances, and some applications may not require certain roles. It is also likely, in some instances, the same person(s) will fulfill more than one role for a given application or module.

Module Lead

- Responsible for documentation, gathering information, and coordinating other Key Module Stakeholders
- Leads participant in reviewing assembled software and business process needs requirements
- Liaises or coordinates with departmental staff, project managers, and vendor
- May also be a module lead and feature function reviewer
- Provides feedback or clarifications on software needs
- Leads departmental implementer for new software module/functionality

Module Stakeholders

- Participate in reviewing assembled software needs requirements
- Assist in gathering documentation and identifying department or division needs
- May also provide feedback or clarification on software needs

Recommendations

- Add an Applications Business Analyst staff in the IT Department to provide applications support to departmental users for departmental business applications.
- Departments should be encouraged to become more responsible for changes to application setup and configurations, with assistance from IT personnel. If department personnel are unable to make these changes, training should be provided. If needed, third-party subject-matter experts can be helpful for large or complex projects.
- Training department personnel to perform their own simple report writing (basic listings and extracts in tabular form) is challenging, but beneficial. More complex reporting often requires specific understanding of database structures in the application, requiring IT assistance.
- Process owners and/or power users should take a more active role in monitoring upcoming functionality improvements from new software releases. Utilization by departments will improve over time. In addition, it would be helpful if process owners across departments monitored and discussed applications usage with other peer organizations and entities. The feedback gleaned from interagency exchanges could be incorporated into the City's systems to further improve systems functionality and increase its use across the organization.
- Specifically assign roles and responsibilities to each applicable application or module.
- Key assignments should encompass responsibility for understanding industry best practices and solutions, or processes available, as well as taking the lead in continually assessing and inventorying needs.
- Inventory current and future feature/function, reporting, training, and support gaps, and maintain improvement needs lists by specific software modules.

Benefits

- Increased use of applications features, resulting in higher return on software investment
- Higher degree of user independence, as well as less reliability and cost for vendor assistance or time required by IT staff
- Identification of applications user roles and responsibilities
- Improved efficiencies and productivity
- Improved customer service

3. User Access Controls

Background

User Account Control (UAC) is composed of tools to provide and limit end-users access to an application or a system, or to areas and functionality within a system – for example, who can see information, who can update information, etc. User Access Controls are frequently used for the network and operations at a desktop level. UAC improves application security by limiting standard user privileges until an administrator authorizes an increase or elevation. It ensures only agency-approved, trusted applications are authorized to run on the network. In addition to defining end-user access, UAC also further segregates and isolates running processes within a system that have different privileges. The segregation reduces the chances of lower and higher privilege applications from communicating with each other.

As noted earlier, UAC also applies to enterprise or departmental applications systems. These are often set up using role-based security (RBS) to allow people to access various areas in the system, including what capabilities they might have for approval or whether they can just view, add, change, or delete information. These system roles are very critical, and if not set up properly, it can allow unauthorized personnel to see restricted information, or it can even deny access or capability for those that need access and should be authorized to perform critical tasks.

Findings and Observations

- Users reported a lack access to certain information from various applications.
- It is appropriate for staff members not to be required to obtain necessary information through internal requests of other staff members or other manual processes if non-confidential information is available in an inquiry-only manner from various software programs.
- The user license costs to allow users access to an application are appropriate since they are typically a fraction of the cost when compared to the increased labor costs required for workarounds and manual labor.

Recommendations

- Utilize an applications/user inventory to determine user access needs that are not currently provided.
- Utilize integration with Windows Active Directory (AD) to facilitate user access management and reduce the amount of system logins when enterprise application systems support AD.
- Consider a single sign-on application to further ease access to authorized information.
- Determine if any confidential information is available in requested modules (e.g., social security numbers, driver's license numbers, credit card numbers, etc.) If not, grant inquiry-only access to staff members that require it to improve productivity, increase efficiency, and enhance responsiveness.
- Have management and application process owners work with the IT Department to properly set up roles and security for all enterprise or department level application systems. This should include the setup of roles and security for new employees and the disabling of user roles and security for departing employees.
    - Ensure that workflow is configured for on and off boarding employees that conforms with the City's policies to ensure access permission are current.

4. User Training and Support

Background

Software systems are tools utilized to conduct business operations. Like other tools (e.g., phones, audiovisual equipment, backhoes, plotters, etc.), gaining greater utilization of these tools through sufficient training and installation of other available software modules is key to significant increases in productivity and greater efficiency, as well as achieving cost savings in many areas.

Findings and Observations

- Staff productivity can result from additional staff application training.
  - Underutilized software applications will gain significant increases in staff productivity if more training is provided.
- New employees and users do not consistently receive sufficient training on certain applications and systems.
- End-user training ensures applications ownership resides at the department level. This will ensure the sharing of applications support among departments and the IT Department.
- Departments requested training during the questionnaire and interview process. Some feedback are identified as follows:
  - Admin/COM – Need training for Teams and SharePoint
  - Clerk – Need training for Municode
  - Clerk – Need training for Filemaker Pro
  - Clerk – Need training for Ironmountain on customer portal
  - Clerk – Need training for MS Teams
  - Clerk – Need training for MS Office 365
  - Clerk – Need training for phone system
  - Clerk – Need training in Teams
  - Clerk – Need training for Tyler accounting
  - Clerk – Need additional or on-going training for Microsoft Office applications, including Teams and Outlook; Utility phone capabilities
  - Clerk – Need additional or ongoing training for Utility phone capabilities
  - Clerk – Need additional or ongoing training for Adobe Pro
  - Clerk – Need additional or ongoing training for Municode Meetings
  - Clerk – Need additional or ongoing training for website
  - Clerk – Need additional or ongoing training for Versatile Express as new versions roll out
  - Clerk – Need training on Tyler for accounting input
  - Com Dev – Need training for Excel
  - Com Dev – Need training for Teams
  - Com Dev – Need training for OneDrive
  - Com Dev – Need training for Bluebeam
  - Com Dev – Need training for MS Access
  - Com Dev – Need training for Zoom
  - Com Dev – Need training for Avenue
  - Com Dev – Need training for Municode
  - Com Dev – Need training for MaxUC
  - Com Dev – Need training for Slack
  - Com Dev – Need training for Hightail

- Com Dev – Need training for Dropbox
- Com Dev – Need training for Adobe
- Com Dev – Need training for Office 365
- FIN/UB – Would like training for Tyler
- FIN/UB – Would like training for Office
- FIN/UB – Would like training for Adobe
- FIN/UB – Would like training for ESS for timecards
- FIN/UB – Would like training for Bridge Pay/Muni On-Line Payments
- FIN/UB – Would like training for DocuSign
- FIN/UB – Would like training for ResourceX
- FIN/UB – Would like training for MS-365 (Teams)
- FIN/UB – Would like training for Dropbox
- Fire – Would like training for Access
- Fire – Would like training for PowerPoint
- Fire – Would like training for Emergency Reporting System (ERS)
- Fire – Would like training for Office
- Fire – Would like training for Work Orders/Asset Management System
- Parks/Rec – Need Tyler Incode training
- Parks/Rec – Need MS Excel training
- Parks/Rec – Need MS Teams training
- Parks/Rec – Need Square CC training
- Parks/Rec – Need MS OneDrive training
- Parks/Rec – Need MS Office 365 training
- Public Works – Need training for MS Teams
- Public Works – Need training for OneDrive
- Public Works – Would like training for Tyler Incode
- Public Works – Would like training for Citrix
- Public Works – Would like training for web conferencing tools
- Public Works – Would like training for Mobile MMS
- Public Works – Would like training for AutoCAD
- Public Works – Would like training for Marina Program
- Public Works – Would like training for ArcGIS Pro
- Public Works – Need training for Adobe Pro
- Public Works – Need training for Zoom
- Public Works – Need training for Adobe Pro
- Public Works – Need training with upgraded WaterCAD, SewerCAD, XP-SWMM hydraulic models
- Police – Need additional or ongoing training for Office 365 – email
- Police – Need ongoing training for Excel

Business Department Application Training

As applications software changes and grows in complexity, training staff members to properly use software becomes more critical. A renewed citywide emphasis on targeted staff training on applications software will pay significant dividends in increased staff effectiveness and productivity. An inventory of high-priority training is essential to achieve expected productivity. The City can identify and assess future training needs for all applications and users upon completion of an application/user matrix (see *Applications and User Licensing Inventory* initiative).

Recommendations

- Develop a Business Applications Training Plan.
  - Conduct a survey to assess training required to address actual needs and determine anticipated enrollment. This should be driven by department managers to elicit participation when training is made available.
  - Business process improvement reviews will uncover many needs for additional training across departments and application systems.

- Determine strategies for accomplishing training needs and engage software vendors, such as:
  - Self-learning aids (e.g., enterprise software vendor like Tyler Technologies have an extensive user community that users can query and ask other user questions. Tyler University is a resource that provides a how-to catalogue of functional topics that users can access and download)
  - Internal classes (internal or external trainers)
  - On-site vendor training
  - Lunch-and-learns
  - Go-To Application Champions
  - Training opportunities at software vendor annual user conferences
- Participate in software vendor user conference and local user meetings if they are available.
- Create a repository of basic how-to training aids and other training information (e.g., videos, past class information, etc.)
- Consider procuring a screen-capture video solution to assist with developing internal video training aids.
- Consider class attendance as a factor in performance evaluations. This can be accomplished by having department management involved and agreeing to which classes each employee would benefit from.
- Consider efforts to reduce and/or limit the total number of software vendors and databases whenever possible. This will reduce and limit overall cost-of-ownership, support requirements, and training and reporting needs. This will also improve overall integration capabilities.
- Current and future needs can be evaluated and prioritized through a combination of mechanisms, including the Technology Steering Committee.
- Consider using a stand-alone learning management software, see *Learning Management Software* initiative

Benefits

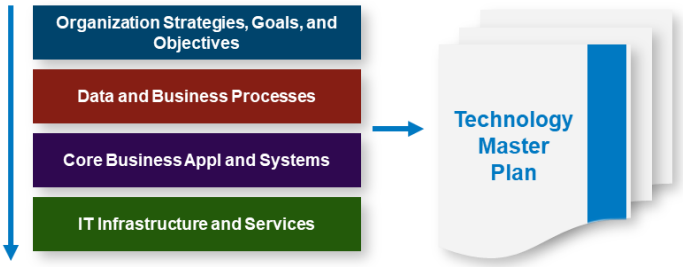
- Improved operations management
- Improved utilization and efficiency of software applications
- Activation and use of existing functionality that is currently unknown but important to the City
- Review and activation of new functionality provided in future applications software releases
- Increased information sharing
- Better identification of training needs
- Increased training alternatives
- Improved software administration (fewer staff members required to service user community)

5. Software Selection Best Practices

Background

Selecting the right system and technology is more critical today than ever before because the efficiency and effectiveness of the organization is directly dependent on its use of technology and information systems. Best practices organizations recognize they must take greater advantage of automation to meet growing constituent and public demands.

Procurement of new software solutions that follow selection best practices can transform certain operations, processes, and constituent services. Without proper preparation, planning, and methodology for selection and implementation, organizations face many problems and risks, including:



- Spending sometimes hundreds of thousands of dollars more than necessary in total cost of ownership
- Failed or prolonged implementation
- Implementation of systems that still do not meet the organization's functional needs
- Low productivity
- Poor contract negotiation position
- Lack of and/or reduced integration between other software systems

Organizations typically fall short of their implementation goals due to one or more of the following factors:

- Insufficiently defining system objectives and requirements
- Failing to adequately involve both management and users
- Underestimating the costs and effort required
- Failing to adequately plan for expansion
- Failing to properly evaluate software

For key software systems to be implemented properly and for the organization to reap the full benefits, the organization should utilize a structured analysis and selection methodology. A structured approach to selection and implementation results in significant benefits, including:

- Reduced risk of a failed or prolonged implementation
- Lower total cost of ownership
- Independent and objective analysis of potential alternatives
- Well-defined objectives and requirements

STARTLING STATISICS

- Only 32% of projects are on time, within budget, deliver all required features and functions, and achieve measurable business and stakeholder benefits.
- Approximately 44% of projects are "challenged" (late, over budget, and/or have less than the required features and functions).
- 69% of project failures are due to a lack of and/or improper implementation of project management methodologies.
- Nearly 40% of those surveyed said that a "lack of employee buy-in and executive support" was the biggest challenge facing a successful implementation.
- A recent customer survey shows that enterprise implementation projects:
  - Have only a 7% chance of on-time implementation
  - Will likely cost more than estimated
  - Will likely deliver unsatisfying results (only 21% will realize half or more of expected benefits)
- In a past study of local government enterprise implementations published in Government Finance Review, it was found that the average project was 176% over budget and 243% beyond the planned implementation timeline.

- Allows for staff and project participants to learn about applications functionality and business processes outside of their scope of work that they may not have visibility to during the course of their day-to-day tasks
- Selection of technology that meets the organization's short- and long-term objectives and requirements
- Effective contract negotiation through well-prepared and documented needs
- Overall project time savings
- Improved implementation readiness

Findings and Observations

- Software selection and procurement that follows best practices involve and include departmental end-users in the assessment process, ensuring that specific business unit functional needs are captured.
- A best practices approach to software selection can avoid thousands of staff labor hours performing tasks that modern enterprise systems have the ability to automate and/or streamline.

Recommendations

- Adapt these best practices for size and complexity of projects. More due diligence is generally required for larger, more complex projects. However, even small projects can benefit from these due diligence methodologies.
- Utilize best practice selection methodology when evaluating new software.
- Consider third-party subject-matter experts (SME) when selecting or improving complex or highly specialized solutions.
- For major enterprise level systems, ensure:
  - Process reviews are completed, and detailed feature/function specifications are documented as part of an RFP.
  - To include all stakeholders in each software evaluation and implementation project by module (e.g., budgeting should include all staff who participate in that process or fixed assets should only include staff who participate in that process, etc.)
  - That reporting needs are identified (*see* Enterprise Reporting Best Practices). This will help inform implementation decision to capture only data and fields that are required to allow for creating a report. This focus can save significant implementation and systems costs.
- For departmental specific applications, ensure:
  - That a high-level identification of applications requirements is developed. The requirements do not have to be as detailed as an enterprise level system. This allows the City to structure software demonstrations to show functionality relevant to the departmental end-user.
  - That functionality and costs may be shared among two or more departments (e.g., Project Tracking and Collaboration can be used by Public Works, Community Development or Recreation, etc.) This is also an effective way to build a business case for the new application.

Benefits

- Reduction in hardware and software requirements
- Reduction in preparation time for deployments
- Better identification of integration requirements
- Reduced license fees
- Increased utilization of applications systems
- More effective due diligence

Example Work Plan

Step	Software System Selection Work Plan
Phase 1 – Needs Assessment and Recommendations	
1	Kick-Off and Project Team Development – Hold a formal Kick-Off Meeting, and then work with the Project Manager to finalize the makeup of the selection Project Team and document required roles and responsibilities. Include representatives from all key stakeholder groups.
	IT Infrastructure and Staffing Readiness Review
2	IT Information Meetings and Interviews – Conduct information-gathering activities focused on the ability of the existing IT staff and infrastructure to support the needs of the organization and review the readiness to implement and support the platform that will be required for the new software system, including:
	IT Network and Infrastructure
	Storage and Backups
	Servers, Server Applications, and Management
	IT Security
	Disaster Recovery
	Desktop Environment
	Printers
3	Documentation – Document information and summarize the required preparation initiatives, findings, and recommendations.
4	IT Assessment Memo – Prepare a memo assessing gap and readiness of IT infrastructure to support the organization's general needs and the introduction of the new software system. The memo is to include the following:
	General readiness of IT to support the organization's needs and support the introduction of a new software
	IT Initiatives with findings and recommendations, including the following scope:
	IT Environment and Infrastructure
	IT Applications Support Staffing Structure
	Business Department Needs Assessment Interviews
5	Business Process Review and Feature/Function Analysis – Meet with the identified personnel by functional area and software modules to review existing manual and automated systems and operations, including any custom-developed work-around systems and processes. Include a cross-section of all user types in each assessment workshop.
6	System Requirements Documentation – Document information gathered during process reviews and develop feature/function requirement specifications specific to your organization.
Phase 2 – RFP Development	
7	Preliminary Vendor Research, Communication, and Coordination – Research vendor community to identify qualified vendors meeting the organization's system and service requirements and communicate with potential vendors. Vendors do not respond to all RFPs, so pre-communication is helpful to obtain proposals that are in the organization's best interest to consider.
8	Develop Request for Proposals (RFP) – Prepare a Request for Proposals (RFP) document, and work with the organization to make adjustments and revisions, as well as ensure its compliance with the organization's purchasing guidelines and is distributed per policy (assumes development of a single RFP document). RFP should include, but will not necessarily be limited to, the following:
	Comprehensive list of functions/requirements with prioritization
	Cost, including purchase or other financial payment plan options
	Required technical specifications
	Installation costs
	Migration from existing to new system (cost and timeline)
	Training cost and training schedule

Step	Software System Selection Work Plan
	New system hardware/network/system software requirements
Phase 3 – Vendor Evaluation and Demonstration Management	
9	Manage vendor questions and answers during established proposal response timelines.
10	Proposal Evaluation – Analyze and evaluate proposal responses. Provide an initial Summary Vendor Comparison Worksheet that provides side-by-side comparison of key system evaluation requirements, including feature/function compliance statistics.
11	Analysis Results Workshop to Determine Vendor Finalists (Short List) – Conduct a collaborative review workshop with a key stakeholder committee and determine which vendors are to be short-listed.
12	Develop Demonstration Documents – Prepare an agenda and sample demonstration scripts for vendor demonstrations to be sent to vendor finalists for their advance preparation. Also, prepare vendor demonstration evaluation forms for use by selection committee members during demonstration sessions.
13	Reference Check Form Preparation – Prepare form to be used by project team members during finalist reference checks or calls.
14	Schedule and Facilitate Vendor Demonstrations – Schedule demonstration dates and facilitate initial vendor demonstrations to ensure that pertinent requirements are addressed (estimate three vendors at X days each).
15	Develop Site-Visit Documents – Prepare an agenda for each vendor site-visit and a site-visit evaluation form for organization selection committee members to complete during each visit.
16	Post Demonstration/Visit/Reference Check Due Diligence and Follow-Up – Track follow-up issues and conduct comprehensive due diligence. This may include additional demonstrations, Q&A facilitation, reference checking, and site-visit assistance, etc.
17	Finalist Selection – Conduct a meeting with the organization selection committee to facilitate discussion and finalize the vendor selection.
18	Review Selected Vendor's IT Requirements – Review the IT (server, workstation, network, etc.) requirements provided in the selected vendor's proposal, and prepare a memo outlining observations and recommendations for IT.
Phase 4 – Contract Review and Negotiation Assistance	
19	Implementation Plan Review – Review implementation plans, project management office, resource requirements, and timelines.
20	Implementation Team Organization – Establish Implementation Project Team based upon PMI and COBIT Project Management Office (PMO) principles and applications management best practices.
21	Contract Review and Negotiation Assistance – Conduct contract reviews and negotiations with an SME and legal representation.

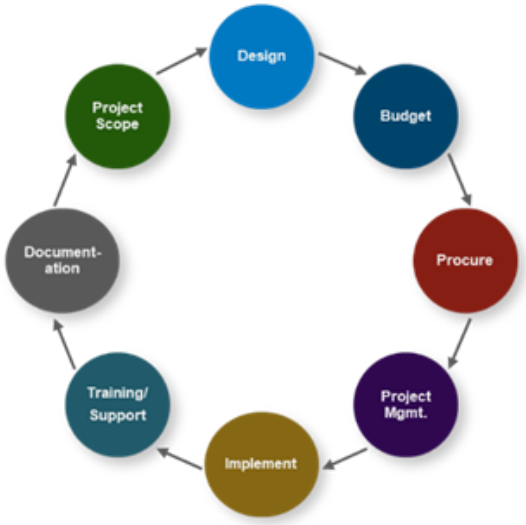
Example Feature/Function Specification

Feature Number	Feature / Function / Capability	Standard - Current	Standard - Next	Report Writer	3rd-Party Application	Custom Modification	Not Available	No Response	Comments
	Requisitions/ Purchasing								
	VENDOR MAINTENACE GENERAL FEATURES								
4.020	**VENDOR - ADDRESSES** - Provide for multiple addresses per vendor (must support non-USA addresses) with a minimum of four addresses and five lines each.						1		
4.028	**VENDOR APPROVAL** - Ability for departments to setup a temporary vendor with only purchasing to approve new vendors.						1		
4.035	**ONLINE REQUISITION/PO APPROVAL** - Provide functionality online to route requisitions or purchase orders to appropriate users (or their backup users) with notifications for their approval or disapproval. Allow entry of disapproval notes and ability to restart the approval process if required.	1							
4.035	**ONLINE TRACKING OF APPROVED REQUISITIONS** - Ability to use online query for all purchase requisitions that are awaiting the user's approval.	1							
	ENCUMBRANCE ACCOUNTING								
4.042	**ENCUMBRANCE ACCOUNTING** - Provide all procedural functions of an encumbrance system including verification of budget availability before accepting invoice, requisition and purchase order transactions.	1							
	PURCHASE REQUISITIONS								
4.047	**FORMAL BID FUNCTIONALITY** - Provide formal bidding functionality and process, which ties with both purchased requisitions and purchase order functions.		1						Future Release
4.050	**BUDGET/ PURCHASE LIMIT CONTROLS**- Provide security controls to either allow or disallow amounts to be entered that exceed budget amounts.	1							System either start workflow process, or not route items that exceed budget amount
4.052	**RECURRING REQUISITIONS** - Allow recording, reporting, retrieval, and editing of recurring requisitions.						1		
4.054	**ELECTRONIC REQUISITIONING** - Provide the ability to generate electronic requisitions by multiple end-users.	1							
4.099	**DEPRECIABLE ASSET** - Ability to code items as depreciable assets.	1							This is available at the PO level.
	PURCHASE ORDER PROCESSING								
4.109	**PURCHASE ORDER GENERATION** - Allow items to be split from requisitions to multiple purchase orders.					1			
4.140	**PURCHASE ORDER - THRESHOLD AMOUNT** - Ability to set a limit (cumulative) for a single vendor in a year for purchases.	1							Yearly limit tracked via misc. user defined field
4.158	**CONTRACT EXPIRATION ALERT** - The system should provide a warning or block payments if a contract's insurance has expired.	1							Information is available via drill down
4.160	**APPROVALS**- Ability for an approval to be routed to multiple approvers, via workflow rules, where either approver, but not both, is not required.	1							
4.194	**PURCHASE ORDER COMMITMENT REPORTING** - Generate a purchase order commitment report reflecting the dollar amount of anticipated delivered by vendor.	1							
	INTEGRATION								
4.198	**INTEGRATION - ACCOUNTS PAYABLE** - Provide for automatic transfer of purchasing information to Accounts Payable (e.g. vendor, address, amount, purchase order number, etc.)	1							
4.199	**INTEGRATION - BUDGET** - Provide capability to validate funds availability for Requisitions and Purchase Order transactions. Allow override capability.	1							
4.202	**INTEGRATION - GENERAL LEDGER** - Ability to download purchasing card transaction file (.txt) to post transaction detail to General Ledger by general ledger account code. Note: each transaction is associated with a specific general ledger account number in the text file.								Standard P-Card integration is available via import into Accounts Payable
4.203	**INTEGRATION - PROJECT ACCOUNTING** - Purchase Order transactions coded to Projects must integrate with Project Accounting								

6. Project Planning and Implementation Best Practices

Background

A best practice approach should be followed for all significant implementation projects. The complexity and risk determine the actual level of due diligence that should be performed. The following is an outline of *project planning and implementation best practices*:



- **Determine Scope of Work** – Work with all stakeholders to determine what needs to be accomplished.
- **Design** – For larger, more complex projects, the design effort may become a separate project. For smaller projects, design is integrated into budgeting.
- **Specifications** – Make sure an appropriate level of vendor-agnostic specifications are included with procurement requests that reduce ambiguity and provide better comparisons between vendors.
- **Collaborate** – Include input and requirements of all stakeholder groups to ensure all requirements are included in specifications and all stakeholders buy-in to the final solution. The IT Steering Committee should review as part of the Committee's roles and responsibilities.
- **Develop Budget** – Project budgets include hardware, software, and consulting and SME costs. Consulting costs are estimated by outlining the various work steps and estimating the hours required to complete them.
- **Gain Sign-Off** – Once the budget is complete, review the scope of work and costs with the project sponsor and gain their approval before continuing, including consent by the IT Steering Committee.
- **Create Project Plan** – Based on all stakeholder needs, delivery dates, and the tasks to be completed, develop a project plan and estimated implementation date.
- **Outline Communication Plan** – Outline the process for communicating implementation dates, improvements, and training to appropriate staff members.
- **Document Other Plans** – Other plans may include training, testing, contingency, and back-out. These plans are developed on an as needed basis.
- **Configure, Implement, and Train** – Utilizing planning methodologies and technical expertise, configure the necessary system components, and implement the solution with the least possible impact to staff and productivity. The IT Steering Committee should receive status reports on the progress of the implementation, including whether the project is on time and within budget, user needs are being met, and vendors are following through with their contractual obligations.
- **Post-Implementation Review** – Complete a post-implementation review with successes, lessons learned, and any unresolved issues requiring vendor assistance. Report the results of the IT Steering Committee's review.
- **Post-Implementation Support** – All implementations that affect multiple users require on-site, post-implementation support to eliminate remote response times.
- **Documentation** – Develop any necessary procedures and update documentation as part of the project.

Recommendations

- Develop a project portfolio methodology for all IT and application software-related projects.
- Follow planning and implementation best practices.
- Review all major active and upcoming projects during IT Steering Committee meetings.
- Obtain services of third-party project managers, and/or subject-matter experts, to supplement internal resources as appropriate and/or cost beneficial.

Benefits

- Prioritization of projects
- Reduced periods between transitions
- Increased information-sharing capabilities
- Enhanced communication and consensus
- Increased anticipation and management of technology upgrades
- Improved analysis and planning
- Increased departmental collaboration
- Measurement and tracking of results and outcomes

7. Enterprise Reporting Best Practices

Background

Enterprise software applications that support the critical business functions and processes of the organization (i.e., Financial, Maintenance and Operations, and Property) also store and retain the organization's critical information and data.

Reporting on any function requires accessing captured data, and then extracting and presenting it as meaningful information. Information is the outcome of the reporting process, presented in a useful, consumable, and digestible format, enabling the organization to:

- Equip supervisory and management personnel with information to make necessary daily decisions during the conduct of fulfilling operational responsibilities
- Provide leadership with the ability to better understand and validate operations and output
- Measure how well the organization is meeting its goals, objectives, and service levels, as well as meeting any established key performance indicators
- Make decisions and establish practices and policies to manage risk
- Empower leadership to make strategic decisions necessary for guiding mid- and long-term direction for the organization as well as measure the ongoing implementation and results of those decisions

Information provided from reporting results can be presented in many formats, including, but not limited to:

- Traditional rows and columns
- Tabular
- Pivot tables
- Graphic (e.g., line, bar, and pie, including dashboard presentation)
- Overlay

Ideal reporting systems can also provide the results in actionable format, including, but not limited to:

- Using analysis tools to apply filters and factors to view and better understand the information
- Using the data to determine options and apply decision criteria (what-if scenarios)
- Sharing and combining data with information from other departments, systems, or even external data sources
- Allowing collaboration and group analysis

An organization will find it difficult to maximize utilization of its application software and achieve its goals in an environment where data is painstakingly entered into a system but cannot be retrieved in a meaningful way. In short, enterprise applications cannot deliver full value without providing the organization the ability to use data contained in these systems to manage its operations and guide it in determining its future direction.

Findings and Observations

- Reporting is a core business function. Staff across all workshop sessions expressed the desire to improve reporting and data sharing.
- Challenges are reported across several different software applications (e.g., Incode, ActiveNet, Greenvue, etc.)
- Many staff do not have the training or knowledge to generate standard, ad-hoc or custom reports.
- IT support for report writing is limited.

Recommendations

- The City should conduct a complete inventory of all reports, including shadow system reports (i.e., those compiled in MS Excel).
  - We have included the sample below as a starting point.

    Note: This is only an example. Headings and data fields can be added, changed, or deleted to best meet City needs.

Report Name	Priority & Reporting Tool Used	Dept	IT	Vendor	Report Options

- The inventory table provides a tool to document responsible party(s) and roles (user, IT, or vendor), in keeping with *Application Management Best Practices*. Those responsible for report creation and development should be identified and maintained. Departmental staff members are most familiar with their business processes and data and are often best equipped to develop reports independently. We recommend that Departmental staff receive report writing training and develop the majority of reports within the function.
  - Involve IT or a third party for more complex reporting needs.
- Department staff can be trained to develop basic and moderately sophisticated reports. For more complex reports that require joins and other more complex functionality, department staff can partner with IT, internal staff who have the required skills, or a third party in the report development process. The table below is an example of what some organizations have used to assign departmental application and reporting, based on roles and responsibilities. These should be completed for each application software system within the organization.
- Current shadow systems or unmet reporting needs should be addressed in the new systems to ensure that future business processes are captured in the enterprise systems.

Enterprise Software Needs Assessment
Roles and Responsibilities

PO = Process Owner(s)
PU = Power User(s)
AA = Application Analyst(s)
RW = Ad Hoc Report Writer(s)
ML = Module Lead
MS = Module Stakeholders
FF = Feature Function Reviewer(s)
EC = Evaluation Committee Selection Participants

	General Ledger (incl. Bank Recon)	Budgeting	Purchasing and Requisitions	Contracts Management	Accounts Payable	Accounts Receivable	Cashiering	Fixed Assets	Financial Reporting	Ad Hoc Reporting
PO =										
PU =										
AA =										
RW =										
ML =										
MS =										
FF =										
EC =										

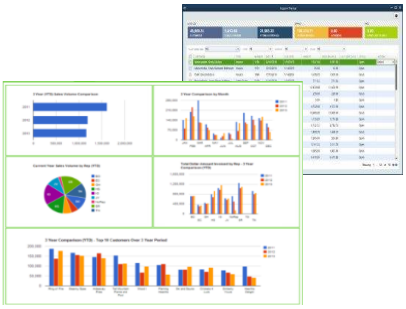
- The City should make use of all reporting and information presentation options available. Options for meeting reporting needs are as follows and are also **placed in order of preference and priority**. It should be noted that these options are often dependent on the technology, database, database structure, and development tools the application vendor(s) applied when building their systems.
  - **Dashboard(s)** - Dashboards are provided by many enterprise application software vendors. Dashboards are often used as the launch platform for the application, but also display information that is of interest to the specific user's role. The status of expenditures against budget, number, and types of work orders issued versus completed for a particular time period, and much more, is an example of this. These results are often displayed graphically as context-sensitive content so that clicking on the graphic enables drilling-down to the detailed information contained in the application upon which it is based. Frequently used reports can also be pinned on the Dashboard for quick access and execution.
  - **Vendor Application Standard Reports** - Most vendors provide a set of prewritten reports that are included with the software application. These are reports that the software vendors have determined are most needed or requested by the application user community and included in a quick-access link that can be executed from a drop-down list or menu. These standard reports usually have additional criteria to select (e.g., applying a date range, specifying a particular value type, etc.) Some vendors have written these reports using their own report-writing services (i.e., SSRS), which allows the use of standard reports as a base from which user modifications are applied with the vendor's ad hoc reporting tools.

- **Ad Hoc Reports** - Ad hoc reporting tools allow for the custom development of reports without the benefit of programming knowledge. Most report-writing tools are intuitive enough for non-IT-oriented department staff to independently create customized reports. It should be noted that familiarity with the application and data contained in the system is a prerequisite to be able to use any ad hoc reporting tool. However, any user that is a mid- to high-volume user of the application who is also computer proficient usually has the system knowledge to make use of an ad hoc reporting tool. As noted earlier, more sophisticated reports may require the assistance of IT staff. Ad hoc reports are a powerful tool for the user community, allowing them to independently meet their basic reporting needs. The types of ad hoc reporting tools that are available include:
  - Application vendor proprietary tools
  - Vendor-incorporated SQL Server Reporting Services (SSRS)
  - Third-party reporting/BI tools (e.g., Crystal, Cognos, Business Objects, etc.)
  - Other non-SQL, server database-specific reporting tools (e.g., Oracle reporting tools, etc.)
- **Financial Analysis and Financial Statement Report-Writing Tools** - These reporting tools are a form of ad hoc reporting, but include additional capabilities related to financial analysis and financial reporting needs of finance and accounting staff. A few common reporting tools for this need are listed below:
  - Reporting tool developed by the software application vendor, to be used with their particular application
  - Tools to produce financial reports, like Annual Report builders and other tools to produce other GASB-related/required reports
  - Third-party financial reporting tools offered to work with the more common financial/accounting systems in the local government market space
- **Application Vendor Business Analytics and Key Performance Indicators (KPIs)** – Some application systems have tools that allow for performance-based analytics and other performance measure-related reporting. These are often accompanied by a dashboard with the same characteristics described in the *Dashboard* option above. Many of these tools also provide more sophisticated capabilities for exporting to Excel for the use of Excel-based pivot tables and other advanced Excel capabilities. Some software vendors are beginning to offer these capabilities as an optional “bolt-on” to their application solutions.
- **User-Programmed/Coded Reporting** - These are reports built using internal IT staff and could also include hard-coded reports that a vendor may build for the customer. Standard and ad hoc reporting options should be explored before turning to this alternative. This option is usually deployed when the reporting need is so sophisticated or complex that a coding method is the only way to accomplish the desired outcome. Examples of this type of report include:
  - SQL queries
  - Other coded/programmed reports
- **Application Vendor-Written Custom Applications** - Because of the vendors’ detailed knowledge of their own systems, they are often a good resource for hire to write custom reports. It is often best to have several reports grouped together, which will help keep costs more manageable as vendors will provide discounts for larger blocks of hours for these reporting services. It is also a good idea to request that the vendor build these reports using their report-writing tool, if possible, so responsibility in maintaining them can be assumed in the future, as needed, or used as a base to build variant (modified) reports.

- After completing the existing report inventories and identifying City reporting roles and responsibilities as recommended above, an assessment and gap analysis should be conducted to include:
  - A review of existing reports to determine how well they meet needs, as well as if any modifications are required to better meet needs or provide more value
  - A detailed list of necessary reports that are needed for all departments and divisions, including any formatting or Excel export needs and reporting tool options to be applied (per definitions above), and organization-wide cross-application reporting needs, which require additional processes to combine data from multiple sources using multiple reporting tools and options
  - Conduct a workshop, after the undeveloped necessary reports have been identified, to prioritize these reports, with participation of all staffing levels within the City from line and field staff to supervisors and management, including executive leadership, as necessary, to cover all reporting needs in the assessment and gap analysis process
    - Prioritization should apply a High, Medium, and Low scale. High-priority reports should be done in the first third of the implementation period. Medium-priority reports should be completed in the middle third of the implementation period. Lastly, the low-priority reports should be completed in the final third of the implementation period. Cost-benefit and impact to operations and customers should be utilized in these prioritizations.

8. Dashboard Preparation Improvement and Automation

Background



Dashboards are provided by many enterprise application software vendors. Dashboards form part of a user's homepage and display reports, key indicators, and other metrics regarding day-to-day operations, activities, and historical trends (e.g., status of expenditures against budget, number and types of work orders issued versus those completed for a particular time period, etc.) These results are often displayed graphically as context-sensitive content, so clicking on the graphic enables drilling-down to the detailed information contained in the application upon which it is based. Benefits of dashboards include:

- Quick links for immediate access to required tasks and approvals
- Easy modification of dashboards for each user's preference
- Automated generation of dashboard information
- Transformation of data into visual information
- Easy-to-understand graphics
- Real-time analysis
- Drill-down access to activity detail

The market offers the following main dashboards types:

- Standalone software applications
- Web browser-based applications
- Desktop
- Enterprise-specific functionality

The marketplace for these systems is vendor-rich and dynamic. As new vendors enter the marketplace, they bring forth new features and functionality. Examples of the public sector-oriented vendors include:

- Tableau
- Power BI – by Microsoft
- CityView 360 – by Agiline Software
- OpenGov
- Socrata

Findings and Observations

- Staff would like the ability to create and share a citywide dashboard.
- City staff would like to have dashboard capability that is independent of any one enterprise system, where data from several systems can be presented.
- Finance staff does not have use of an Incode dashboard. A dashboard has been configured but is not yet fully operational due to errors to filtering the data structure.
- The City does not have a centralized dashboard functionality that can help departments and key staff simplify and automate routine or monthly performance management.

Recommendations

- Conduct research on the overall system capabilities of dashboard solution providers.
- Consider performance dashboards that are available in the modern enterprise solutions before considering a third-party application.
- Complete a review and an assessment of Performance Dashboard needs with a cross section of leaders and users.
- Documenting the needs will result in an expectation of functionality to be delivered.
- Follow the recommendations of the *Software Selection Best Practices* initiative.

9. Maintaining Software Updates

Background

Maintaining up-to-date software for the City applications is critical for maintaining system security, functionality, and unified training for end-users of a software across the organization.

Findings and Observations

- Some software systems are not always maintained at the most current available version.
- Falling further behind often creates upgrade scenarios with several intermediate steps, risking additional problems, and potentially makes upgrades more expensive and time-consuming.

Recommendations

- The City should follow the best practice recommendation of maintaining a minimum of N-1 (current major release or the one prior). This includes desktop applications and all core enterprise applications.
- Maintain consistent updates across all users.
- Ensure patch management software is implemented properly to provide software updates across the organization for desktop software updates, consistency, and automation. Include software updates in the organization's sustainability and replacement planning.
- Review version release notes for each application software release to determine if any new functionality has been added that the City would need or like to implement.
- Provide appropriate user training with each release.

10. Centralized Land and Parcel Data Management

Background

Centralized land parcel data is increasingly crucial for consistent organization-wide parcel and address data for all departments to utilize. Updating and sharing a central parcel and address database is essential, allowing departments to retrieve historical records more efficiently and with consistency across the entire organization.

Modern enterprise applications are increasingly tightly integrated with geographic information systems (GIS). which rely on accurate parcel information to generate maps. Maps allow for a succinct visualization of data. Agencies are increasingly making that data and capability available to the public via their websites and other online tools.

Findings and Observations

- The City uses multiple geo-based applications for CAD/RMS, Work Requests, Tyler Incode for utility billing, GIS, etc.
- Community Development uses Greenvue Digital Permit Suites to support its operations. Staff reports challenges and functional gaps in locating parcel information and history.
- Public Works Departments uses Accela GoRequest for service request management. It lacks a true enterprise asset management system that allows staff to access GIS map-based address and parcel data with all associated infrastructure assets.
- The address/parcel information is not synchronized between GIS and the various applications that rely on address, and parcel data.
- The City could realize significant productivity gains and improved accuracy by using a common, centralized parcel/address database to populate any new or changed information. This includes centralizing data from all applications that contain address data and all GIS data environments to improve the ability to share layers (see the *GIS Assessment and Master Plan* initiative).

Recommendations

- Utilize the GIS database for master address and parcel records (see *GIS Assessment and Master Plan* initiative).
- Future software application systems should be selected based on their ability to store both a master address/location and parcel management database (as applicable).
- New systems should allow for regular updates and synchronization with GIS.
- Master addresses/locations should be shared across all geo-based applications.
- All address and parcel updates from external and internal sources should be done through GIS first. Updates to other systems would then use GIS master information.
- Strict control of who is authorized to make updates of this information should be enforced, typically limited only to GIS data editors.
- Geo-based applications should be configured so that each transaction requires users to select from valid addresses or validate against the GIS database, not type in free-form addresses.

11. Data Integration and Management Strategies

Background

In today's fast-paced technology world, the amount of data an organization is tasked with managing is growing rapidly. How organizations manage, integrate, utilize, and maintain the quality of this data continues to evolve, as historical integration and data storage options change with new technology.

When evaluating the best data management strategy for your organization, there are numerous factors to consider. Many of these items have been discussed and identified as initiatives in this report. Some of these considerations include:

- Where will your infrastructure be housed? (On premise vs. cloud)
- What kinds of technologies will your customers use to interact with your agency today, tomorrow, next year, or five years from now?
- What internal and external users will want access to data? If the answer is "everyone," how will your organization make sure they are getting correct/quality data?
- Does your organization have adequate technical resources and staffing to manage the ongoing demand for data and ensure data quality, security, and regulatory requirements to meet these demands? Is there a current staffing structure in place to support a data management strategy in the future?
- What standard data management tools are available with the latest application offerings available on the market? Will these tools meet the current and future reporting and integration needs of the City? If not, what are the gaps and the most cost-effective data integration solutions available to address these shortcomings?

Data integration is not just a matter of selecting the right software or even the right project. It is a holistic business strategy that impacts your agency's capacity to innovate and grow. In order to become a data-driven city, it is essential to understand your organization's business goals, needs, available resources, supporting infrastructure, and funding available for such an initiative. In addition, the overall direction of the data management market is an important consideration to ensure that the City develops a flexible strategy that sets your agency up for success in the future.

Common Data Integration/Management Options

There are a multitude of options available to either provide native application and/or external data integration solutions to meet the needs of the City. Several common alternatives are outlined below.

Vendor's Applications and Available Reporting/Analytics Tools

In a perfect world, a single vendor solution for all enterprise applications would, in theory, provide all the necessary integration needed to share data between modules. In turn, extracting data from this single data source would reduce labor costs due to manually compiling data from disparate or siloed systems. In some cases, a single vendor solution will not meet every department's needs. The end result could very well be the selection of multiple vendor applications with the goal to provide some data integration between those systems. (i.e., file export or custom interface).

Many vendors also provide standard output reports, as well as reporting modules/tools such as an Analytics module, Crystal Reporting, SSRS to produce customized (ad hoc) reports needed by the City across multiple data sources.

Other Data Management Options

Other common data management/integration strategies involve one or multiple combinations of data warehouses, data lakes, and data hubs. There are some subtle and distinct differences between these alternatives. These distinctions are outlined below:

Data Warehouses vs. Date Lakes

To understand the differences between a data warehouse and a data lake, it is important to understand the types of data they primarily serve. There are two types of data, structured and unstructured.

Raw data that has not been cleaned is called unstructured data—which comprises most of the data in the world, like photos, chat logs, and PDF files. Unstructured data that has been cleaned to fit a schema, organized into tables, and defined by data types and relationships, is called structured data. This is the fundamental difference between data lakes and data warehouses.

Data lakes store data from a wide variety of sources like IoT devices, real-time social media streams, user data, and Web application transactions. Sometimes this data is structured, but often, it is quite messy because data is being ingested straight from the data source. Data warehouses, on the other hand, contain historical data that have been cleaned to fit a relational schema.

Data Hubs

A data hub serves the purpose of enabling the seamless flow and governance of data. Unlike data warehouses and data lakes, data hubs are not focused on analytical uses of data. Data hubs are different. Their focus is enabling data sharing and governance. Data hubs can support a range of use cases, most often operational in nature (such as the provisioning of master data to enterprise applications and processes).

Some predominant vendors in the data warehouse market space include:

- Snowflake (Cloud data warehouse)
- Azure SQL (Cloud data warehouse)
- BigQuery (Cloud data warehouse)
- Redshift (Cloud data warehouse)
- Hadoop (On premise)
- Teradata (On premise

Findings and Observations

- Producing reports is difficult due to multiple sources of data.
- Many existing application systems' existing reporting capabilities are not highly utilized due to lack of training or staff with requisite reporting writing skills.
- Data availability is limited due to a lack some enterprise application solutions (e.g., Land Management, Enterprise Asset Management, GIS, Enterprise Document/Content Management).
- The City has multiple systems that are currently not integrated or share data.
- Data availability is also limited when processes are completed outside of enterprise application systems (i.e., manual, paper, and shadow systems such as Excel).

Recommendations

- It is recommended that before exploring options available for an enterprise data management system, that core enterprise applications (if replaced or upgraded) be fully implemented and highly utilized. The data has to be resident in these systems before it can be shared.
- To identify the best data management strategy, City staff (IT, Dept. Leads, Subject-Matter Experts, etc.) will need to identify all use cases across the enterprise to determine reporting/analytics needs and the best suited approach to data management.
- Consider engaging a third party to perform an assessment of current enterprise systems to assist in identifying opportunities for efficiencies, benefits from new technologies, and current integration/reporting challenges.
- It is recommended that careful analysis of long-term costs for storage, licensing, and staffing be completed to determine the return on investment to implement a data warehouse/data lake solution. Most agencies can meet the vast majority of their reporting needs within modern enterprise application systems that are well implemented and highly utilized.

Benefits

- A well-planned and supported data integration and management program can increase productivity and operational efficiencies through the reduction of data entry and transparency of data
- Optimal data management will provide checks and balances on data governance and quality
- Improve customer service and accessibility to both internal and external consumers of data
- Provide a data source for producing analytics and reports on demand across disparate systems

12. Cloud Computing

Background

Cloud computing can be described as IT services or equipment that are not internal, but available through the Internet. This can range from having a server hosted at a third party, accessing information from a portable device, processing requests from the field, subscribing to an Internet-based software solution per a subscription model (often referred to as "software as a service" or SaaS), and more. The benefits of cloud computing allow individuals to collaborate and remain centralized, regardless of location.

Cloud computing is one of the most prominent discussions among current trends in IT. Significant benefits can be achieved including security, disaster recovery, and cost savings. However, cloud computing options for many systems are still not the most cost-effective or secure approach.

Findings and Observations

- The organization has already used some forms of cloud computing, including:
  - The City utilizes off-site backups and has off-site disaster recovery planning.
  - Versatile Express for electronic document management.
- The City uses Office 365 for electronic mail and OneDrive and Hightail services for cloud-based file services and collaboration.
- The City's Incode System is a SaaS.
- The user of cloud-based systems can increase IT fixed costs.

Recommendations

- The City should continue to consider cloud computing options for future projects.
  - Cost-benefits can be a significant factor for some cloud decisions.
  - Some cloud solutions do not reduce cost.
  - Some cloud solutions have limited functionality when compared to some on-premise, server-based solutions.
  - Moving some existing on-premise, server-based solutions may provide little benefit to the City regarding costs or functionality.

13. Cost Allocation Best Practices

Background

Information technology's role in executing operational best practices is that of an internal support function to all departments and City system users, City constituents, and the public. The departments, users, constituents, and the public are customers of the IT function.

IT cost recovery is the concept of funding the IT function budget from all other departments based upon various metrics utilization and services provided. In this way, many IT costs can be spread equitably among departments. The organization can gain a true understanding of the costs required to support the technology infrastructure and support services in order to make better management decisions.

IT cost recovery could be an excellent way to allocate enterprise-wide application software, Office 365, supporting infrastructure, network, workstations, Internet, cybersecurity, and telecommunications expenses across the organization.

Findings and Observations

- Some IT software costs, including maintenance and support costs, are in departmental budgets, not the IT budget.
- IT infrastructure and equipment replacement spending has historically been less than peer organizations.
- Additional funding is needed to meet the organizational need to create a flexible mobile workforce with current generation tools.
- A simple method to allocate IT costs would allow IT increased flexibility in implementing recommended upgrades to the benefit of all users.

Recommendations

- Consider moving enterprise-wide IT-related costs to an Internal Service Fund (ISF) to allow equitable cost sharing and funding.
    - Utilize the recommended Sustainability Plan recommended to determine long-term technology costs.
- Consider using a methodology such as number of workstations or computing devices per department to allocate ISF costs.
- Review IT expenditures (capital and expense) to determine what costs should be allocated to enterprise funds.

14. IT Project and Services Portfolio

Background

An *IT Support Services Portfolio* is a complete list of IT projects and services provided to City staff and the public. The support services portfolio outlines IT responsibilities for each service and any service-level agreement for those services (e.g., 24/7 support required, disaster recovery priorities, user-access permissions, report writing for certain software modules, server uptime requirements, etc.) Applications support is only one aspect of the complete portfolio. Other IT services include projects, service desk, data network, telephone systems, cybersecurity, etc.

Recommendations

- Create an IT Projects and Services Portfolio to effectively communicate and set expectations for all users regarding what support services IT provides and communicate service-level standards.
- Maintain a five-year project portfolio and budget.
  - Create a separate “small projects” portfolio for non-TMP projects requiring less than 40 or 80 hours of IT work.
- The project portfolio and small project inventory should be reviewed periodically as a part of IT Governance.

Departmental Applications and Systems

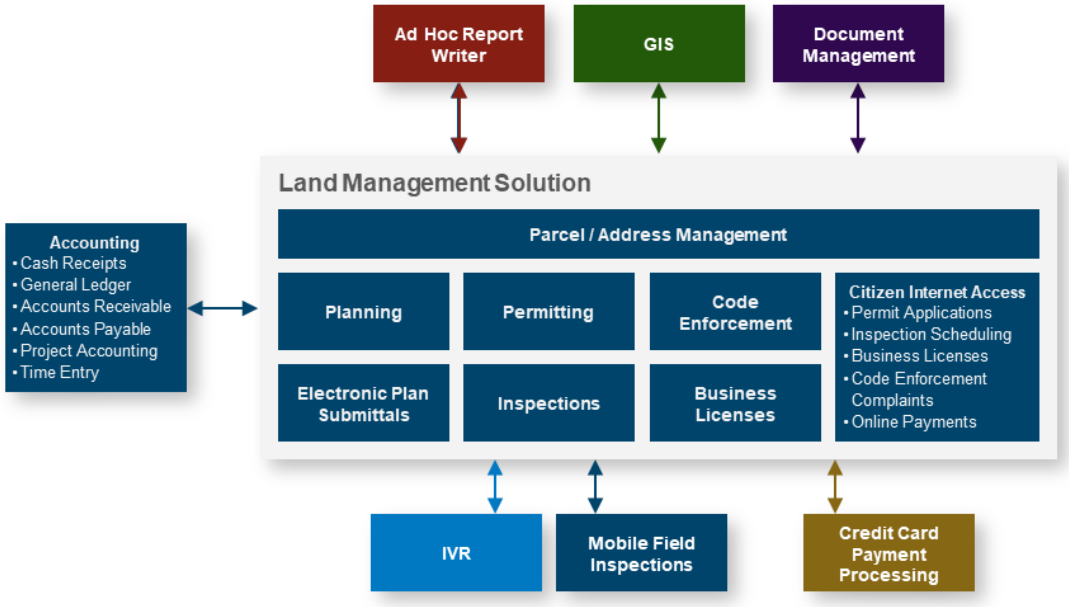
The *Departmental Applications and Systems* category includes IT Initiatives that are primarily department business applications-related and were identified during the assessment process. Many of these initiatives and recommendations can have a significant impact on overall productivity, enhanced communications and information sharing, improved constituent service, improved transparency, and, in some cases, cost savings.

15. New Land Management System (LMS)
16. New Enterprise Asset Management (EAM) System
17. New Marina Management Software
18. Enterprsie Resource Planning (ERP) Improvement
19. ActiveNet Parks & Recreation System Improvements
20. Time and Attendance System
21. Police RMS Improvements
22. Electronic Ticketing and Citation System
23. Electronic Content Management System (ECMS)
24. Project Management and Collaboration
25. Legislative Management System
26. Door / Gate Access Control
27. Learning Management Software

15. New Land Management System (LMS)

Background

A *land management* system manages the creation, issuance, and tracking of community development activities related to planning and zoning, permitting, inspections, licensing, code enforcement, and parcel/address management. The illustration and table in the following pages show typical modules available in land management systems.



Findings and Observations

- The City currently uses custom software, Greenvue, for Zoning, Permitting, Inspections, or Code Enforcement operations provided by CSG Engineering.
- The City uses Greenvue to track plan checks at a high level. Staff indicated that it would like additional functionality to track workflow at a more granular level.
- Code Enforcement activities are tracked in Greenvue (which is managed by Planning) and the Police Department.
- Customers have the ability to pay for permits online. However, the vendor customer support, and status tracking of accounts need improvement.
- The current system lacks integrations with the financial system to reflect payments due for an account, or other billing information to be collected through Incode.
- Police would like the ability for citizens to report abandoned vehicles, which can be automatically routed to the Community Service Officer for action and enforcement.
- Other departments reported a desire to be able to have read-only access to planning and permitting status of projects.
- The City does not have an online public-facing portal to automate the sharing of Department information with the public (e.g., project status, property information, etc.). Modern systems have the ability to automate this functionality.
- Staff would like the ability to automate workflow across different departments and business processes with notifications and alerts for action. Modern systems have the ability to allow for agency-defined workflow that routes plan and permitting review and approval processes from intake through the issuance of a Certificate of Occupancy.

- Modern land management systems have standard features that addresses the functional gaps staff reported in the workshops. Please reference the *Benefits of a Modern Land Management System* below for additional examples of functionality.
- The City should expect significant productivity gains with a fully implemented, integrated, modern land management application solution.

Recommendations

- Given the limitation of the Greenvue application, the City should undertake the process for selecting a new modern land management system.
- Modern land management systems are highly complex. For a future system to achieve the City's functional goals, it is recommended that the City adhere to the principles identified in the *Software Selection Best Practices* initiative. As a part of the selection process, the City should:
  - Conduct a system process review and assessment to identify all functionality requirements, modules needed, and integration requirements (e.g., GIS, online payments, etc.)
  - Review applicable manual processes and shadow systems, such as spreadsheets, to determine automation improvements that will result in labor efficiencies.
- The complexity of implementing this system is on par with other major enterprise solutions. The City should consider the assistance of a third-party consultant with expertise in local government Community Development systems to provide selection and implementation guidance and advisory services.
- It is recommended that the City consolidate all City Code Enforcement activities into a future enterprise system. The City will have the ability to assign user access to any staff across departments who have a need for this functionality.
- It is recommended that the Police Department use a future Code Enforcement module to process abandoned vehicles reporting and activities.

Benefits of a Modern Land Management System

Benefits associated with the utilization of the system include:

General Benefits

- Newer technology platform (processing, capacity advantages)
- Real-time notifications/queues
- Task tracking
- Real-time access to information
- Elimination of duplicate data entry
- Improved data integrity
- Reliable information
- Workflow capabilities
- Reduced operating costs
- Improved internal communication
- Foundation for future improvement
- Improved online information for citizens to access

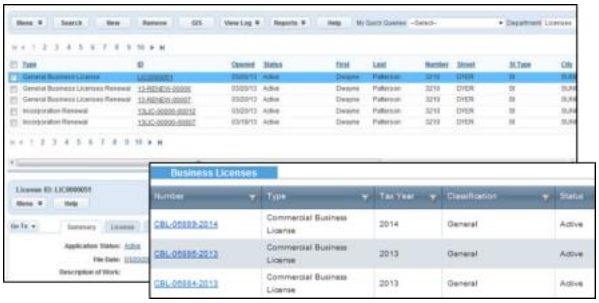
Specific Benefits

- More automated permit processing from application through permit issuance
- Automatic routing for permits requiring reviews and approvals
- Single electronic file for all permit applications and documents
- More automated tracking of reviews, inspections, and fees by permit and development projects
- Tracking of timelines, tasks, and required group reviews
- Viewing of all project and permit information at a glance
- Readily accessible planning and zoning records
- Automatic generation of case documentation
- Centralized current and historical parcel information

Online Citizen Access

Online citizen access enables a more transparent government by providing the public with 24/7 access to real-time information for inquiries and payment processing. This empowers residents to retrieve online information that is pertinent to each individual, and for them to take further actions, which improves customer relations by eliminating the need to be physically present at City Hall. The following are examples of online citizen access transactions:

- Online permit applications
- Submit and access plan review comments
- License renewals
- Permitting, planning, and licensing payments
- Submit code enforcement complaints
- Submit inspection requests
- Access to inspections results
- GIS maps (zoning, districts, etc.)



GIS Integration

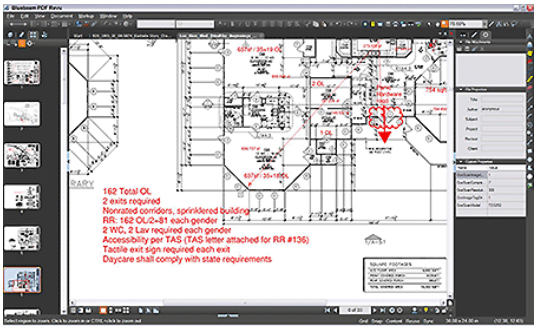
Land management systems offer real-time integration to geographic information systems (GIS) in order to display land-use, zoning, parcel, permit, inspection, and code enforcement activity layers on a map. Benefits of GIS integration to land management systems include:

- Viewing system activity on a map (e.g., active planning projects, permits, code cases, etc.)
- Map routing of daily inspections
- Ability to overlay multiple map layers
- Integration to website for resident inquiries

Electronic Plan Submittals and Reviews

Electronic plan submittals are architectural/developmental plans that are in an electronic format. These plans can be submitted by the public through the City's permitting and planning processes. In addition to the electronic receipt of plans, electronic plan reviews allow City staff to review plans and electronically mark up and track plan comments. The following are benefits associated with electronic plan submittals and reviews:

- Increased productivity through quicker processing
- Elimination of physical plan routing
- Submittal, review, and tracking of electronic plans
- Centralized storage and retrieval of electronic plans
- Concurrent review of plans by multiple staff across multiple departments
- Electronic collection of plan review comments
- Reduced number of and shorter resubmission cycle(s)



Mobile Computing

Mobile computing provides the flexibility to operate a more mobile and productive workforce. A land management system can allow staff to utilize applications while in the field in order to perform their job functions while away from their office. Common benefits of mobile computing include:

- Completion of work while in the field
- Real-time access to information
- Inspection results in the field
- Receipt of notifications and assignments
- Reduced travel to and from office locations
- Map routing based on location of activities
- Retrieval of mapping information
- Management of Code Enforcement cases in the field

Dashboards

Dashboards form part of a user's home page and display reports, key indicators, and other metrics regarding day-to-day operations, activities, and historical trends. Benefits of dashboards include:

- Quick links for immediate access to required tasks and approvals
- Easy modification of dashboards for each user's preference
- Automated generation of dashboard information
- Transformation of data into visual information
- Easy-to-understand graphics
- Real-time analysis
- Drill-down access to activity detail

Reporting

The number one problem that is commonly seen when utilizing disjointed applications is the extensive time users dedicate to the consolidation of information for reporting purposes. Land management systems allow information to be quickly retrieved from a single source with numerous readily available reports. Users are also able to create their own reports without requiring them to be technical experts. This allows staff to spend more time studying analytics rather than manually assembling reports. Benefits of improved reporting include:

- Aggregated data across divisions and departments
- Improved data accuracy and reduced human error
- Intuitive report creation capabilities
- Council-ready reports
- Sharing of created reports
- Elimination of labor-intensive report creation

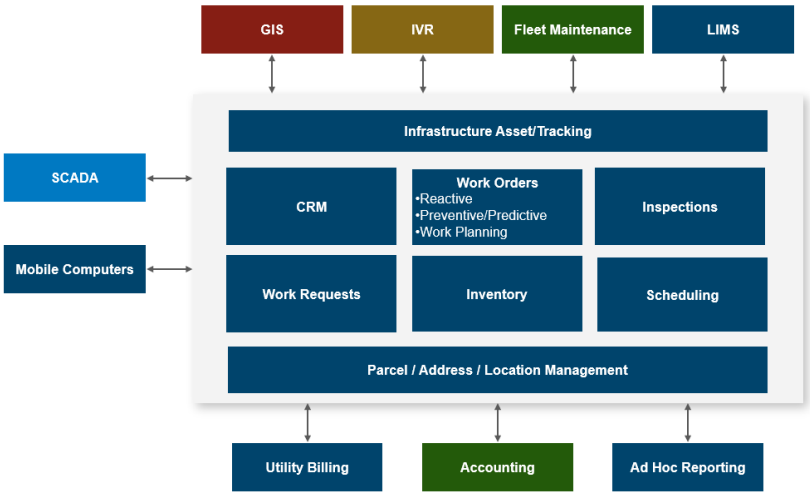
16. New Enterprise Asset Management (EAM) System

Background

An *Enterprise Asset Management* (EAM) system comprises a suite of application modules that manage business processes for work orders, preventative maintenance, and asset management of City infrastructure, facilities, streets, sidewalks, parks, trails, bridges, drainage, culverts, etc. EAM is new terminology, and many people still use older terminology such as "Work Order and Maintenance Management" or "CMMS."

The following list and diagram illustrate typical maintenance and asset management software system functionality. It is not intended to be all-inclusive, but typical software functionality.

- Work Requests
- Inspections and Condition Assessment
- Work Orders
- Preventative and Predictive Maintenance
- Facilities Maintenance
- Asset Tracking
- Warehouse Inventory
- GIS Integration
- Report Writing
- Costing and Budget Forecasts



Findings and Observations

- The City does not have an Enterprise Asset Management (EAM) system for work orders/maintenance management operations.
- Public Works is a primary user of an EAM system.
- Currently, Public Works uses various applications that typically reside within a single modern EAM system. The applications include:
  - Accela GoRequest – Citizens and staff service requests
  - Mobile MMS – Time tracking, asset inventories, daily COVID checks, facility checks
- Reporting is a challenge due to information residing in different systems.
- The process for storing, accessing, and managing permanent records resides in different systems. An EAM system will help the City consolidate its work order activities into a single system, which will help facilitate data sharing and reporting.
- Staff expressed interest in implementing a true EAM system that includes the following functionality:
  - Tracking of
    - Labor materials
    - Equipment
    - Meter service
    - Valve exercising
    - Sewer assets and associated work
    - Booster pump controls
    - Tank maintenance
    - Service requests

- Inventory
- Hydrant maintenance
- Auto repair history
- Equipment calibration history
- Police assets and equipment

- Integration to GIS with tagging of assets
- Integration with Mobile MMS.
- Improved collection and reporting of data
- Create irrigation maps to track and locate assets.

Recommendations

- It is recommended that the City undertake the process for acquiring an Enterprise Asset Management system (EAM). The process should follow the industry *Software Selection Best Practices* initiative, including:
  - Conduct a process review and needs assessment to:
    - Review applicable manual processes and shadow systems, such as spreadsheets, to determine automation improvements that will result in labor efficiencies
    - Identify and document the City's required capabilities in a feature/function format
    - Identify reporting, integrations, and data conversion needs
- EAM implementations are complex undertakings, and on an organization-wide basis are commonly under-scoped and underfunded, leaving organizations with limited utilization and intended benefits.

Benefits of Modern EAM Software

This section provides additional information about the benefits of EAM.

An *enterprise asset management (*EAM*)* system provides automation in managing the maintenance and day-to-day operations related to infrastructure assets, buildings, facilities, and often, fleet vehicles, while capturing and reporting on the labor, equipment usage, and materials costs associated with a work order and preventative maintenance. A work order/management system allows collaboration and sharing of information between divisions, departments, and citizens to provide a transparent and efficient government operation.

General Benefits

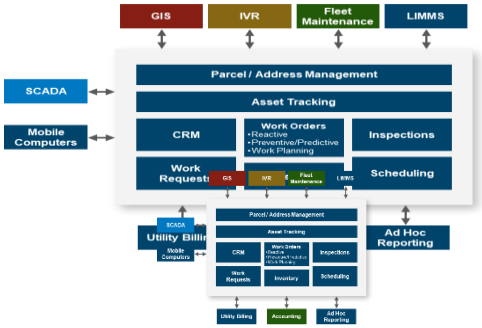
- Newer technology platform (processing, capacity advantages)
- Real-time notifications/queues
- Task tracking
- Real-time access to information
- Elimination of duplicate data entry
- Improved data integrity
- Access to reliable information
- Workflow capabilities
- Reduced operating costs
- Improved internal communication
- Foundation for future improvement

Detailed Benefits

- Electronic routing of citizen requests
- Centralized task and maintenance management
- Completion of work orders from the field
- Retrieval of historical work order and cost information
- Quicker work order completion times
- Improved decision-making through access to real-time information
- Viewing of asset and activity trends visually through GIS mapping capabilities
- Better replacement planning and forecasting
- Enhancement of staff productivity
- Improved regulatory compliance
- Improved safety and risk management

Reporting

The number one problem commonly seen when utilizing disjointed applications is the extensive time users dedicate to the consolidation of information for reporting purposes. Work order systems allow information to be quickly retrieved from a single source with numerous readily available reports. Users are also able to create their own reports without requiring them to be technical experts. This allows staff to spend more time studying analytics rather than manually assembling reports. Benefits of improved reporting include:



- Aggregated data across divisions, departments, and organization
- Improved data accuracy and reduced human error
- Intuitive report creation capabilities
- Council-ready reports
- Sharing of created reports
- Elimination of labor-intensive report creation

Mobile Computing

Mobile computing provides the flexibility to operate a more mobile and productive workforce. A work order system can allow staff to utilize applications while in the field in order to perform their job functions while away from their office. Common benefits of mobile computing include:

- Completion of work while in the field
- Real-time access to information
- Inspection results in the field
- Receipt of notifications and job assignments
- Reduced travel to and from office locations
- Map routing based on location of activities
- Retrieval of mapping information

Inventory Warehouse/Stores Management

Material management is often a costly endeavor within an organization. An efficiently run and well-organized warehouse—where inventory levels are monitored, material is available, and reordering is easy—is the best method of controlling costs.

Most EAM vendors have an add-on software module that is designed to track warehouse transactions in a secure environment. This type of system tracks incoming and outgoing materials from multiple storage areas, including work vehicle inventory. It also manages stock, material cost, suppliers, and, if needed, requisitions.

This inventory add-on capability often supports the following:

- Cycle counts
- Barcode technology
- LIFO/FIFO and weighted-average cost types

Most systems also have search capabilities that retrieve transaction records, materials, amounts, and other information.

Online Citizen Access

Online citizen access enables a more transparent government by providing the public with 24/7 access to real-time information for inquiries and payment processing. This empowers residents to retrieve online information that is pertinent to each individual, and to take further actions, which improves customer relations by eliminating the need to be physically present at City Hall. The following are examples of online citizen access transactions:

- Submittal of citizen requests
- Electronic routing requests to staff
- Citizen request inquiries
- GIS maps (zoning, voting precincts, etc.)

Citizen Request Management

A *citizen request management* system is used to track, manage, and resolve citizen concerns and requests in a timely manner by automatically routing citizen requests to the appropriate department. It also provides the citizen with the flexibility to submit and track their complaints through the Web or a mobile phone application. Common benefits of a citizen request management system include:

- Ability for citizens to submit requests 24/7 through a phone application or the website
- Automatic assignment and routing of requests, by type, to appropriate department(s) or staff
- Ability for citizens to view current request status
- Conversion of requests to work orders
- Ability to include photos and geolocation of a request
- More effective and efficient processes
- Improved transparency and citizen relationships

GIS Integration

Work order and maintenance management systems offer real-time integration to geographic information systems (GIS) in order to display land-use, zoning, and infrastructure layers on a map, and work order activity that resides within the system. Benefits of GIS integration include:

- Viewing system activity on a map (e.g., zoning, infrastructure assets, etc.)
- Map routing of work orders, service requests, and daily inspections
- Displaying locations of infrastructure assets
- Generating asset condition analysis
- Ability to overlay multiple map layers
- Integration to website for resident inquiries

17. New Marina Management Software

Background

Marina management software is used in the private sector by boat dealers, marina management companies, and boatyards to manage their or their customers' boats, rentals, repairs, and maintenance. Marina management software can manage and optimize dock utilization and manage assets.

Common features of Marina Management software include the ability to:

- Track the inventory of boats, spare parts, and equipment required for maintenance
- Manage short- and long-term rentals
- Manage permits and licenses
- Create and manage contracts for various types of services
- Monitor arrivals and departure of boats
- Manage resident and visitor processing and access control
- Provide billing and accounting features or integrate with other cashiering solutions
- Report on occupancy, boat traffic, slip rental, etc.
- Integrate with gate/door access software systems to control user access to slips and facility

Example vendors to consider in this marketspace may include:

- Nautical Software Solution
- DockMaster
- DockWa
- Scribble Software
- Total Marina Package

Findings and Observations

- The City operates a marina facility that can accommodate 580 boats.
- The Department currently uses the Nautical Software Solution to manage its marina operations.
- Nautical Software Solution does not integrate with the financial system.
- Staff identified the following pain points with the current software:
  - The software is over 20 years old
  - Not able to easily track slip owner names with multiple FOBs within the ALX software
  - Lacks credit card processing capability
  - No online payment options
  - Vendor support could be better
  - Need ability to email invoices and receipts
  - Credit card processing is time consuming and requires significant data extraction and manipulation
- True Read program for electrical monitoring is not reliable. It requires significant data manipulation, and is no longer supported by any vendors for parts or software.

Recommendations

- Although marina software solutions are not as complex as full enterprise resource software, the City should take care to follow software selection best practices that are identified in the *Software Selection Best Practices* initiative. The process should include:
  - Conducting a needs assessment and process review and document business and systems needs (e.g., credit card payment and/or online payments)
  - Conduct comprehensive product demonstration with vendors
- Consider reaching out to Nautical Solution to determine if it has a more current software version which may close existing functional gaps.

18. Enterprsie Resource Planning (ERP) Improvement

Background

Enterprise resource planning (ERP) is an organization-wide software solution that allows integration among various departments and their respective functions. The result is a centralized system of communication, data storage, and operations management. Common ERP applications modules for in the local government mid-market agency include Accounting, Financial Reporting, Payroll, or Human Resources.

Findings and Observations

- The City uses Tyler Incode version 10 Enterprise Resource Planning (ERP) software as a service (SaaS) for both finance and utility billing.
- The system went live in 2016.
- Incode is used by many smaller mid-sized local government agencies throughout the country.
- The City has not fully implemented all licensed modules.
- Finance would like to push the system to non-finance users.
- Budget module has functional gaps, which include:
  - Non- Finance Department end users reported that they cannot do a budget check in real-time in the system
  - Non- Finance Department end users reported that they have to contact finance to obtain a budget report
  - Parks need ability for budget tracking and generating up to date budget reports for its program areas and specific projects accounts (e.g., department expense tracker)
  - Lack of automation and workflow for budget preparation
- Accounts payable is live and works well with some gaps, which include:
  - Finance would like ability to automate AP more fully with electronic workflow submittals and approvals. Currently, it uses Nvoicepay for limited automation
  - Would like the ability to scan invoice and auto-capture data without manual entry
- Other system improvements may include:
  - Departments would like ability to generate a detailed department-specific financial reports in near real-time.
  - Need to automate system to allow for adding a training event / course detail. Currently, staff has to manually go into each individual employee profile, training tab, add the event details, save and do it again for the next employee.
  - The system is unable to process public safety time and attendance and scheduling due to complex business rules.
  - Requisition process is not standardized across City.
  - Purchase order threshold is configured, but is not consistently used. Additionally, use for cross-departmental project is limited.
  - The City would like ability to convert MOM legacy financial system into Incode.
  - Projects and Grants Accounting module is licensed but not widely used.
  - City cannot tie/associate a project to a fixed asset.

Recommendations

- The City should conduct business process reviews and needs assessment(s) to determine and inventory functional gaps, in detail.
  - Review applicable manual processes and shadow systems, such as spreadsheets, paper, and other databases, to determine automation improvements that will eliminate or reduce these shadow systems and result in labor efficiencies. Any requirements that the vendor is not capable of providing can then be dealt with by other means, such as more efficient workarounds, third-party applications, modifications, change in organizational processes and procedures, etc.
  - This process should also be used to inventory all required reports, as well as integration/interface requirements between other applications, such as credit card processing, GIS, Parks and Recreation, and future systems such as Enterprise Asset Management and Land Management systems.
- Develop an improvement plan to close these gaps, which should include:
  - Modules that are licensed but not implemented
  - Additional modules that may need to be licensed
- Work with Incode to determine implementation plan and vendor training by module.
- Quantify vendor costs and hours need for implementation and training by module.
- Follow the guidelines in the *Applications Management Best Practices* initiative to increase the probability for implementation success. Primarily, a best practices approach to implementation of enterprise systems should include end users in the setup and configuration of the system to enable all necessary business processes are implemented.

Benefits

- Improved streamlined processes
- Improved operational consistency, efficiency, and accuracy
- Improved online access to information
- Improved financial reporting
- Elimination of information silos
- Better identification of integration requirements
- Improved utilization and realization of ERP investment

19. ActiveNet Parks & Recreation System Improvements

Background

Many Parks & Recreation software systems offer individual software modules that may include:

- Membership Management
- Activity Registrations
- Facility Scheduling
- League Management
- Swim Team Management
- Point-of-Sale
- Equipment and Locker Rental
- Fundraising and Donation Management
- Child Care Management
- Marketing
- Website Content Management
- Reporting
- Online Customer Access
  - Registration Software
  - Facility Scheduling Software
  - Equipment and Locker Rentals
  - Customer Relationship Management

Findings and Observations

- The City currently uses ActiveNet.
- ActiveNet is not integrated with the City's Incode Financial System
- Payments are manually entered into Incode via the cashiering system
- Staff reports that vendor support is insufficient.
- Customized system enhancement are not working, and getting vendor to fix enhancement issues is a challenge.
- The systems FlexReg feature is not working smoothly.
- Other challenges include:
  - No electronic facilities reservations capability
  - No electronic class drop-in reservation capability
  - Does not have ability to manage senior meal program participant list
  - System is not able to distinguish registrant by zip code
  - Public portal is a concern

Recommendations

- Conduct an assessment of all unmet needs to identify additional functionality requirements, additional modules needed, vendor support gaps, and user training that is needed.
- Identify manual processes and shadow systems, such as spreadsheets, to determine automation improvements that will result in labor efficiencies
- Work with the vendor to develop a customized project improvement plan.
- If the current vendor is unable to make identified system improvements, the City should consider replacing the current system with a new system.
- Should the City decide to move in a different direction, it should follow the principles described in the initiative for *Software Selection Best Practices* to develop an RFP.
- The City should ensure that the current or new system should integrate with its GIS system to allow it to locate assets (e.g., buildings, playgrounds, etc.) on a map or to allow a system to use the parcel and address feature to determine registrant zip codes, etc.
- The City should ensure that improvements to ActiveNet, or a replacement system should integrate with Incode to allow for the automation of payment processing.

Benefits

- Improved training
- Improved software application utilization
- Improved reporting, resulting in better management decision-making
- Improved customer access to information via a customer facing web portal

20. Time and Attendance System

Background

The tracking, recording, and storing of employee time and attendance information is a significant undertaking. A manual system with repeated entry and review steps often leads to inaccurate reporting, payroll discrepancies, and lost data. Automated time management systems can provide:

- Single-occurrence data entry, with integration to time clock equipment as needed
- Standardized employment rules and implementation
- Centralized database for electronic review of records
- Consistent enforcement of vacation and sick policies, FLSA requirements, and union rules
- Web- and server-based options
- Integration with other functions, such as accounting and/or payroll
- Automated calculations and accruals based on user parameters

Such systems:

- Reduce duplicate efforts, thereby saving valuable time and resources
- Decrease inaccuracies and human error
- Improve management of vacations, sick leave, and other absences

Findings and Observations

- The agency currently uses Tyler Incode ESS centralized time and attendance system.
- Police and Fire are not able to use the Incode timesheets.
- Fire is not able to automate timesheet workflow in Incode.
- Fire does not have the ability to automate shift, overtime, or vacation bidding.
- Approval processes in Incode do not meet the City's need for flexibility or for designating specific hierarchy of approvers by department.

Return-on-Investment (ROI) Consideration

In a software selection study conducted by Nucleus Research, an organization that transitioned to an automated time-entry system saw a return on investment within six months and an overall return of 225% of their initial investment.[1]

Recommendations

- Conduct a comprehensive process review, and develop feature/function requirements for all time keeping, attendance, and accrual tracking needs across all City Departments.
- Reach out to Tyler Incode and discuss the City's needs from the feature/function requirements to determine if the gaps can be closed.
- Public safety time and attendance requirements are often more complicated than that of the City's other departments. The City should consider procuring a new system that is specific to Public Safety for Fire and Police (Please *see Public Safety Scheduling System* initiative for details).

[1] "ROI Case Study: Kronos Workforce Timekeeper Anonymous Healthcare Organization", Nucleus Research

Benefits

- Consistent and standardized organization-wide timesheet system
- Reduced manual processes
- Increased processing volume
- Reduced data entry errors
- Reduced payroll processing time (from improved processes, policies, and practices)
- Single automated interface to ERP system

21. Police RMS Improvements

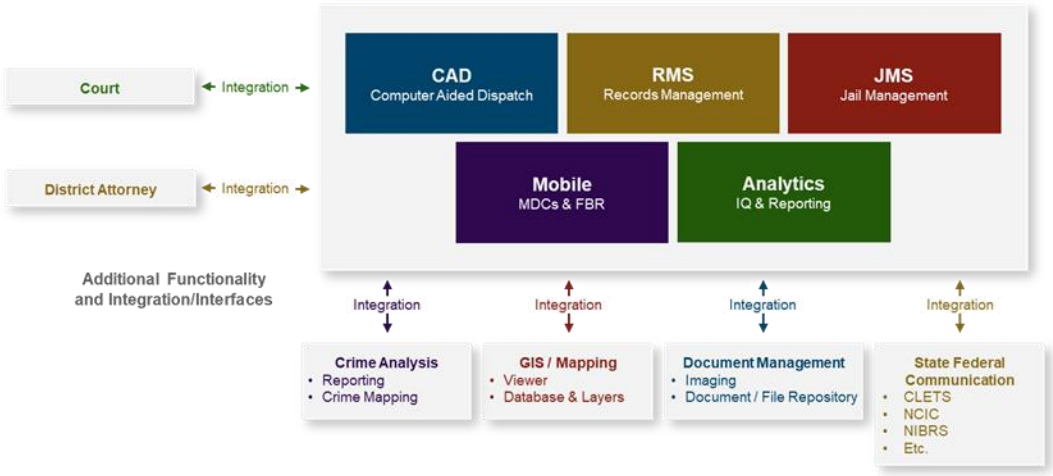
Background

Integrated *computer-aided dispatch* (CAD) and *records management systems* (RMS) enable public safety and law enforcement to centralize public safety incident information, preserve data integrity, and enhance operational efficiency. Personnel within the department use this integrated environment to quickly capture, record, update, share, and access critical incident and public safety data.

Common functionality of CAD/RMS systems include:

- Computer-Aided Dispatch with GPS and Route Management
- Records Management
- Mobile Data Computing
- Field Reporting
- Property/Evidence with Bar Coding
- Personnel/Training
- Crime Analysis
- Investigations
- Intelligence/Suspect Tracking
- Mapping

The following is a high-level view of the primary or "core" operational or application area and integration points.



Findings and Observations

- Police uses Sun Ridge Systems RIMS.
- Police do not currently have the use of a vehicle log to track maintenance and repairs. The Department would like to have that ability to have use of a system that would automate this process.
- Police do not have the ability to track officer training for non-state mandated training.
- Unable to generate court reports showing officer training.
- The public is not able to make online property crime reports.
- The public is not able to make online reporting of abandoned vehicles.

Recommendations

- The City should improve the current system to eliminate functional gaps that were discussed in the workshops and described here.
- The City should take an inventory of all systems functional gaps. Once identified, the City should reach out to the vendor and obtain a cost quote for improving the system as identified by the inventory.
- RMS systems are complex and do not lend themselves to user-guided and on-the-job training. The City should consider purchasing additional end-user training with the vendor to allow staff to fully utilize the features of the system.
- The one-time training should be augmented with periodic or annual systems training that are described in the *User Training and Support* initiative.

22. Electronic Ticketing and Citation System

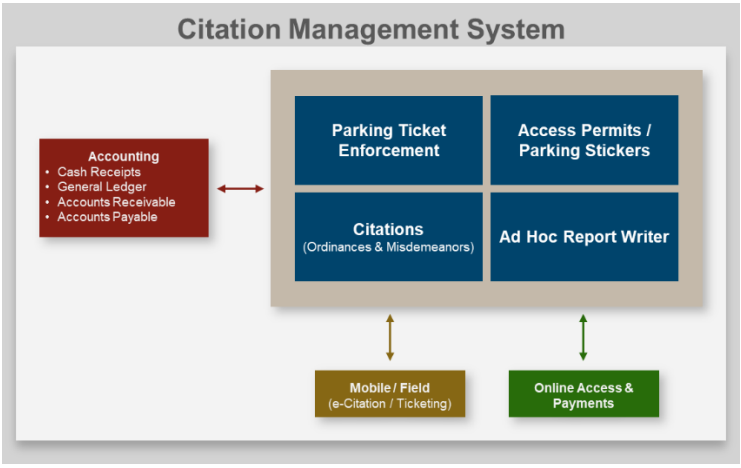
Background

Electronic citation (eCitation) technology represents a continuing transformation in public safety technology. Transitioning from traditional handwritten citations into digital documents, that can be quickly populated and accurately issued, has significantly helped enhance the effectiveness and safety of law enforcement officers in the field. Citation systems offer agencies the ability to issue tickets and citations electronically.

Citation management systems provide the following capabilities:

- **Citations** – This capability provides the ability to track citations (moving violation or others) from issuance to determination. The systems provide the ability to set classes and fine structures. Violation and history are also maintained for quick inquiry, along with people, addresses, and related subjects.
- **Parking Tickets** – If needed, many systems provide a parking tickets component that streamlines the administrative adjudication process for parking and equipment violations. There is also the ability to track late payments and assess late fees.
- **Access Permits and Parking Stickers** – Some systems provide the ability to sell, manage, and enforce tags or stickers for parking or other services that can deliver a stream of revenue for the organization. Some organizations have used this capability to issue annual passes for unlimited visits to parks or other facilities or programs.
- **Mobile or Field Capabilities** – This includes the ability to issue citations in the field with the connection to a small portable printer. Vendors typically support a variety of handheld devices, including handheld computers, laptops, and tablets. Many also integrate license plate recognition technology.
- **Reporting** – These systems support reporting, including a number of standard reports that can be picked from a list and run as needed. They also include ad hoc reporting capabilities, so specific reports can be created, as needed.
- **Online Services and Payments** – Most systems provide the additional capability for public access to their citations and tickets and to pay for any associated fines online using credit cards.

The diagram below illustrates a typical citation management system.



Example vendors in the marketplace for these systems may include:

- CrimeStar – Citation
- L-Tron – eCitation
- MSA – Ecitation
- Saltus Technologies - digiTICKETS
- Tyler - Brazos

Findings and Observations

- The City Police Department's citation process is manual.
- The City's Sunridge RIMS system does not have a citation management functionality.
- The City uses TurboData Systems to management payment collection and processing for parking citations with the Courts.
- TurboData systems is primarily a parking citation management system.
- A future citation management system may need to integrate with TurboData.
- The City also uses Data Ticket as a database to track outstanding citations.

Recommendations

- Consider initiating a review and assessment of features and functions requirements, and document the results with the aim of consolidating ticketing and citation program into a single software solution that also includes online payment processing.
- Apply results of the assessment to research options and solicit quotes from vendors.
- The City is currently using Tyler Incode; it may consider exploring cost and technology advantages of using an eCitation system with the same vendor.
- If a third-party system is the only alternative, then ensure there is integration built between the selected system and the City's CAD/RMS and ERP systems.
- Adhere to the principles identified in the Software Selection Best Practices initiative.

23. Electronic Content Management System (ECMS)

Background

Electronic content management systems (ECMS), also sometimes referred to as *electronic document management systems* (EDMS), is a software system for organizing and storing different kinds of electronic documents. In addition to document scanning, storage, and records retention management, modern systems have additional functionality, which include:

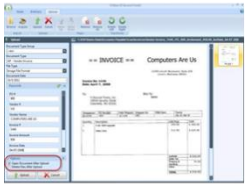
- Enterprise records management, including retention management
- Integrated document and process workflow management, including internal request management, routing, and distribution (Accounts Payable, Accounts Receivable, HR, Project Tracking, etc.)
- Forms management (Web and internal based)
- Project and process collaboration
- Web publication or posting for all above items, if desired

Example ECMS systems in the local government marketplace include, but are not limited to:

- Laserfiche
- Hyland's OnBase
- Granicus

Findings and Observations

- The City does not have a true citywide ECMS.
- Documents and content are scattered across systems. A sample of those systems include:
  - FileMaker Pro
  - Versatile Express
  - Incode
  - ActiveNet
  - GIS
  - Mobile MMS
  - GoRequest
  - Municode
  - Dropbox
  - Iron Mountain



- Contracts management is manually stored. There is also no automated process for alerting the city to milestones and expirations.
- Staff is not able to easily understand document versioning (e.g., draft v. final).
- End users would like the ability for electronic search for City resolutions, ordinances, or minutes.
- Staff expressed a desire for a more systematic structure for naming and structuring records and information.

Common benefits of organization wide ECMS solutions include:

- **Compliance** – Improved and more efficient abilities to comply with increasing volume and complexity of regulations and retention requirements
- **Security** – Improved physical abilities and accessibility to security

- **Workflow Capabilities** – Electronic capture, routing, and approvals of manual paper processes
- **Improved Efficiency** – Increased productivity through automation of manual processes and time reduction in retrieving and sharing information
- **Reduced Costs** – Reduced costs of printing, paper, storage space, and labor
- **Reduced Carbon Footprint** – Minimized paper waste
- **Improved Transparency** – Increased accessibility to information via the Web, including full automation of some types of documents immediately upon creation without additional processing or labor
- **Disaster Recovery** – Protection of vital records through storage redundancy
- **Digitization** – Ability to digitize often accessed paper documents to reduce the time required to retrieve these documents from physical files

Return-on-Investment (ROI) Considerations

- A study conducted by Coopers and Lybrand found the following:
  - The average document gets copied 19 times in its life.
  - 90% of documents that are handled in an office are merely passed along or shuffled through.
  - The costs to manage a single document: $20 to file a document, $120 to find a misplaced document, $220 to replace a lost document
  - 7.5% of all documents get lost.
    - An office that generates 200 documents a week will lose 15 of them, costing a total of $3,300.
  - 3% of all documents are misfiled.
    - An office generating 200 documents a week will misfile six of them, costing the company $720.
- A feasibility study by the North Dakota Information Technology Department regarding ECMS technology found the following:
  - An organization that scans 600 documents per day can have the following benefits from implementing an ECMS:
    - An ROI payback period of 15 months
    - Gained productivity of almost $114,375
    - Subsequent annual savings of $110,295
    - An overall three-year benefit impact of $531,990
    - Saved $36,556 in annual costs when compared to manually storing and managing documents
- A study conducted by Prescient Digital Media found that an ECMS saves employees between 50-60% of time searching for documents.

Recommendations

- Many ECMS systems are implemented by third-party vendors. Many resell vendors do not have local government industry experience. ClientFirst recommends searching for vendors that have specific local government industry expertise.
- Conduct a needs assessment and process review with all departments as a first step to gain an understanding of how the ECMS system should work across the entire City.
    - Consider what functionality, configurations, and training would improve the staff members' ability to effectively utilize an ECMS system, provide more transparency, and integrate other departmental applications and business processes.
- Follow the principles described in the initiative for *Software Selection Best Practices* to develop an RFP.
- ECMS implementations on an organization-wide basis are commonly under-scoped and underfunded, leaving organizations with limited benefits. The selection process should include a full assessment of potential costs and resources required in order to properly prioritize implementation efforts that will occur over multiple years.
- Integration with other core enterprise application systems across the City should be strongly considered.
- Conversion of paper documents from all document retention sources, including those located in shared network drives.
- Implementation of an ECMS system offers an ability for the City to digitize important and often accessed paper documents. If the digitization is included as part of the overall ECMS acquisition, vendors will often provide resources at a more affordable rate for performing this service.
- Some Enterprise Resource Planning vendors offer their own native ECMS solution. As the City researches its options, it should consider the cost advantages for native or non-native ECMS options.

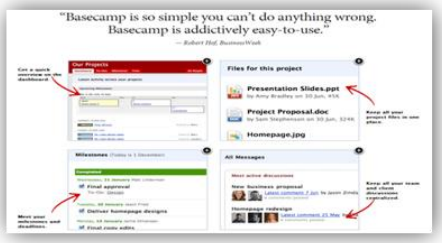
Benefits

- Automated workflow and routing
- Reduction in paperwork and related costs
- Online document retention and archiving
- Improved version and authorization control
- Improved public records access
- Increased information-sharing and collaboration capabilities
- Ability to provide Web posting and public access to customers and the public
- Integration with Agenda Management and Media Management

24. Project Management and Collaboration

Background

Project collaboration and management software can provide effective, flexible, and secure ways for planning and sharing information, including storing, routing, and managing documents, maintaining task lists, managing forms, and creating and managing workflows. The following are benefits of project tracking and collaboration software:



- Internal and external project teams will have a central repository of information related to each project.
- Project documentation is stored centrally to the project (e.g., contracts, purchase orders, reports, interviews, findings, procedures, data, etc.)
- Documents, final and interim reports, procedural documents, and collected project data are adequately tracked to projects.
- Data is not duplicated due to distribution methods and management.
- Teams are provided with an electronic distribution point for information regarding a project.
- Project collaboration tools provide the ability to share information through multiple types of communication and media, such as:
  - Task creation, tracking, and assignment
  - Calendaring
  - Gantt charts
  - Contacts
  - Alerts
  - Document sharing libraries (versioning, check-in/out)
  - Workflow
  - Search
  - MS Office integration
  - Mobile access for smart phones
  - Project sites
  - Website content management
  - Discussion forums
  - Photo galleries
  - Metadata management

Several vendor-hosted project tracking and collaboration solutions are available that will support collaboration with both internal and external groups of users. Sample project tracking and collaboration solutions include:

- Basecamp
- Monday.com
- Teambox (Redbooth)
- Zoho
- Wrike
- Smartsheet
- Microsoft Teams

Findings and Observations

- The City lacks a common solution for managing and tracking projects (special or routine) that allows the department to share and collaborate with its internal and external customers.
- City staff are using various tools at their disposal and on an ad-hoc basis.
- Public Works would like specialized software for project planning, collaboration, and management
- In the COVID-19 environment, organizations are increasingly relying on remote work enabling software to conduct City business processes.

Recommendations

- Use the Technology Governance Committee structure and process to review project management, tracking and collaboration solutions, as well as their overall capabilities, so the organization can identify a single solution to meet this need.
- Conduct an assessment that documents feature/function requirements and needed capabilities.
- Although this type of software may not have the complexity of major enterprise systems, the City may benefit from following the principles of the *Software Selection Best Practices* initiative, in order to identify and implement a solution that can be utilized by most departments. End-user and continuing training should be adopted and follow the guidelines in the *User Training and Support* initiative.

25. Legislative Management System

Background

Legislative/Council management systems (L/CMS) allow an agency to centralize, automate, and manage the entire process for legislative/council meeting management. It provides for the capability to manage and track resolutions, ordinances, ordinance numbers, roll call voting, dates, and related actions. It is capable of capturing meeting activities in real-time and to archive activities to enable inquiry and reporting. The system allows for access to information for all departments and users involved in Council meeting management process. In a manual environment, this legislative information, such as ordinances, is often entered numerous times. When automated, it only needs to be entered a single time. Modern systems are offered as a standalone module, as modules in a suite of applications from a single vendor, or part of an *Enterprise Content Management System* (ECMS).

In many instances, the legislative management systems can be integrated with media management systems to stream and record video and audio information, time stamp it, and tie it to the correlating meeting agenda or activity during a meeting. The system has the ability to push/publish agendas, minutes, and media recordings to the Agency's website.

Typical Meeting management capability includes:

- Automates the drafting of minutes based off the meeting agenda
- Provides for PC, laptop, or tablet-based access to meeting materials
  - Prior to Board meeting for prep and review
  - During meetings to engage and follow the meeting process
- PC, laptop, or tablet-based voting

Findings and Observations

- Staff expressed a desire for electronic minute taking for Commission meetings that minimizes the use of paper.
- The City Clerk uses MS Word to record minutes.
- Staff and public records requests for resolutions, packets (archived), deeds, agreements, minutes, etc. are processed manually. The Clerk and others would like a system that allows for easy searching and tracking of legislative materials.
- Modern systems allow meetings to be livestreamed with video/audio recordings and can be integrated with Meeting Media Management systems.

Recommendations

- Conduct a needs assessment and process review, and document needs, including the development of detailed feature/function requirements.
- Issue RFP to solicit proposals from vendors in this marketplace.
- Use the feature/functions to analyze and compare system options available in the marketplace.
- Follow best practices per the *Software Selection Best Practices* initiative to select an appropriate system.

- It can be advantageous to coordinate the purchase and selection of a legislative management system with the selection of a new ECMS system because:
  - Some ECMS system provide this capability as part of their suite of applications.
  - The timing of the acquisition ensures the desired features are integrated with the ECMS system.
  - There may be cost advantages to a single consolidated system.
  - It reduces the need for IT support for fewer disparate application systems.

Benefits

- **Reporting and Metrics** – Use system reporting and metrics to monitor the public engagement level, mobile usage, page visits, etc.
- **Event Management** – Schedule events to broadcast live or record from any video source (camera, cable TV, tape).
- **Archive and Publish** – Archived files automatically transfer to internal and external storage and can be automatically published to the organization's website.
- **Streaming** – Leverage a media server for public streaming.
- **Integration with Agendas and Minutes** – Import agendas and synchronize indexed videos during meetings and, afterward, produce a public record on the website with the agenda linked to the video.
- **Anywhere and Anytime Access** – The public and staff can watch live streaming broadcasts or play archived videos through the website. Viewers can jump to desired topics through index points to review only the information or agenda items that are important to them.
- **Public Searching** – Public can find what they want through a searchable public record on the website. All meeting audio, video, minutes, and agendas can be integrated.
- **Notifications** – The public can subscribe to the agenda, or to a particular search, to receive notifications when new content is available.

26. Door / Gate Access Control

Background

Door Access Control, sometimes referred to as keyless entry, is an effective way for the City to manage security and control access to various buildings, facilities (e.g., Marina), and secure spaces. The system limits security risks and allows for the management of access by employees, customers, and the public. Many municipalities are moving to a single, organization-wide system to manage security and access to facilities. Some systems in the marketplace allow for integration with video security systems to allow the City to associate keyless entry devices with video or photographic imagery to ensure users comply with contractual or rental agreements.

Findings and Observations

- Public Works manages a marina facility.
- Access to the marina is via a gate that is restricted by a gate access control unit.
- Staff and customers use a keyless entry FOB (frequency operated button).
- The current FOB system has limitations that does not allow staff to easily track and report on gate information by assigned users.
- The City reports that the current system is obsolete, and the original vendor that installed the system is no longer in business.
- The City would like that ability to report on data that allows it to ensure that renter uses of assigned slips conforms with the City's terms and conditions with the user/renter.
- The current system does not allow for the ability to search gate access by FOB number and/or tenant name with multiple FOBs to see how many times an FOB has entered a gate and by how many days in a row (integrating all fobs/one owner).
- Staff reported that it is not able to easily track slip owner names with multiple FOBs within the ALX software

Recommendations

- Complete a review and needs assessment of the City's facility access and control requirements for external and internal doors and access points.
- Consider a single citywide system, which can integrate with video security systems.
- Access should also allow extending to constituents and others, as appropriate.

Benefits

- Improved maintenance and less time
- Mechanical locks and keys replaced with electronic locks, badges, or cards and readers.
- Eliminated expense of re-keying or changing locks for employee separations
- Employees and others are less likely to set off false alarms
- Automatic regulation of access reduces need for on-site security personnel
- Allows for more efficient temporary access by outside personnel, like visitors or vendors
- Decreases liability and risk from greater access control

27. Learning Management Software

Background

Learning-management software helps organize, manage, and track employee completion of online courses throughout an organization. Courses can be tailored by department roles, individual staff, or specific ongoing certifications. Common functionality available from learning-management software includes:

- Creation of customized courses
- Interactive content (e.g., exams, quizzes, videos, etc.)
- Automated reminders of courses to complete or finish
- Tracking of course progress, completion, and results
- Printable certificates of completion
- Recurring certification and training requirements
- Real-time analytics and reporting

Findings and Observations

- Stand-alone, third-party learning-management and tracking software is available in the marketplace.
- Police do not have access to software to track police officer training that is not mandated by the state.
- The City is not using the Incode HR module. Modern ERP systems with a Human Resources Module have the ability to track employee training.
- The City lacks an automated system for adding a training event / course detail. It is done manually.
- The City does not have a centralized calendar system to show the schedule for training classes.

Recommendations

- Conduct a needs assessment and process review, and document needs.
  - Needs assessment should include any departments that can benefit from learning-management software and online training content creation

- If necessary, apply the needs and feature/function requirements from the process review to solicit proposals for learning-management software vendors
- Follow best practices per the *Software Selection Best Practices* initiative to select the appropriate software
- City staff reported significant software training needs. The procurement of a learning management software should conform with the guidelines of the *User Training and Support* initiative.
- Current and future needs can be evaluated and prioritized through a combination of mechanisms, including the Technology Steering Committee.

Smart Technologies

Smart Technologies is the concept of using new technologies in combination with creativity, information sharing, and the collaborative process to better serve and interact with the public.

28. Website Improvements
29. Online Civic Transparency (Government Transparency)
30. GIS Plan and Improvements
31. GIS Staffing
32. Mass Outbound Communication
33. Intranet
34. Smart Water Meter Solution

28. Website Improvements

Background

Municipal websites have become informational portals for citizens to quickly access information and conduct transactions without having to call City staff or go to City Hall. Additionally, interactive functionality and transactions can be made available 24/7.

Findings and Observations

- The City uses Municode for its website hosting and management.
- Staff expressed the desire for more end-user training.
- Some departments expressed the desire for:
  - Better search capabilities
  - Intranet functionality
  - Easier navigation for users
  - Integration with other City systems
  - More control over editing and content management, including the ability for the creation of online editable forms for program enrollments/applications

Recommendations

- Conduct an assessment of website improvements desired by each department.
- Consider applying design elements that will improve overall website navigation.
- Identify user training requirements by specific users responsible for website content.
  - Assimilate the training needs with *User Training and Support* initiative
  - Offer regular training to keep staff skills fresh and to ensure they can keep website content current
- Develop a content management policy.
- As part of the content management policy, implement standard practices, and make the website maintenance a component of the Technology Steering Committee responsibilities to ensure the site is maintained regularly and remains relevant and up to date for the public.

Benefits

- Reduced resident in-person visits
- Improved public records access
- Increased information-sharing capabilities
- 24/7 availability
- Improved resident-user experiences
- Increased resident interaction and transaction capabilities

29. Online Civic Transparency (Government Transparency)

Background

The movement toward increased government transparency has been growing in recent years. The public desires more openness, accountability, honesty, participation, and collaboration. In response to this trend, local governments are seeking web-based software to address this growing need. These government transparency solutions can integrate with City enterprise systems. Data can also be viewed in dashboard form for internal use and applied against key priorities and performance metrics. The key element of these systems is that data and financial reporting can be presented to the public through the City's web portal. Portal functionality can include:

- Graphical presentation of budget, financial reports, and data
- Performance dashboards
- Project communications

Example vendors that offer this service include:

- OpenGov
- Socrata
- Munetrix
- ClearGov

Findings and Observations

- Staff reported the desire to satisfy the public's increasing requests for government transparency, including access to financial information.
- Staff reported the desire to visualize key performance indicators via a dashboard.
  - Relatedly, staff would like the ability to provide narrative text for the data presented
- Staff would like the ability to publish or present this information to allow the public to access or query this information via a Web portal, thereby reducing some request types.

Recommendations

- Research the marketplace for vendors to determine functionality.
- The procurement process should follow the guidelines identified in the *Software Selection Best Practices* initiative.

Benefits

- Provide 24/7 access to data
- Present complex information that is understandable
- Improve public trust and support
- Reduce information requests

30. GIS Plan and Improvements

Background

Modern enterprise systems are increasingly geospatial information systems-centric (GIS). Integrating GIS with other agency business systems is now a core requirement.

GIS has become vital to enterprise systems by adding a geospatial component to agency information. It allows for the tracking of all land parcels within the community, inventory of infrastructure assets (e.g., pipes, drains, valves, pump stations, signs, light poles and other fixed items), enabling of the distribution of the right information to the right people to make data driven decisions, and expeditious access to geospatial data and mapping solutions targeted to specific needs.

Many benefits from the use of GIS are recognized by the City, but further benefits can be accomplished faster and more efficiently through strategic planning, increased utilization of GIS solutions, training, and enterprise application integration.

A GIS Assessment and Plan would set forth procedures and methods used to determine where the City envisions going with GIS in the future, which may include:

- Creation of a GIS program
- Evaluating potential data sources and data needs
- Integration of GIS with other City enterprise applications
- Data acquisition needs
- GIS integration with Smart City applications
- Developing GIS applications and functionality
- GIS resource requirements
- Planning for the long-term maintenance of the GIS system and data
- Development of a GIS-specific budget

Considering the City's limited IT resources, an overview of GIS as a service is described below.

ArcGIS Server Web Services

Esri ArcGIS Server Web services represents various GIS resources. These include map, address locator, image, and the geo-processing toolbox. These maps, locators, images, etc., are stored on an ArcGIS site and made available to various client applications. One significant advantage of this approach is that ArcGIS Web services do not need specialized GIS software. Instead, the data can be consumed within a Web browser or from various client applications. The City will be able to share critical GIS resources more rapidly across the organization.

Typically, City staff would be creating, capturing, and storing geospatial data every day, requiring better methods for synchronizing field data with the City's application systems.

Findings and Observations

- The City does not have a citywide, industry standard GIS system.
  - Parcel information is stored and referenced at the County.
  - Other geospatial maps are generated by third parties.
- As the City grows, Police, Public Works, Finance/Utility, Community Development, and Recreation will have GIS data and integration needs.
- There is no GIS Strategic Plan to establish a framework of initiatives and tasks to keep up with the growth and needs of the City.
- The City will benefit from a plan that outlines a methodology for the development of GIS capabilities.
- Critical applications are not integrated with GIS to allow for real-time resulting of mapping information (e.g., Incode (for utility billing), ActiveNet, or Greenvue.
- Public Works has identified significant gaps with GIS needs. Some gaps include:
  - Lack ability to see or update field asset/infrastructure information in real-time in the field via a mobile device
  - Sewer Video files are not linked to GIS
  - No ability to see water tanks specs, plan sheets, cleaning history, chlorine history, water quality history asset management system that is likened to GIS
  - Lack of linkage to SCADA, AMI and Mobile MMS

Recommendations

- Conduct a GIS Assessment and develop a 5-year GIS plan to introduce and maintain geospatial information management to the City.
- Establish a GIS Steering Sub-Committee to bring citywide stakeholders to the table to help identify and prioritize core/project GIS needs and solutions.
  - Review GIS needs and identify potential GIS interfaces.
  - Identify potential areas for improved display of geo-spatial information for residents, developers and visitors.
- Develop a plan that prioritizes and defines the steps and actions needed to close these gaps.

Benefits

- Centrally managed geospatial information
- Accurate geospatial information and inventories
- Improved maintenance and operational efficiency across the City, including field productivity
- Increased end-user functionality
- Increased government transparency
- Improved information distribution and citizen engagement
- Enhanced customer service through improved field to office communication
- Better informed City staff of available GIS services for improved data driven decision-making
- Improved utilization of applications that support GIS integration
- Inventory with location of all assets for maintenance management and planning
- Secure sharing of information
- Real-time access to geospatial information from the field
- Increased ability for team members to communicate and collaborate
- Easier creation and storage of digital maps
- Better analysis of infrastructure

31. GIS Staffing

GIS systems are increasingly becoming the data backbone to modern enterprise applications systems. Please see the *GIS Assessment Plan and Implementation* initiative for a detailed overview if its capabilities.

Findings and Observations

- The City's main GIS user is the Public Works Department.
- Control of its GIS system resides with Public Works Staff, including one staff member who is considered the resident expert.
- Public Works, Finance/Utility Billing and Community Development staff expressed the need to upgrade the City's GIS infrastructure and capabilities
- The City's IT service is staffed by one employee who handles critical network support functions.
- The IT Department does not have resources to support centralized GIS.

Recommendations

- Develop a GIS Assessment Plan to determine future long-term GIS needs for the City.
- As part of the GIS Plan, identify resource requirements needed to support centralized GIS and other core systems that interface with the GIS system
- Consider creating a full-time GIS staff position to accelerate the adoption of GIS within the agency
    - As new business applications are implemented, create integrations between GIS and each applicable application.
    - Utilize the GIS Assessment Plan and GIS Steering Sub-committee to identify GIS priorities.
- Determine training needs for GIS data entry, mapping and reporting

32. Mass Outbound Communication

Background

Outbound communication systems, which also include Reverse 911, have gone through a significant transformation in recent years. Enhanced mass notification systems can integrate with severe weather warning systems and use delivery mechanisms like emails, texts, RSS feeds, social media, etc. These systems can be used for non-emergency mass notifications as well, such as street closures, interruptions in water service, major organization events, etc.

Example solutions include:

- AlertMedia
- Alertus
- Dialogic
- Everbridge (the City has access to this application via San Mateo County)
- Genesys
- OnSolve

Findings and Observations

- The City is not using a true centralized Mass Outbound Communication platform
- The City Clerk uses Municode to do mass emailing
- Police, Fire, Public Works & Emergency Services Departments use San Mateo County's Everbridge system for emergencies or natural disasters
- The City lacks the ability to engage in mass marketing efforts or to consolidate all communications into a single platform that would enable a unified publishing of public-facing materials and information
- Staff expressed interest in potentially using the system for notifications for the following activities:
  - Planned service interruptions
  - Street closures
  - Special events
  - News releases
- Some systems allow the public and customers the flexibility to register for the type of notifications they would like to receive (e.g., text, RSS, social media, email, phone calls, etc.)

Recommendations

- Some website providers in the marketplace may offer a resident notification capability and the ability for the public to register for specific notifications. Consider collecting citizens' communication preferences (e.g., mail, email, text, website, opt-in or -out for specific types of communications, such as public safety, emergencies, community events, general info, etc.)
- Determine costs of greater usage. Costs are usually measured per contact, but some vendors have gone to an annual-subscription model based on agency population.
- Reach out to the County and Everbridge to determine if the City can piggy-back on the County's existing contract for a license with functionality that are sole specific to the City.

Benefits

- Increased community outreach
- Improved public relations
- A single standardized tool for use across City departments

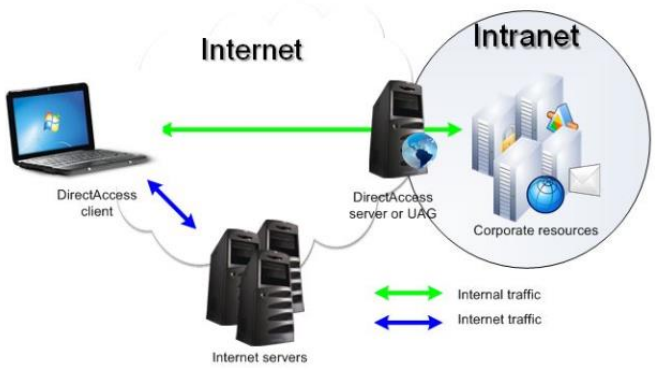
33. Intranet

Background

An *intranet* has a similar function to an organization's public-facing website, except it uses the organization's internal computer network to house a website-structured presence to share information in a private, secure manner. Generally, it is dedicated to internal use by the organization, staff, and management.

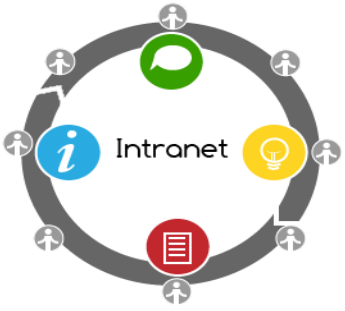
Intranets or intranet sites provide useful information, such as the ability to communicate within the organization and reduce miscommunication by providing consistent information and instructional content. It also reduces time spent requesting and distributing documents between and throughout departments and the need for maintaining physical documents. Intranets can be used to:

- Quickly communicate news, changes in policies or benefits, and emergency information
- Promote a common culture
- Offer a dynamic calendar of events, activities, due dates, etc.
- Send important news and newsletters
- Allow easy access to policies and procedures, training manuals, or forms
- Provide contact information for departments, supervisors, and other staff
- Collaborate on City projects with contractors and vendors
- Contain links to application-supported services (i.e., there may also be a link to Employee Self-Services that is tied to the Human Resource and Payroll applications, enabling employee capabilities to access electronic check stubs, electronic W-4 forms for filing changes, or other HR/P&C services)



Additional potential citywide Intranet uses could include, but would not be limited to:

- Increased City-Employee communications
- Tricks and tools that would benefit users
- Contact information (internally and externally shared)
- Major project-related information
- Personnel forms
- Benefits information
- Policies and procedures
- Administrative forms
- Training libraries



Agencies that are most successful with Intranets configure staff personal computers to have the organization's Intranet site as the homepage that launches whenever a browser is opened.

Findings and Observations

- Departments have expressed the need for the creation of an intranet at the City to enable sharing of documents and resources, particularly during COVID.
- Staff reported that some users use Tyler Incode's ESS (Employee Self Service) or Microsoft Teams or SharePoint as an ad-hoc intranet.
- Some local government-focused website vendors provide intranet design and implementation services on the same platform as the City's website.
- The City's current website vendor, Municode, does not have this functionality.

Recommendations

- Conduct a citywide assessment for internal department communications that could be posted or stored on the Intranet, such as frequently asked questions and frequently requested information, so employees can utilize the intranet's self-service capabilities.
- Make the intranet the default Internet browser homepage for all City staff.
- Use the intranet site as a method to reduce other mass employee communications, such as email, flyers, and bulletin board posters (as applicable).
- Design the intranet with tools to automatically convert the intranet content and presentation components to a mobile-compatible display format, so employees can use their smart phones and tablets to access the City's intranet.
- Provide training for staff to access self-service capabilities as users. In addition, provide training for staff that need to post content and provide self-service information to ensure they can post and maintain content regularly.
- There are many parallels between implementing an organization's public-facing website and implementing an internal organization-wide intranet. It is recommended the City consider designing and building the intranet with the same tools and resources that are used for the City's public website.
- Implement best practices and make the intranet a component of the Technology Steering Committee responsibilities to ensure the site is maintained regularly and remains relevant and up to date for the City's employee community (see *Technology Governance* initiative).

Benefits

- Reduction in miscommunication due to the use of a single-source communication location
- Electronic document availability (decreasing labor and space requirements for physical documents, such as procedure manuals or paycheck inserts)
- Electronic form availability (decreasing the need for physical employee forms)
- Increased employee productivity and collaboration
- Remote access to information when outside the office

34. Smart Water Meter Solution

Background

Advances in technology is allowing service providers to improve integrations and automate more of their business processes across different technology systems including meters, hardware, communications, and software. Advanced Meter Infrastructure (AMI) technology allows AMR systems to link, in real or near-real time, meter endpoints with Utility Billing/Customer Information (UB/CIS) Systems that manage the billing and accounting functions of utility service.

In recent years, advances in utility applications technology is increasingly allowing utility systems to perform sophisticated business intelligence (BI) analysis to optimize systems performance, leakage detection, and revenue capture. The emerging applications platforms are also providing customers with on-demand insight into usage and billing information, and the ability to query and perform their own BI activities, in order to adjust their service level options. These applications fall under the smart water technology solutions. Some vendors in the marketplace include:

- WaterSmart
- Valor Water Analytics
- SilverBlaze

Findings and Observations

- The City is located in an urban environment with a geographic size of approximately 20 square miles.
- Cellular coverage is good and reliable.
- The City is in the process of evaluating AMI system vendors for an all-mesh system to automate and achieve operations efficiencies in its water utility operations.
- Tyler SPMR (Smart Phone Meter Reading) is used for meter readings.
- Staff also reported a need for a Web portal that would allow customers to have access to their AMI data on a daily basis.

Recommendations

- As the City evaluates vendors for a new AMI system, it should ensure that appropriate integrations are identified with its utility billing system, Incode.
- Additionally, the City should ensure that a future AMI and current UB system have the ability to integrate with smart meter technology to allow both the City and its customers access to read-only and near-real time meter information.
- The City should consider a commercial off the shelf (COTS) smart water technology to augment a future UB/CIS system to allow for the ability to perform BI analysis and for advanced system leak detection on both sides of the meter.
- The process for procuring a COTS smart water application should follow the guidelines of the *Software Selection Best Practices* initiative.
    - Conduct a needs assessment
    - Identify required feature/functions for a viable solution
    - Solicit bids from vendors
    - Conduct product demonstrations (onsite or remotely)

IT Infrastructure refers to networks, servers, equipment, inside or outside cable plant, and other communications infrastructure.

35. Computer Equipment Replacement Plan
36. File Servers and Disk Storage
37. Internet Bandwidth
38. Network Redesign
39. Office 365 – Full Implementation
40. Wireless Expansion
41. Remote Access – VPN
42. Structured Connectivity System

35. Computer Equipment Replacement Plan

Findings and Observations

- A formal citywide computer replacement plan does not exist, including servers, storage, switches, or firewalls.
- Other technology systems, such as audiovisual systems, camera systems. and door access control systems do not have a formal replacement schedule.
- IT replaces desktops on an as-needed basis.
  - Many desktops have been in service beyond the five-year recommended lifecycle.
  - Most workstations have been upgraded to Windows 10.
- Some network equipment and servers are also in service beyond their recommended lifecycle.
- The managed service provider maintains an inventory of all "managed" devices and can provide recommendations based on industry standard replacement cycles.

Recommendations

- Utilize the managed services providers inventory and expand to include to all technology with a standard life expectancy.
- Develop a seven-year, rolling computer equipment replacement plan and budget accordingly.
- Allow customized length of time for replacement of any technology that may have a unique end-of-life.
- Continue to purchase discounted extended warranties at the time of purchase that will cover the equipment throughout its useful life (e.g., five years for computers and servers).
- As appropriate, provide analyst and management-level personnel with laptops and docking stations.
  - By policy, encrypt any data stored on mobile devices.

IT Equipment	Recommended Replacement Cycle (Years)
Network Switches	7
Phone System Upgrade	5
Phone System Replacement	10
Audiovisual Equipment	5
Servers	5
Disk Storage	5
PCs	5
Laptops	4
Mobile Devices	2
Wireless Devices:	
Point-to-Point	5
Wireless LAN	4
Windows Software	+/- 5
MS Office	+/- 5
Printers, Scanners	5
Plotters	5

Benefits

- Better forecasting of purchases
- Managed process that flattens capital expenditures over time
- Improved computer performance
- Improved available features
- Improved portability through use of a single device
- Ability to keep spare equipment around to be reissued, eliminating employee downtime
- Increased employee performance by eliminating the use of old, slow, and post-lifecycle technology
- Reduction in total cost of ownership

36. File Servers and Disk Storage

Findings and Observations

- Several file servers are running Microsoft Windows Server 2012 and 2016.
- Active Directory servers are 2012 and 2016, respectively.
- Servers are not virtualized, resulting in many physical servers to maintain and keep up to date.
- The City is moving applications to the cloud in the next few years.
  - Some applications will remain on-premise due to response time requirements.
- Disk storage needs are not significant.

Recommendations

- We recommend a resilient virtual server environment with local and cloud-based backups.
  - Expand the existing backup solution provided by the managed services company to include all backups and cloud recovery.
  - Upgrade Active Directory to 2019.
  - Consider moving to Azure Active Directory.
- Implement a capital replacement plan to replace servers and storage on a regular, best practices-based schedule.

Benefits

- Elimination of unexpected space availability
- Better management of data retention and management
- Improved availability for storage and access to user community

37. Internet Bandwidth

Background

Increased Internet bandwidth and high availability are becoming increasingly important to organizations for daily functionality. This allows for additional resources to become available during peak Internet usage and provide for resiliency when disasters occur that may affect primary Internet connections that are no longer accessible.

Findings and Observations

- Internet connectivity is installed at City Hall.
- Primary Internet bandwidth is 100Mb download and upload.
  - A secondary Comcast Business Class internet connection is 200Mb download and 20Mb upload.
  - This secondary Internet access speed is recommended for no more than 15 devices.
- Future use of cloud services will increase the importance of Internet bandwidth.
- Most peer institutions are moving toward two diverse, high-speed Internet connections.

Recommendations

- Implement a second Internet connection with speeds identical to the primary Internet connection.
  - Best Practice would be to implement an Internet connection from a separate provider.
  - Utilize both Internet connections in an "active/active" manner. This will increase available Internet bandwidth for all staff.
- Additional Internet bandwidth will be required as the City increases the use of cloud-based systems.
- Increased Internet costs have been included in recommended *Five-Year Budget*.

Benefits

- Improved performance
- Increased Internet uptime
- Increased resiliency, providing increased cloud-based applications and services uptime
- Reduced risk and liability
- Disaster recovery safeguard

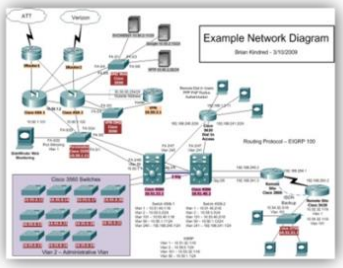
38. Network Redesign

Background

A local area network (LAN) is a group of interconnected computers that span a building using copper, fiber cabling, or wireless technology as a means of communication. Typically, access to a LAN is controlled by authentication software integrated with Active Directory. Authorized users access the network and can then use resources and applications assigned to them. LANs are very common due to their small size, low maintenance, fast speeds, and ease of use.

A wide area network (WAN) is a network that connects various off campus facilities into a single network. WAN bandwidth is significantly more expensive than LAN bandwidth and, therefore, is often limited.

Findings and Observations



- The majority of network switches were purchased between 2007 and 2013.
  - Best Practice network switch life cycle is seven years.
  - The majority of network switches will be end-of-life and no longer supported this year.
  - Switching equipment does not provide Power over Ethernet (PoE).
    - PoE is Best Practice for support of VoIP phones, wireless devices, video cameras, and other equipment requiring a network connection and power.
- Several brands of network switches are installed.
- There are several network switches that do not appear on the inventory because they are "unmanaged."
  - "Unmanaged" network switches are a security risk and can cause broadcast storms as they begin to fail.

Recommendations

- Redesign the core network to increase speeds by a minimum of ten times.
  - Create a resilient core network that eliminates single points of failure.
  - Redundant core switching is recommended.
- Redesign network segmentation to limit broadcast traffic, implement quality of service prioritization, and improve security.

Benefits

- Improved network performance speed and reliability
- Reduced support costs
- Full redundancy across sites
- Increased security

39. Office 365 – Full Implementation

Background

Microsoft Office 365 is a subscription service that is part of the Office product line. Office 365 is focused on enterprise customers. Office 365 products and services comprise: Outlook, which includes email, calendaring, people, and tasks; Hosted Services, which include Office server platforms for Exchange, SharePoint, and browser-based Office applications; and Office Applications, which include Word, Excel, PowerPoint, and Teams for use as a collaboration platform.

Microsoft is transitioning its customers to a Software as a Subscription (SaaS) model. This is a departure from the conventional software license model. The SaaS model allows Microsoft to update the Office 365 software on a rolling release basis and charge monthly fees for each software license.

Findings and Observations

- The City has Office 365 licenses that provide the majority of feature/functions available.
  - Staff did not receive formal training during the Office 365 implementation.
- The City is currently using Online Exchange for electronic mail.
  - An initial Discovery project is underway to plan a move to SharePoint and OneDrive for user files and shared drives.
- During COVID, staff have been working from home and informally using Microsoft Teams tools for video conferencing and chat.

Recommendations

- Continue moving to SharePoint and OneDrive.
  - Provide training with each Office 365 implementation.
- At the successful conclusion of the SharePoint and OneDrive implementation, develop policies and procedures for the use of Teams applications.
  - Train staff in proper use of Teams.

40. Wireless Expansion

Findings and Observations

High-speed wireless Internet is a key infrastructure component of a Smart City strategy. A strong wireless infrastructure for staff and public wireless access at City facilities is now expected. A public wireless infrastructure deployed throughout the City can enable many Smart City applications, including smart meters (water or parking), the Internet of Things (IoT), automatic license plate readers, traffic monitors, some video surveillance applications, and many more Smart City tools.

Findings and Observations

- The City has wireless capabilities for staff and guest computing within City facilities.
  - Multiple vendor's wireless access points are utilized by the City.
  - The use of several vendor wireless access points reduces staff ability to manage and secure the devices

- Demand for Wi-Fi will continue to increase.
  - Staff demand will increase as they become more mobile.
  - Public demand for wireless at City facilities is increasing.
  - Public demand for wireless a City parks will increase.
- Staff at remote locations that use point to point wireless have intermittent connectivity issues
  - Current point to point wireless solutions are shared frequency and may be subject to interference

Recommendations

- Plan to expand wireless to all City indoor and outdoor spaces.
- Upgrade point to point wireless to faster bandwidth and licensed frequencies.

Benefits

- Improved wireless speeds
- Reduced complexity
- Increased security
- Expanded coverage

41. Remote Access – VPN

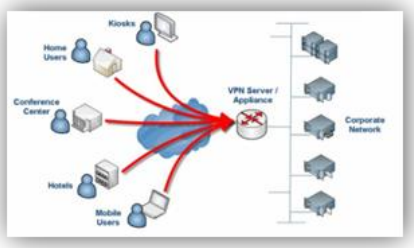
Background

Remote access is used by staff when working off site to access work products and applications that reside on City premises. COVID-19 has increased the demand for remote access as staff work from home or other locations more frequently due to concerns related to the pandemic.

Demand for remote access will continue to grow for on-premise applications, especially for staff members with significant computing needs in the field. Increased access to mobile applications for smart phones and tablets will also be part of increased remote-access demand.

Findings and Observations

- Remote access generally works well for staff. Some staff reported system lockups or the need to reset remote access regularly.
- Remote access to City applications do not require two-factor authentication.
  - Two-factor authentication (like banks and cell phone companies) is becoming a security best practice.
- The City has determined that cloud application services in the appropriate long-term strategy.



Recommendations

- Implement remote access improvements as a part of the two-factor authentication project.
- Consider implementing a small Remote Desktop Protocol (RDP) server for improved remote access to systems.

Benefits

- Increased mobility for the current workforce
- Improved productivity for off-site personnel
- Increased convenience for staff using Employee Self Service remotely
- Improved balance between security and business needs

42. Structured Connectivity System

Background

A *structured connectivity system* is a complete set of cabling and connectivity products that integrate voice, data, wireless, video, and other technology systems into a comprehensive infrastructure.

Findings and Observations

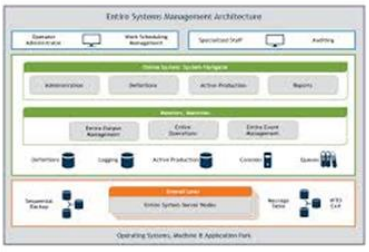
- The copper, horizontal cabling system at City Hall is primarily comprised of Category 6 (1 GB) cable.
  - Category 6 cable is adequate for the newest generation of wireless access points (WAP).
  - Best practice cabling for wireless access points is two cables per WAP.
- Small, unmanaged switches have been installed in some areas to reduce cabling needs.
- Unmanaged switches are:
  - A significant cybersecurity risk
  - A significant risk to network stability
  - Cannot be remotely managed or inventoried

Recommendations

- Assess all cabling installation for quality and completeness.
- Install two Cat 6A cables to each new WAP location.
- Identify all unmanaged switches and replace with cabling to tele/data closets.
  - Utilize Cat 6A as the new cabling standard.
- Develop Structured Cabling Systems (SCS) standards as a basis for any upcoming recabling efforts.
  - This document will be used to support the ongoing needs of the City as it relates to maintaining the existing SCS and can be provided to architects and/or contractors as part of the construction specification for future projects. The SCS Standards Document should have the following as its goals:
    - Implement a non-proprietary cable infrastructure system supporting multi-vendor equipment and services.
    - Provide reduced cost for future cable installation, support, and management.
    - Maintain consistency providing reduced training requirements for employees.
    - Improved troubleshooting and support for ongoing management/maintenance.
    - System based on recognized industry standards (ANSI, TIA/EIA, IEEE and BICSI).
- Provide suitable patch cord management system at equipment racks and/or cabinets.
  - Improve patch cord management by reducing patch cord lengths and improved “dressing”.
- Utilize the SCS standards to bid and hire a contractor to perform small cabling jobs as required.
  - Charge departments back for cabling as a part of department moves (See *IT Cost Allocation* initiative).

The *IT Operations* section addresses daily support and maintenance of all IT infrastructure and user support.

43. Service Desk Ticketing System
44. IT Policies and Procedures
45. Mobile Device Management
46. Network Management Tools



43. Service Desk Ticketing System

Background

Service Desk systems provide an easy way for users to submit requests. IT staff members can assign and track tickets. The automated electronic, mail-based communications included in Service Desk systems can allow users to track the progress of their tickets as IT staff members update the status. Service Desk systems prevent items from "falling through the cracks" by logging all requests. Another key benefit of Service Desk ticketing systems is the collection and analysis of metric data related to the number of requests submitted, resolved, and remaining open.

Findings and Observations

- The City's Service Desk is located at the managed services provider.
  - The Service Desk receives four-to-six tickets each month.
  - The majority of tickets are handled by City staff outside of the ticketing system.
- Summary metrics related to Service Desk performance are not available or reviewed regularly.
- Service Desk ticket response-time or resolution-time metrics are not tracked.

Recommendations

- Consider implementing a cloud-based Service Desk ticketing system for use by all City staff.
  - Assign tickets to City staff and third parties, as necessary.
- Strongly encourage users to utilize the Service Desk ticketing system.
  - Develop a marketing campaign to encourage users to utilize the ticketing system and email directed at the ticketing system to report issues.
- Revise Service Desk data capture to a more hierarchical data collection model. Collect data based on:
  - User department
  - Issues vs. requests for service
  - Application
- Metrics related to meeting Service Desk service levels should be developed and tracked on a weekly and monthly basis.
  - Staff should be encouraged to report all time spent on Service Desk tickets in the system.
- Key metrics may include:
  - Tickets submitted by department
  - Tickets closed during the month
  - Average number of tickets open during the month
  - Staff time spent per ticket and overall on problem resolution and service
  - Thirteen-month rolling graphs of the above metrics
  - Ticket aging reports, such as tickets open more than seven days
- Develop Service Desk ticket response-time and resolution-time goals based on urgency.
  - Track number of tickets assigned, priority, response time, and resolution time by team member.

- Each month, summaries of Service Desk tickets opened and closed should be presented to management.

Benefits

- Central ticketing system
- Availability to many users
- Increased resolution rates
- Support for all devices
- Improved user communication, experiences, and satisfaction
- Better diagnostics and problem identification

44. IT Policies and Procedures

Findings and Observations

- The City has a minimal number of IT policies.
- IT policies and procedures are a best practice.

Recommendations

- Revise the IT section of the Acceptable Use policy every three years.
- Create a limited number of additional IT policies and procedures that include the following topics:
  - Security Awareness Training
  - Computer Security Incident Response
  - PCI Compliance
  - Emergency Response Policy
  - Data Retention
  - Social Media
  - Mobile Device Usage and Management
  - Password Policy
  - Policy governing use of Personal Identifying Information
- Upon completion of IT policies and policy compliance, develop desk procedures to verify compliance and document key IT processes.

45. Mobile Device Management

Background

Mobile device management (MDM) software is a collection of applications that allows management, distribution, usage, and maintenance of laptops, tablets, and smart phones. Additional features allow configurations to be done on devices to discourage wrongful use and reduce individual device maintenance.

Findings and Observations

- MDM provides the ability to see and control all mobile devices owned or controlled by the enterprise.
- A key feature of MDM products is the ability to "wipe" a partition on the device if it is lost or stolen.
- The City does not use mobile device management tools.

Recommendations

- Research, pilot, and select a full-featured MDM software product.
  - Products that integrate with the Help Desk system or inventory system should be given top priority in any evaluation.
  - Leading products include AirWatch, MAS 360, or Meraki.

Benefits

- Improved staff efficiency and mobility
- Support for all devices
- Less time manually managing and monitoring
- Increased use of remote access
- Simplified distribution of software

46. Network Management Tools

Background

Network management is the general term used for the activities, procedures, and tools that relate to the operation, administration, provisioning, and maintenance of computer network systems, effectively keeping the network up and running smoothly, while also monitoring the system to quickly identify potential problems.

Findings and Observations

- The City contracts with a managed services provider to for firewall management.
  - Other network devices (switches, routers, WAPs) are not included.
- Several network devices lack management capabilities.
- Multiple wireless access point manufacturer products are installed, limiting the potential for central management.
  - Network management tools can simplify configuration updates by automatically storing configuration files and tracking revision levels.

Network Management

- ✓ Network Device Monitoring
- ✓ Performance Monitoring
- ✓ Bandwidth Monitoring
- ✓ Firewall Management
- ✓ Router/Switch Management
- ✓ Proactive Monitoring
- ✓ Threshold Customizations
- ✓ Altering
- ✓ Network Interface Stats

Recommendations

- Consider utilizing the managed services provider to manage all network devices.
- Procure products from a single manufacturer to improve management and operational efficiency.
- If possible, consolidate all network and operations management into a single toolset.

Benefits

- Less time manually managing and monitoring
- Increased utilization
- Increased resource access
- Centralized access to multiple applications and platforms

IT Security addresses all security systems and practices, including disaster recovery, to protect systems and data.

47. Audit Logs and Log Management
48. Backups
49. Disaster Recovery Planning
50. IT Security Assessment
51. Security Awareness Training
52. Two-Factor Authentication
53. Windows Active Directory
54. Next Generation Antivirus

47. Audit Logs and Log Management

Background

The *audit log and log management software* are used to monitor the status and health of Active Directory, servers, and all network devices, respectively. This software also allows the ability to create audit trails of changes made to the Active Directory and other applications and systems. With log management and alerting software, IT staff members can be notified immediately for any issues or potential threats to the Active Directory domain. Audit logs are important tools for managing the environment. In addition, should an incident occur, audit logs can provide valuable forensic information related to the incident and any potential perpetrators.

Findings and Observations

- The City does not use an Active Directory monitoring tool.
- The City is interested in moving Active Directory to the Microsoft Azure cloud-based instance.
- Active Directory monitoring tools combine on premise and cloud-based monitoring.
- Only firewall logs are regularly monitored (by the managed services vendor).

Recommendations

- Log management products should be evaluated and selected following software selection best practices.
    - Investigate the Active Directory log management tool capabilities first to determine if expanding use of the product will satisfy City requirements.

Benefits

- Centralized Active Directory management system
- Improved automation of routine tasks
- Increased investigation visibility using audit trails
- Improved security
- Improved reporting and metrics
- Better diagnostics and problem identification
- Availability of forensics log
- Alerts to bad logon attempts
- Increased staff productivity

48. Backups

Findings and Observations.

- The City utilizes eVault for on-premise backups.
  - On-premise backups are synchronized to two collocation facilities.
  - Backups include full file server (bare metal) backups and file based for easy restoration.
- Office 365 is backed up using Datto software as a service.
- OneDrive online file storage is not backed up.
- An official SharePoint site has not be established therefore backups are not in place.

Recommendations

- Consolidate all backups to a single backup solution.
  - We recommend Datto based on ease of use and disaster recovery capabilities.
- During the implementation of SharePoint and OneDrive, synchronize locally stored desktop and laptop files with OneDrive for backup.
  - Utilize Datto for an additional layer of backup protection if desired.

49. Disaster Recovery Planning

Findings and Observations

- The City does not currently have a disaster recovery plan.
- Service-level agreements (SLAs) are not in place for application recovery in the event of a disaster.
- Utilizing cloud-based backup and disaster recovery is a best practice methodology.
  - Relying on cloud-based backup and disaster recovery generally requires resilient high-speed Internet services.
  - Current City Internet services are not resilient.
- Datto has excellent cloud-based recovery capabilities.

Recommendations

- As an initial planning step, work with the departments to understand expected service restoration time frames.
- Weigh risks versus costs when determining the overall disaster recovery strategy.
- Consider the following disaster recovery scenarios when developing strategies:
  - Loss of main computer room
  - Major disaster eliminating all area communications, including City Hall and other facilities
- Evaluate applications portfolio and determine the SLA for each application for restoration.
- Develop strategies for restoration of high-priority applications.
  - Begin to implement, based on strategy and application priority.
  - Test portions of plan every six (6) months.

Benefits

- Emergency preparedness compliance
- Improved communication
- Awareness of procedures
- Better diagnostics and problem identification
- Reduced risk and liability
- Faster, well-informed decision-making
- Identification of business-critical functions
- Decreased recovery times and exposure to system failures
- Awareness of immediate actions

50. IT Security Assessment

Background

It is a best practice to conduct an IT security assessment every three years. Penetration testing should be performed annually or whenever major firewall changes are made.

Findings and Observations

- An IT security assessment has not recently been performed at the City.
- Third-party penetration testing has not been completed recently.
- The City's main internet firewall is maintained by the managed services provider.

Recommendations

- Consider making network, wireless, and Active Directory improvements before engaging in a security audit.
- Conduct an external penetration testing annually or whenever major firewall changes are made.
- Conduct an internal penetration test at the conclusion of the recommend network and wireless upgrades.
- Engage a third party to perform a security assessment every three years.
    - Complete security recommendations included in this plan prior to initiating a security assessment.

Benefits

- Risk mitigation
- Meets compliance requirements and industry best practices

51. Security Awareness Training

Background

Security Awareness Training is a formal process for educating employees about computer security. A good security awareness program should educate employees about corporate policies and procedures for working with information technology. Employees should receive information about who to contact if they discover a security threat and be taught that data is a valuable corporate asset.

Regular training is necessary to provide staff with knowledge to help protect the organization's network from viruses and malware. Users are the frontline defense for the prevention of virus and malware attacks.

Confirming how well the awareness program is working can be difficult. The simplest metric is measuring the number of incidents over time, which should be decreasing. The best practice method of measurement involves a multi-phased approach of baseline testing, then training, then testing using an automated phishing approach. Follow-up with additional training as needed.

Online training provides multiple benefits, including:

- Staff members can work at their own pace, on their own schedule.
- Staff members can be enrolled in multiple online training courses.
- An administration control panel can be used to monitor users' progress and set up phishing campaigns to test the users.
- Reports can then be generated to see how users did compared to previous phishing campaign scores in order to measure improvement.
- Organizations should encourage users to complete training on a regular basis as part of compliance requirements.

Findings and Observations

- The City does not have a formal security awareness training program.
- Security awareness training is a best practice targeted at improved staff security readiness.

Recommendations

- Develop a program of online security awareness compliance training.
  - This training should be mandatory for all users.
  - Incorporate training plans into the annual review process.
  - Select a proactive training solution that allows periodic deployment of simulated phishing attacks to test user awareness.
  - Random security awareness testing best practice ranges from monthly to every three months.
    - Security awareness testing can be automated to limit administrative burden.

52. Two-Factor Authentication

Background

The need for both increased information sharing and remote access to data networks, and increased security threats, creates new requirements to validate the identity of the individuals accessing information in these systems. To meet these requirements, many agencies at all levels of government are using a strategy known as advanced authentication or *two-factor authentication*. This approach supplements traditional username and password authentication with alternative forms of verification based on a user's physical characteristics (such as a fingerprint), or an object in the user's possession (such as a smart card or a token).

Findings and Observations

- Two-factor authentication is a security strategy based on the principle of defense-in-depth.
- The importance of two-factor authentication increases with the additional use of cloud-based systems.
  - Many cybersecurity breaches at agencies could have been prevented if two-factor authentication were in use.
- National Institute of Standards strongly recommend two-factor authentication for water and wastewater utility supervisory control and data acquisition (SCADA).
- It is a best practice to use two-factor authentication for Office 365, HVAC/building control systems, and IT system administration.

Recommendations

- Budget for and implement two-factor authentication for access to City systems, including Office 365, SCADA, HVAC, and cloud-based application systems from untrusted devices or locations.
- For management staff who would benefit from remote access to applications, consider a soft-token two-factor authentication to reduce complexity.

Benefits

- Enhanced security and compliance

53. Windows Active Directory

Background

Windows Active Directory (AD) is a central directory structure that provides authentication to network resources (files, printers, applications, and more). Groups and organizational units can be created in AD to lessen the ongoing maintenance requirements of adding and deleting user rights. Domain controllers are Windows Servers running a version of AD Domain Services.

Findings and Observations

- The Active Directory domain is Windows 2012 R2.
- Some older servers remain in the server inventory.
- The City is interested in Azure Active Directory.

Recommendations

- Upgrade all Active Directory domain controllers to Windows Server 2016 or 2019.
- Move all non-Active Directory services from Active Directory servers to other servers.
- Review the server inventory and delete all decommissioned servers.
- Consider a hybrid Active Directory <-> Azure Active Directory configuration.
- Implement integration between AD, network devices, and City applications wherever possible to provide a means for centralized authentication.
- Specifications for future application software should include the requirement to integrate with AD.

Benefits

- Improved functionality and security
- Meets industry compliance standards
- Enhanced feature sets that were once non-existent are now available

54. Next Generation Antivirus

Findings and Observations

- The City uses WebRoot as an antivirus solution.
  - The antivirus solution is managed by the managed services provider.
- "Next generation" antivirus solutions use Artificial Intelligence methods to detect changes in patterns that indicate the presence of a virus or malware.

Recommendations

- Procure and implement a "next generation" product such as Sentinel1 or Cylance on all desktops and laptops.
- Utilize all available cybersecurity services on Internet-facing firewalls.

IT Staffing

IT staffing can be one of the most important areas of business management, especially in view of the impact IT decisions can have on the organization's productivity, budget, morale, and overall success.

55. IT Staffing

56. Enterprise Applications Support

57. Business Analysis and Project Management Skillset Needs

55. IT Staffing

Background

As a part of the technology master planning process, ClientFirst conducts a review of available technology resources versus the level of resources required to implement the recommendations included in the plan.

Findings and Observations

- Current staffing levels are insufficient to implement the recommendations of the plan.
- Project budgets provided in the plan include third-party subject-matter expertise where recommended.
- The job descriptions provided to ClientFirst as a part of the initial information request have not been updated for several years.
- The City's managed services provider is responsible for some services (end-user device ongoing maintenance, firewall), but not others (network, servers, wireless).

Recommendations

- Add IT staff to assist in coordinating business application implementations and third-party resources.
- Revise job descriptions periodically.
- Third-party subject-matter expertise is recommended to assist the City in the following areas:
  - Business application software selection and implementation project management oversight
  - Network engineering initiatives and projects
  - IT managed services
  - Cybersecurity assessments and penetration tests
  - Office 365 and Microsoft Azure design, implementation, and staff training
  - Citywide fiber-optic initiatives
  - Future complex design, procurement, and/or implementation projects

56. Enterprise Applications Support

Background

Local government agencies increasingly understand the direct correlation of effective applications utilization, organizational efficiency, and productivity gains. As described throughout this document, increasing applications utilization is key for the organization to do more with the same labor resources. Additionally, institutional knowledge too often leaves the organization through retirements and other employment separations because many processes and procedures are inadequately automated in enterprise systems. Typically, agency goals of improved transparency and constituent services are also accomplished through various software programs that automate and streamline processes.

Most organizations have a blend of application/business analyst skillsets within their business departments and their IT department. However, we have yet to encounter a small- or mid-sized agency with adequate resources to meet the organization's needs.

To meet these needs, IT departments are beginning to transform their overall department structures to take on more responsibility in managing applications support services. This trend is being made possible, in some measure, by the streamlining of typical IT department operations through productivity and monitoring tools.

Typical applications support staff proactively handle Help Desk needs related to business department applications, business process analysis, applications training, applications setup and configurations, ad hoc report writing, and database administration. The goal of applications support staff is to increase efficiencies in the agency by facilitating the automation or simplification business processes through the use of enterprise technologies.

Findings and Observations

- The City will soon begin the implementation phase of a new Land Management (Permitting) application.
- This report identifies opportunities for improvement in several other major application systems.
- The IT staff are primarily performing Help Desk-related functions.
  - IT staff are fully occupied by their current responsibilities.

Recommendations

- Consider adding a business systems analyst (IT Specialist) FTE to the IT staff.
  - Over the long term, this position can increase IT's ability to assist departments in improving application utilization and efficiency and improving business processes.
- Continue to foster a culture that focuses on improving application efficiency to benefit residents, staff, and other constituents.

57. Business Analysis and Project Management Skillset Needs

Background

Local government agencies increasingly understand the direct correlation of effective applications utilization, organizational efficiency, and productivity gains. As described throughout this document, increasing applications utilization is key for the organization to do more with the same labor resources. Additionally, institutional knowledge too often leaves the organization through retirements and other employment separations because many processes and procedures are inadequately automated. Typically, agency goals of improved transparency and constituent services are also accomplished through various software programs that automate and streamline processes.

Most organizations have a blend of application/business analyst skill sets within their business departments and their IT department. However, we have yet to encounter a small- or mid-sized agency with adequate resources to meet the organization's needs.

To meet these needs, IT departments are beginning to transform their overall department structures (over time) to take on more responsibility in hiring, training, retaining, and managing applications support services. This trend is being made possible, in some measure, by the streamlining of typical IT department operations through productivity and monitoring tools.

Typical applications support staff proactively handle Help Desk needs related to business department applications, business process analysis, applications training, applications setup and configurations, ad hoc report writing, and database administration.

It is not unusual to designate applications support staff for the following major applications systems:

- ERP (Accounting, Finance, and People Management)
- Work Orders/Maintenance Management
- CIS
- Personnel Management
- ECMS (Electronic Content Management System)

Findings and Observations

- The City does not have one dedicated staff member for the support of enterprise applications.
  - Enterprise applications are supported by Sys Admins.
- Although good work has been accomplished with the resources that are available, many departments expressed a need for additional assistance with enterprise applications.
- Currently, IT staff spends approximately 20% of an FTE providing enterprise application support.
- IT has had limited training in documenting and improving business processes. These skills are critical for improving the efficiency of the City's major busines applications.

Recommendations

Expanding the Application Support function within the IT Division should result in development and deployment of standards, methodologies, and best practices for applications deployment, business process improvement, application interfaces, and report writing. Improvements should also include documentation of procedures, applications interfaces, service-level agreements, and other methodologies related to applications systems.

We believe the short-term direction of the City should be to expand this function within the IT Division to include:

- A focused effort to expand the skillset of the Applications Support function, including:
  - Additional business process analysis and design skills
  - Additional project coordination and management skills
- We believe that, over time, the City may desire to add up to three (3) Enterprise Applications Analysts who would work with the departments to increase application utilization and improve efficiency.
  - Recommended areas of focus for Enterprise Applications Analysts are:
    - Public Safety
    - ERP, including timekeeping and scheduling
    - Enterprise Asset Management, Document Management, and all other systems

The *telecommunications system* is a critical tool for local government entities. It enables the ability to communicate effectively with constituants and deliver high standards of service. Telecommunication is also a key element in teamwork, allowing employees to collaborate easily from wherever they are located.

58. VoIP Phone System Improvements

58. VoIP Phone System Improvements

Background

Voice-over-IP (VoIP) technology replaces older digital telecommunications systems. VoIP uses the data network as its distribution layer and operates as an application on the network. When built correctly, VoIP can provide high-quality services and extensive features and scaling capabilities. VoIP has become the best practices, accepted communications standard. Older systems are typically more costly and troublesome to maintain because of their age and limited support options. Benefits of VoIP include reduced costs and increased features and support. VoIP hardware upgrades can occur automatically and seamlessly.

Unified communications also have the capabilities to integrate voicemail and email together, allowing easier access and control of communications and collaboration tools, including:

- Integration of multiple devices
- Video conferencing
- Document sharing
- Texting and instant messaging
- Mobility and remote workers

Client trends in telecommunications include the replacement of existing DID and PRI telecommunications lines and services with Session Initiation Protocol (SIP) services to reduce costs and provide carrier level redundancy. These changes also provide a reduction and stabilization of costs.

Findings and Observations

- Some staff reported issues with phone features.

Recommendations

- Provide new and additional training to all users.

Benefits

- Determine immediate cost reduction opportunities
- Improved support options and capabilities
- Increased redundancy and quality of services
- Improve support and timing for moves, adds, and changes
- Provide remote connectivity to address COVID operational services
- Increased long-term ROI