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TO: Mayor and Council

FROM: IT Steering Committee

DATE: June 16, 2014

SUBJ: Information Technology Strategic Review and Options

At the June 23, 2014 Council meeting, the IT Strategic plan resolution was tabled, so that the Mayor and Council could provide input to the IT Steering Committee. The IT Steering Committee has received input, and would like to recommend that the Strategic plan, be referred to as "Information Technology Review and options". This Information Technology Review and options, will steer the IT Steering Committee and serve as a guide with technology improvements in the future.

The Committee respectfully requests approval of the Mayor and Council for this review, which we believe creates a better government through improved communication, a more efficient operation and enhances services for residents.

RESOLUTION TO ACCEPT TECHNOLOGY STRATEGIC REVIEW AND OPTIONS BY PRINCETON

WHEREAS, The Mayor and Council of Princeton recognizes that information technology investments are essential to municipal operations, including critical public safety functions and citizen services; and

WHEREAS, the overall objective of management for the Municipality of Princeton is to ensure effective and efficient management of all Municipal operations, ensuring equitable and thoughtful investments of tax payer dollars; and

WHEREAS, a strategic Information Technology (IT) Review and Options consisting of essential investment priorities is needed to guide the Municipal budgeting process; and,

WHEREAS, the Municipality developed a three year Strategic IT Review and Options with the assistance of Dr. Shannon Tufts; NOW, THEREFORE

BE IT RESOLVED that The Mayor and Council of Princeton hereby accepts as its strategic IT Review and Options the Review attached herein.

I, Linda S. McDermott, Clerk of Princeton, County of Mercer, State of New Jersey, do hereby certify that the foregoing is a true copy of a resolution adopted by the Mayor and Council of Princeton at its meeting held July 14, 2014.

_____

Linda S. McDermott, Clerk

Town of Princeton Strategic IT Review & Recommended Options

Prepared by Shannon Howle Tufts, Ph.D., on behalf of the Town

6/16/2014

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The following changes have been made to the draft version of this report (dated 4/28/2014) at the request of the IT Steering Committee:

Projects Moved to Priority One Status (from Priority Two Status):

- Printing and Multi-function Devices
- Server Virtualization
- Document Imaging & Management System
- Social Media

Projects Moved to Priority Two Status (from Priority One Status):

- Held Desk Personnel & Process (move due to recommendation that the Temporary Technical support position be made a full-time equivalent position)

EXECUTIVE SUMMARY

The Town of Princeton's Strategic Information Technology Review & Recommended Options is offered as a framework for sustainable, effective and efficient technology investments, coupled with an unwavering focus and commitment to providing better Town services through a more accessible, transparent and accountable government. Technology is a tool used to improve customer service but the administration, policies, and procedures surrounding a given function or process must be revised and fine-tuned in order to provide the highest quality of service. The Strategic IT Review maps the vital infrastructure, applications, and initiatives that will enhance Town services and their delivery in mission-critical areas. It also outlines the steps needed to achieve a Town information technology enterprise with a focus on optimized performance, efficiency and effectiveness gains.

Key Findings

There are several key findings in the Town of Princeton' Strategic IT Review, including areas of noted excellence as well as areas of improved investment:

- The Town is building on a strong technological foundation. The work and investments made by the government have substantially improved customer service and increased efficiency and effectiveness.

- The level of technological sophistication is particularly impressive in the Town, given the size of the IT Department and the level of funding allocated to technology endeavors. **In assessing the project load and completion rate, it cannot be overstated how successful the current IT staff have been with limited personnel and funding.**

- The Town should increase the number of IT staff in order to keep pace with the desired level of citizen interaction and engagement, as well as to offer increased transparency and accountability.

- Princeton offers several online services for its citizenry and the addition of SeeClickFix is an excellent tool for citizen engagement.

- The Town website is a source of concern for many of the Town Council and staff. Options for the website are included in Section 6.

- High-quality communications are the hallmark of a high-performing IT Department. Princeton' IT Department needs to engage in more frequent

communications with its end users and elected officials to facilitate needs assessment and service delivery.

- Employee-focused technology investments will produce substantial efficiency and effectiveness results, thereby improving citizen service and tax dollar investments. While citizen-facing applications are important, the Town needs to ensure adequate investments in the utility functions of IT.

- Additional recommendations are found in Section 6 of this report, along with a collection of tools and sample templates in the appendices.

Through the structure outlined in the IT Review, the Town of Princeton has refined its focus on high-priority IT initiatives and continues to work toward integration of disparate data and systems into unified, cost-effective solutions. Additionally, measures of success are offered to ensure a focus on customer service and delivery. Finally, the report outlines the required investments in infrastructure and technology initiatives that will provide a foundation for long-term economic viability and service enhancement. The investments will identify two main areas of focus, citizen engagement and Town operational efficiency/effectiveness. Both areas of investment are equally important, with specific timing of the investments outlined to reap maximum benefits.

As Princeton executes the Strategic IT Review, its citizens will continue to see improvements in the quality and accessibility of Town services. The residents will have their personal information protected and taxpayers should rest assured that IT investments are being selected, implemented, and managed wisely. Furthermore, Town employees will have the tools needed to provide the highest-quality services to their customers. Princeton will continue to serve its residents, businesses, and visitors as effectively as possible by turning this report into action.

SECTION 1: STRATEGIC INFORMATION TECHNOLOGY REVIEW OVERVIEW

Introduction

Both internal and external environments of the Town of Princeton are changing, particularly through the consolidation of the former Township and Borough. Technology is a critical supporter of the development, implementation and enhancement of Town services. As a result, it is imperative to outline an overall approach for the selection, use, and support of technology that aligns with Town resources, business needs, and processes. Therefore, a Town-wide approach based on standards, consistency, and compatibility will make more cost-effective use of technology.

The Princeton Strategic Technology Review is outcome-oriented and highlights both short-term needs and long-term requirements for cost-effective, practical technological solutions. Through the investment in and use of advanced technology, the Town can place a strong emphasis on both external and internal customer services. The Strategic Information Technology Review provides a framework for the effective management of Information Technology. The primary goal of IT is to support the business objectives of the Town and to facilitate departmental efforts to provide efficient and effective services to the citizens, businesses, and visitors of Princeton.

As is the case with all strategic reports, this is a "living document" which allows for changes over time and serves as a broad guideline for action. The nature of technological advances and changing governmental needs will mandate report revisions. The review is designed to link the Town's goals and priorities with information technology to provide improved government functions and enhanced customer service.

This review is not intended to limit department autonomy but rather to provide a comprehensive roadmap focused on solving common problems and enabling collaboration. The report is built on the IT management model which utilizes the best features of both centralized and decentralized IT management, support and decision making. The Review also requires the development of the IT architecture and standards which are critical for true economies of scale to be reached and for interoperability to occur.

Some of the benefits of this strategic information technology review include:

- An opportunity to convene a strategic team of thought leaders from the Town of Princeton in order to address the critical issues facing the citizens in a holistic manner.
- The assessment of strengths, weaknesses, opportunities, and threats within the Town related to business process and technology.
- The identification of enterprise-based, inter- and intra-jurisdictional technology solutions to public sector business problems.
- The examination and articulation of best practices from other communities in order to capitalize on strategic technology investments.
- Alignment mapping of technology initiatives to Princeton's vision and goals, thereby increasing the business case for the investment.

In particular, the report examines current investments and operations for re-engineering, communications and connectivity opportunities across the jurisdictions, and enterprise solutions that can be leveraged to increase the effectiveness and efficiency of the departments within the Town of Princeton.

Strategic IT Review Process

The steps involved in the planning process included:

- Establishing satisfaction baseline through use of surveys distributed to all Town employees. In addition, satisfaction data will be collected during supplemental interviews.
- Establishing current status review through the use of interviews and focus groups with each department head and selected end users in the Town.
- Conducting issue identification sessions with selected staff once initial interviews and surveys have been completed.
- Conducting needs definition session with selected staff.
- Conducting best practices research to help guide the Town in the strategic investment in technology. This research will include assessments of current successful strategies and investments in the public and private sectors.
- Preparing draft reports containing:
    - Current strengths, weaknesses, opportunities, and threats.
    - Current public administration and technology trends that will impact the Town.
    - Success stories within the Town.
    - Future projects for the Town (focused on hardware, software, personnel, and policies/procedures)
    - Commonalities identification between departmental efforts
- Conducting review/priority setting sessions with Town Administration, IT Staff, and selected departmental staff.
- Preparing final strategic information technology report and executive summary.
- Presenting final report to Town management and staff.

Scope of the Strategic IT Review and Recommended Options

The Town of Princeton Strategic Information Technology Review provides a framework for the effective investment in and management of information technology from an enterprise perspective. The primary goal of the IT Department is to support the business objectives of the Town government and to facilitate departmental efforts to provide efficient and effective services to the citizens, businesses, and visitors of Princeton. The report examines the current state of technology in Princeton, relative to peer communities. Department technology efforts and ongoing activities are assessed for consistency with the strategic review. The report also provides even greater alignment between the business units and the IT Department in order to cement the foundation for an enterprise-wide approach to the management of information technology.

Many future technology efforts will cross multiple departments with a single goal of providing services to the citizens, businesses, and visitors of Princeton. This environment requires technology to be used as the basis for communication, interoperability, data and resource sharing. Furthermore, technology is the vehicle through which cost reduction can occur by increasing efficiency and effectiveness of services through the use of an enterprise architecture and standards.

SECTION 2: STRATEGIC CONTEXT

Overall Goals and Philosophy for Princeton

The Town of Princeton is a unique and thriving community, which recently completed consolidation of the former Princeton Township and Princeton Borough into a unified Town. The Town boasts an open semi-wooded community with diverse housing, strong recreational opportunities, and is the home of Princeton University. The philosophy of the newly formed Town is based on a deep-seated commitment to citizen engagement, quality of life enhancement, and strategic investments that improve the lives of residents, businesses, and visitors. In addition, the Town is unwavering in its efforts to provide holistic, equitable, efficient, and effective high-quality services to the community. The focus on strategic investments in technology will help to increase trust, recognition, communication, accountability, innovation, and excellence in the Town of Princeton.

Role and Responsibilities of IT Department

The IT Department is a service organization which operates solely to meet the needs of Town employees, residents, visitors, and businesses. The projects undertaken by the IT Department are driven by organizational and departmental needs and opportunities.

The guiding mission of the Information Technology Department, in support of the Town of Princeton, is to provide strategic oversight of information technology in order to provide better and more cost effective services to the public while providing stewardship of the Town's digital information assets. In support of Council priorities, Information Technology works with Town Administration and departmental staff to ensure technology is deployed in a cost-effective manner, while focusing on improving efficiency, collaboration, reduction in error rates, statutory compliance, and increasing levels of customer service and services to the public. This report links the IT Department's goals and objectives to the goals and objectives of the governmental enterprise, as well as to individual departments, in order to meet citizen needs using flexible, productive, and innovative approaches.

Furthermore, the Town of Princeton IT Department, along with other Town departments, is responsible for creating a quality-focused, highly productive, responsive organization, which meets and exceeds customer requirements through continuous improvement of products and services. The goal of the department is to support the business units within the Town through the strategic use of technology, in a manner consistent with service-aligned IT. In addition, enhanced efficiency, effectiveness, and service delivery are critical to the Department and the organization at large.

The Mission of the Town of Princeton IT Department

The mission of the Princeton IT Department is multifold. Its primary objective is to provide strategic information technology leadership, resources, and access to internal and external customers within the Town. In order to accomplish this goal, the IT Department focuses on the Town's overarching goals:

I. To evaluate the needs of the public through improved citizen interaction

II. Provide quality cost effective services to the community

III. Improve public access to the Town and its services

MISSION

The Town of Princeton's IT Department is responsible for achieving excellence that is unparalleled in local government by providing leadership in implementing, supporting and delivering technology solutions aligned with organizational goals and objectives.

In order to facilitate meeting the objectives above, the IT Department:

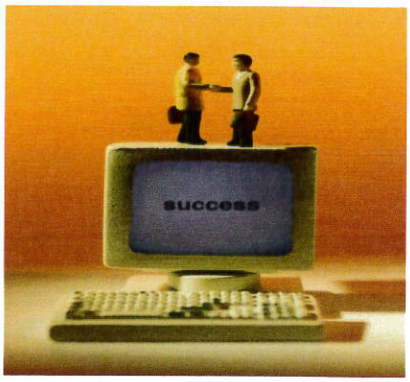
- Supports Town departments through the skills of the IT staff, including identification of technology trends, examination of key business functions, and business process analysis and re-engineering.

- Supports the Town's mission by identifying, providing, and maintaining information technology systems and applications.

- Empowers internal and external customers to create a positive Town experience through the strategic use of technology.

Each of these objectives makes the Town of Princeton a better place to work, live, and visit through the strategic use of information technology.

SECTION 3: MAJOR PRINCETON IT ACCOMPLISHMENTS & ASSETS



This section outlines the major technology achievements in the Town of Princeton in the past two years, particularly focused on accomplishments occurring since consolidation. The level of technological sophistication is particularly impressive in the Town, given the size of the IT Department and the level of funding allocated to technology endeavors. **In assessing the project load and completion rate, it cannot be overstated how successful the current IT staff have been with limited personnel and funding.** The following list, although not exhaustive, should be heralded by Town Council, Administration, staff, and citizens, as this volume of production from a staff of 2.5 employees is unprecedented. Appendix A offers a list of current IT projects underway in the Town of Princeton for your review.

Selected Major IT Accomplishments

1. Physically moved the IT department to new office space
2. Physically moved Code enforcement office
3. Reorganized Code enforcement physical layout on 3 occasions
4. Physically moved Finance
5. Physically moved engineering
6. Physically moved Zoning
7. Physically moved Municipal Court
8. Physically moved Clerks office
9. Physically moved Administration
10. Set up satellite office in Monument Hall for Deputy Administrator
11. Physically moved Affordable Housing
12. Physically moved Human Services
13. Physically moved Tax Collection
14. Physically moved Sustainable Princeton
15. Removed network from DPW laborers trailer, and oversaw network installation in new laborers trailer

16. Physically moved DPW foreman
17. Oversaw network installation in new DPW Forman trailer
18. Physically moved DPW from trailer, removed networking, and set up in new location
19. Physically moved Fire Inspection and Housing
20. Physically moved Office of Emergency Management twice
21. Physically moved Fire inspector twice
22. Oversaw expansion of Mitel phone system to add all old Borough users
23. Coordinated porting of all old Borough municipal phone numbers to Broadview networks on Town side
24. Physically moved Police department including 911 communication center
25. Oversaw Code Enforcement Mitchell Humphrey database migration
26. Oversaw Finance Edmunds migration
27. Oversaw Finance Municipal software migration (Jan 2014)
28. Oversaw Time and Attendance software migration
29. Moved Time and Attendance data to cloud based solution
30. Physically moved Corner House
31. Remove all network and PCs from old Corner House location
32. Set up and install 16 new PCs for Corner House
33. Oversaw construction of new Corner House location including network runs, phones, door access system
34. Oversaw door access system expansion to Monument Hall
35. Oversaw Lawsoft Database migration from previous CIS and Enforcesys
36. Set up reverse 911 self-registration and added old Borough residents
37. Assisted with Website migration for new town
38. Secured Princetonnj.gov domain
39. Outlook and Office 2013 email and software migration (Jan 2014)
40. Issues new town identification cards to entire staff
41. Oversaw door access system and ID Badge system migration into new software
42. Installed two new SAN servers with live replication
43. Dealt with SAN Failure and data loss
44. Installed new Barracuda backup solution
45. Developed trust's between all domains
46. Created new scripting for end user log-ons
47. Installed large monitor and laptop for code enforcement for plan review
48. Replaced 25 end users PCs
49. Oversaw smart card hardware installation in Monument Hall and Witherspoon Hall
50. Coordinated phone line installation for smart card machines
51. Installed 5 large battery backup solutions in Penthouse

52. Acquired an ARIN Number and went through process
53. Coordinated Princeton Community Housing lease re: technology and oversaw physical install and move
54. Successfully ran scans and removed Crypto locker virus on Fire Inspection shared drive
55. Successfully restored all Fire Inspection files that were locked by Crypto Locker
56. Numerous virus removal and cleaning of various end users PCs
57. Oversaw new 911 hardware installation and project management
58. Oversaw new police radio hardware installation and project management
59. Moved several servers that failed to virtual environment
60. Added numerous departmental printers, and general Princeton replacement
61. Researched and ordered color copier for administration
62. Set up scan capability for all copiers to email and mapped drives
63. Coordinated migration of old Borough and Township wireless accounts
64. Replaced 20 cell phones
65. Assisted with assumption of liability for cell phones coming onto our wireless account and going off our account do to staff leaving or retiring
66. Oversaw construction on technology side of new pool complex
67. Added 8 additional cameras in pool complex, including connection into our network for viewing by police communications
68. New police communication radio consoles
69. New digital radio infrastructure equipment
70. New mobile radios
71. New portable radios
72. Set up room reservation calendar to be viewed outside of domain
73. Add Monument Hall conference rooms to room reservation calendar
74. installed large flat screens in all Monument Hall conference rooms to be used by public and departments projecting their laptop
75. Replace panja control board from main meeting room which went bad, and programmed same
76. Videotaped all Council meetings
77. Developed and oversaw new video upload to webmaster to include Council videos on website
78. New MDT software migration and installation
79. MVR integration for all Borough cars to existing Twp. server
80. Installed time and attendance kiosk in Police,
81. Installed time and attendance kiosk in Harrison St DPW
82. Installed 8 new MDT computers in old Borough police cars
83. Oversaw Large Doc solutions database update
84. Served on transition task force technology subcommittee

85. Installed new 4G modems in all police patrol vehicles
86. Narrow banding of police, fire and EMS radios
87. FCC licensing modifications
88. New surveillance cameras and DVR system
89. New police GIS mapping
90. Radio setup for pool and camp staff
91. Oversaw new HVAC system installation in Penthouse and police teleco room
92. Oversaw dog license database migration
93. Mapped various drives based on need of combined departments
94. Worked on project management of wireless access in Monument H
95. Coordinated issuing of physical keys to employees during moves
96. Coordinated rekeying on police admin
97. Coordinated rekeying of Corner House
98. Issued numerous key fobs for door access to employees due to moves
99. Researched email options
100. Researched mobile application software
100. Coordinated See Click Fix installation
101. Coordinated IQM2 installation
102. Numerous Council memos and resolutions
103. Served on multi-meter committee and oversaw technology cdma requirements
104. Physically moved Animal Control officer on two occasions
105. Coordinating Windows XP nonsupport by scheduling pc replacements and looking at software compatibility issues for existing software
106. Went through FBI audit in police department and coordinated IT aspects
107. Created capital budget for combined town
108. Received and prioritized the following service tickets
    - Year 2011= 982 tickets
    - Year 2012= 3757 tickets
    - Year 2013= 4150 tickets
109. Research for loud bell in public works shop for phone system
110. Researched a new network support option
111. Trained new network support team
112. Added panic alarms and relocated alarm system based on moves for Monument Hall
113. Designed new ID badges for new town
114. Converted service tickets to Spiceworks
115. Installed LogMeIn on all servers and workstations
116. Installed anti-virus and remote wipe for cell phones
117. Setup and coordinate police auto attendant
118. Evidence database migration to Best software

119. Crossmatch database migration
120. Mug shot database migration
121. Removal and disposal of old technology equipment throughout the town
122. Meeting with Library on capital projects
123. Meeting with Deputy Admin re town wide Wi-Fi project with merchants association
124. Setup mass calling system for police to merchants, press etc.
125. Setup and coordinate Emergency Operation Center for various storms
126. Issued iPads for various departments
127. issued replacement iPads for various departments
128. Installed time and attendance kiosk at Spring Street garage
129. Added additional computers for police report writing
130. Completed several OPRA requests
131. Removed and secured PCs for possible litigation
132. Worked with Schools to develop fiber map
133. Researched and oversaw Comcast business installation
134. Establish remote access for authorized employees to work from home
135. Install Artemis State of NJ Records management software on all custodian of records throughout town

Selected Major IT Assets

The Town of Princeton has a variety of strategic assets which should be recognized as valuable to the community, and this review would be remiss if they were not noted. In particular, the Princeton Public Schools provides a tremendous asset to the Town at no additional cost through its extension of iNet and fiber connectivity to the Town facilities through their franchise agreement with Comcast. This relationship with the school system is critical to the Town and should be commended as an excellent example of good government.

SECTION 4: CUSTOMERS & SERVICES OF THE IT DEPARTMENT

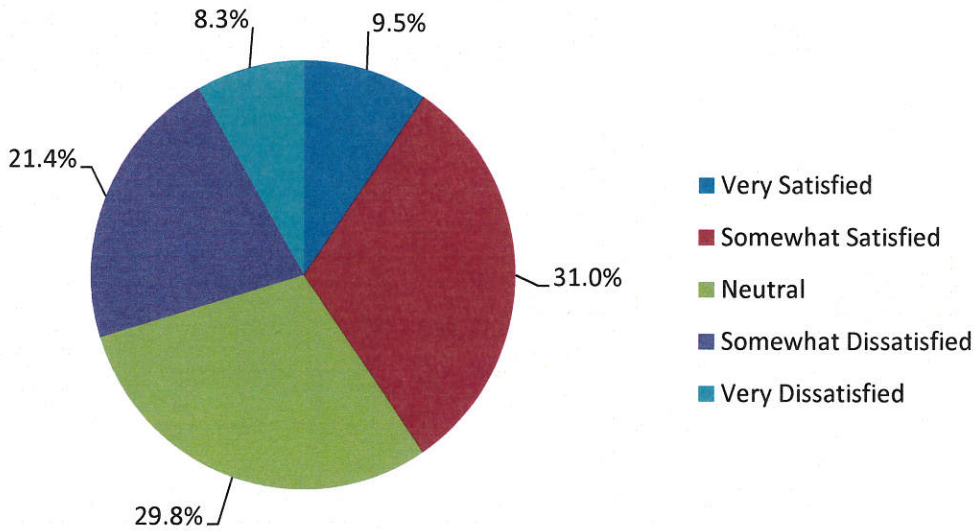
Internal Users Satisfaction

In order to determine a baseline for measuring customer satisfaction with the IT department, a brief survey was conducted on a variety of technology-related topics. The survey was designed to assess customer satisfaction by those departments supported by the Princeton IT Department. The following charts demonstrate the satisfaction ratings of Town employees across all Princeton departments. In Appendix B, the entire survey instrument and its data are available for review.

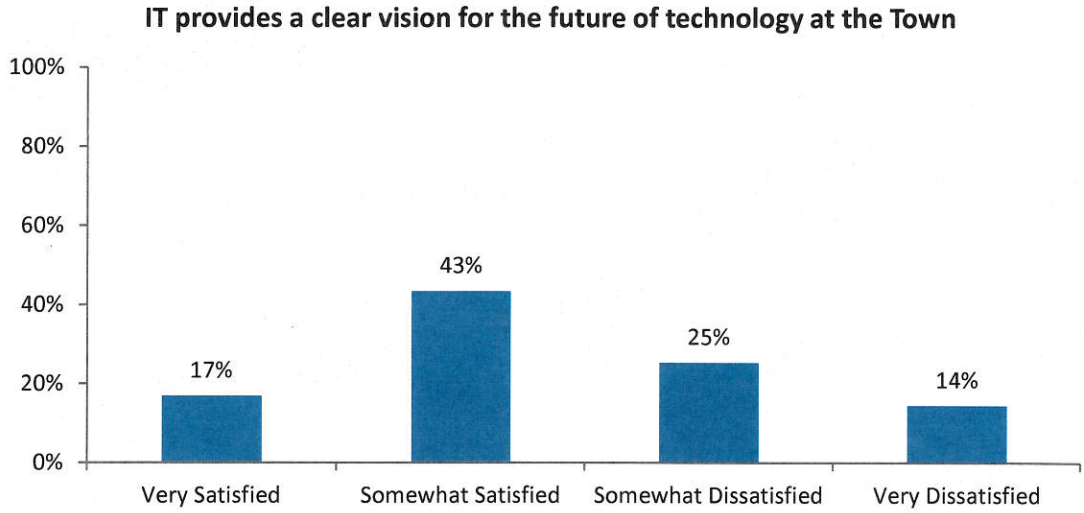
Technology Direction and Leadership: Technological Change

One of the first items assessed was general satisfaction with technological change within the Town. As noted in the chart below, forty percent (40.5%) of the respondents are satisfied with the rate of change, indicating moderate desire for increased technology investments and associated advancements.

How satisfied are you with the rate of technological change within Princeton?



Technology Direction and Leadership: Vision of Technology

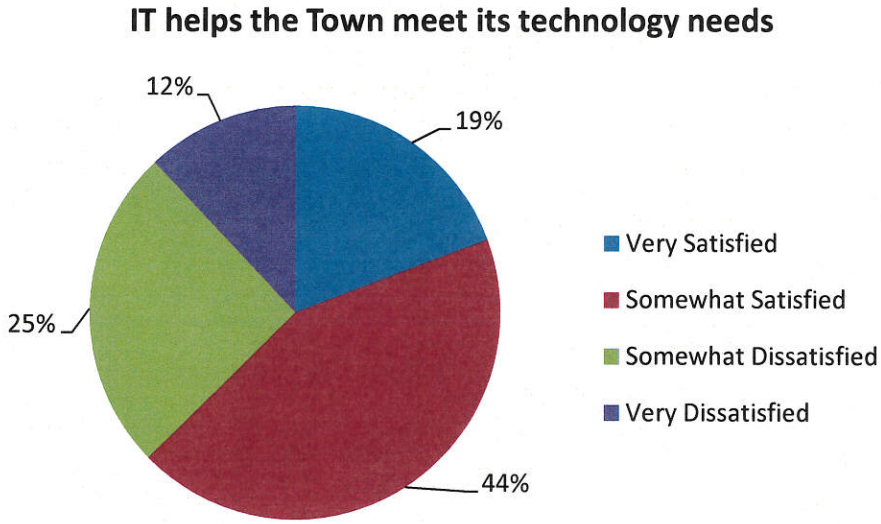


One of the most important jobs for an IT organization to perform is to set a clear vision for the future with respect to technology investments. The responding employees indicate a sixty percent (60%) satisfaction rating with the current IT vision. The use of this strategic IT review is designed to increase satisfaction related to guiding vision by providing a written roadmap. Vision is critical to all IT investments, as it is a function of gathering the various enterprise participants' business requirements and needs, and subsequently providing a holistic solution to mitigate organizational challenges and capitalize on organizational opportunities.

As Princeton moves forward with its technology investments, it is critical that the organization utilize an IT Governance structure to assist with setting and communicating the vision for technology in Princeton. Information specific to the IT Governance structure is provided in Appendix C.

Technology Direction and Leadership: Technical Assistance

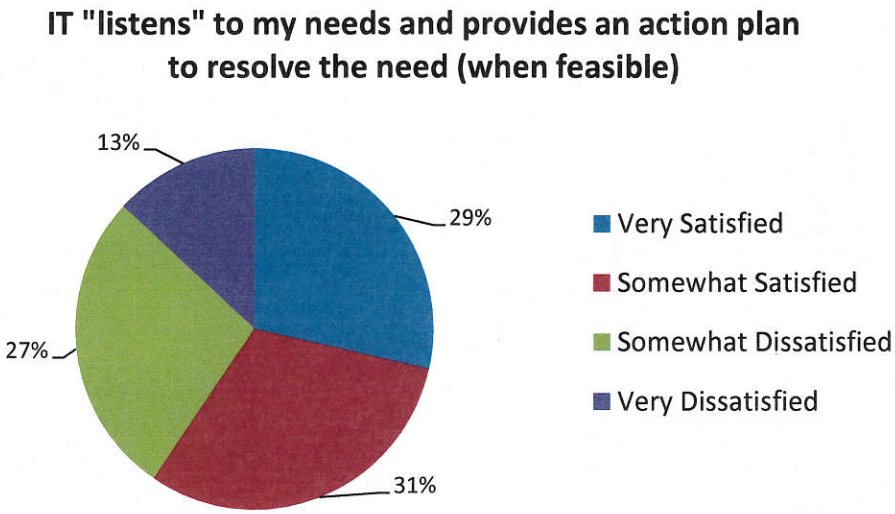
As noted in the chart below, sixty-three percent (63%) of employees served by the IT department are satisfied with the current level of IT department assistance in meeting technology needs. Based on benchmarking data from other municipalities across the United States, Princeton is slightly less comparable to the majority of governments in terms of satisfaction levels with strategic vision and assistance. Ideally, the Town should strive for ninety percent satisfaction ratings on meeting technology needs

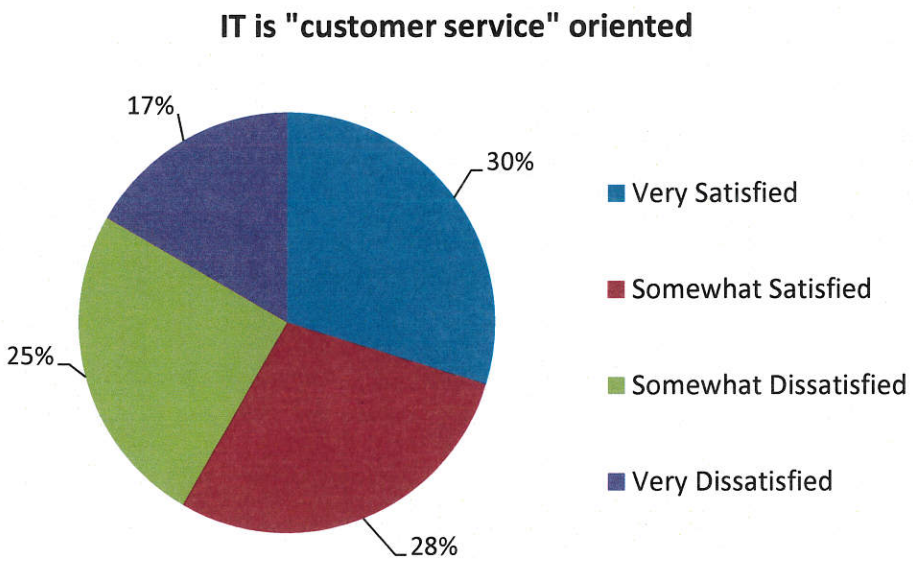


In interviews with the department heads and staff, there was significant discussion about ways to further enhance the assistance levels offered by the IT department. One such improvement can be found by implementing employee self-service for standard IT requests. For example, implementing a software solution that allows employees to deploy a challenge-response scenario to reset passwords would substantially reduce Help Desk calls and improve overall efficiency of operations. In Section 6. Enterprise Strategic Initiatives, concepts such as IT Governance, Employee Empowerment, and Service Level Agreements will be offered as mechanisms to foster more departmental satisfaction with the IT department.

Technology Direction and Leadership: Customer Service Orientation

Customer service is another critical focal area for Information Technology departments and their customers. As noted below, sixty percent (60%) of the survey respondents are satisfied with the listening and resolution skills of the IT department in Princeton, which is an area for considerable attention and ripe for improvement.





The customer service chart above indicates a moderate level of satisfaction with the customer service focus of the IT department (58 percent). While the IT Department is responsible for ensuring the security and integrity of the Town's information resources, it is also important to offer high-quality customer service. Although the survey respondents are fairly satisfied, customer service is an area for continued improvement for the Town of Princeton's IT Department.

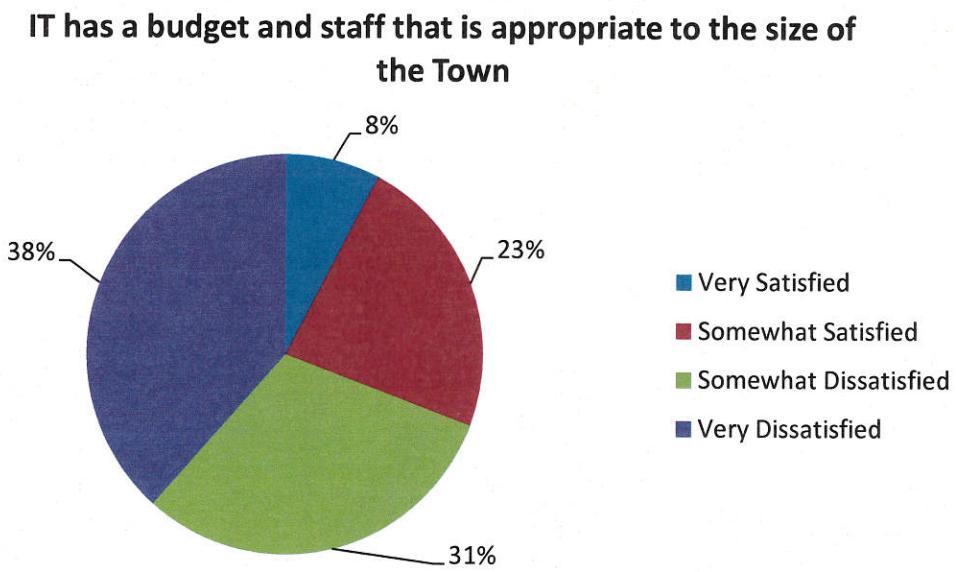
The previous two charts are a particularly salient set of measures, as customer service is the ultimate goal and focus of the Princeton IT Department. Compared to local governments in the United States, the "listening" satisfaction level and the "customer service" rating are slightly lower than most jurisdictions and offer opportunity for significant improvement.

"Quality in a service or product is not what you put into it. It is what the client or customer gets out of it."

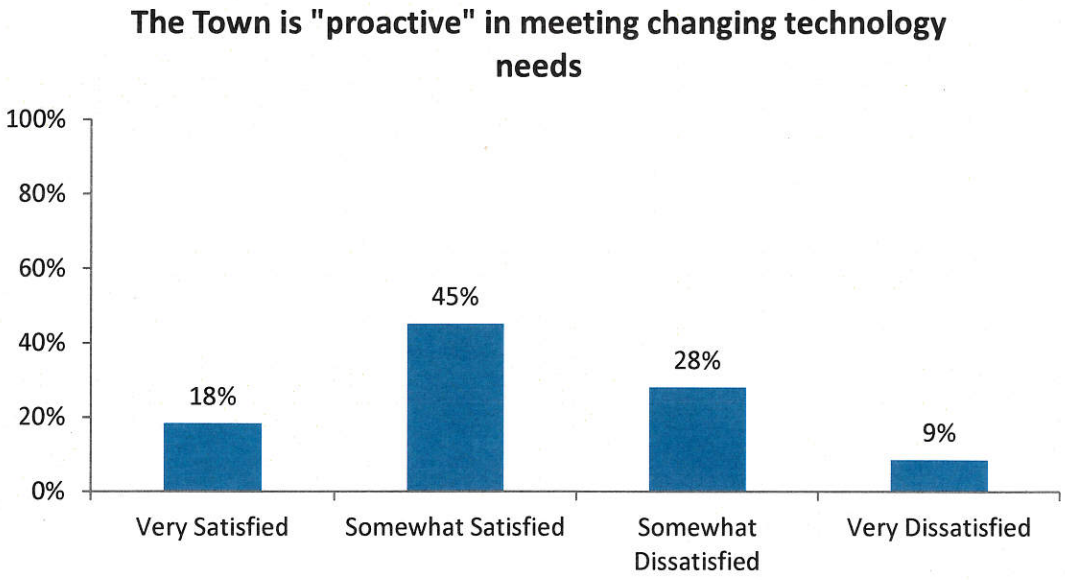
Peter Drucker

Technology Direction and Leadership: Budget and Staffing

One area of repeated concern, as indicated in the survey data as well as through departmental interviews, is the limited IT staff and budget. In fact, the sixty-nine percent (69%) dissatisfaction rating with the IT budget and staff size is the largest dissatisfaction rating ever noted by the consultant during the course of this type of work in other jurisdictions. Across the United States, local governments spend approximately two percent of their general fund budgets on technology initiatives, staffing, support, and maintenance. In leading-edge communities, that percentage is closer to five percent of the general fund. Furthermore, in the private sector, the average expenditure on technology ranges from eight to thirteen percent. This disparity fosters the slow adoption rate of technology in the public sector and limits the efficiency and effectiveness gains possible from such investments. The chart below demonstrates that the majority of Town staff **do not** believe that the Princeton has a sufficient technology budget or IT department staffing levels.



Given the current economic climate in the Town and across the country, it is a difficult time to invest additional monies into technology endeavors. However, in order to remain current and to achieve the efficiency and effectiveness gains associated with technology, Princeton needs to increase its financial investments in technology, particularly staffing levels.

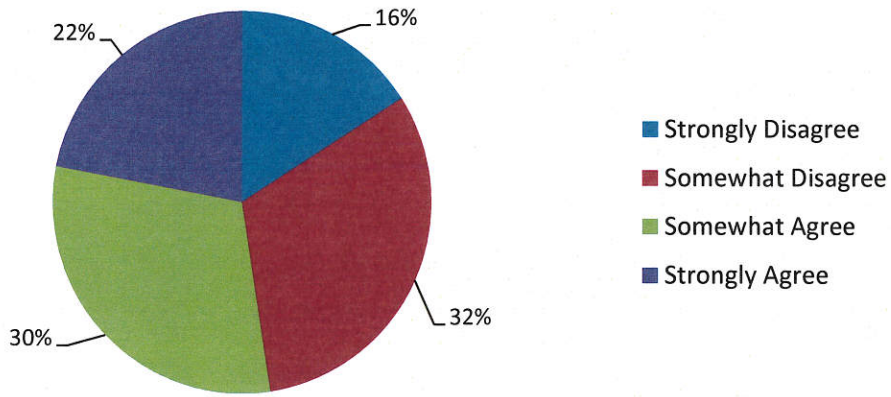


Due to the limited staffing and budget for technology, it is not surprising that thirty-seven percent (37%) of the Town's employees do not view Princeton as being proactive when it comes to technology investments. In fact, one of the biggest areas of concern expressed by department heads, Town staff, and IT personnel is the limited investment in technology and the general perception that Princeton is less technologically advanced compared to similar sized jurisdictions. As the Town continues to realize the importance of strategic IT investments, it will be necessary to increase funding levels. However, more importantly, it is necessary for Princeton to identify key enterprise technology opportunities which have the greatest impact on citizens, businesses, visitors, and employees, and place priorities on those strategic investments. Section 6 will offer some strategic technology projects for consideration.

Technology Direction and Leadership Summary

The survey respondents feel strongly that the IT department should be heavily focused on planning, visioning, providing customer service, and being proactive. These skills are necessary to move the Town further into the 21st Century, by virtue of creating an environment that is progressive, responsive, transparent, and forward-thinking. It is widely held that technology investments are as critical as other infrastructure and utility functions, and Princeton can reap significant benefits from transitioning into a model where they are seen as a technology leader for New Jersey municipalities.

Overall, I am satisfied with the level of Direction and Leadership provided by IT.

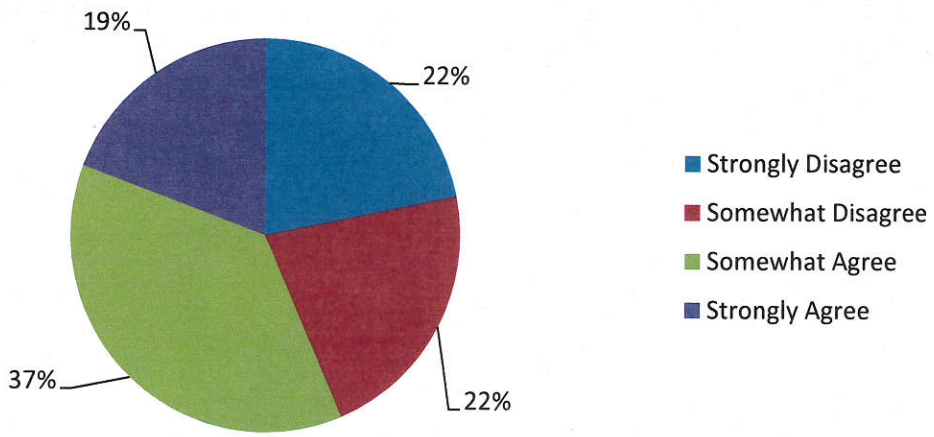


The slight majority of survey respondents (52 percent) are satisfied with the overall direction and leadership offered by Princeton's IT department. The individual comments provided on this survey question repeatedly note inadequate staffing and lack of ability to set direction due to limited control and oversight. There is also severe dissatisfaction with response times for routine technology issues, which is also a result of insufficient staffing levels. These findings are consistent with the various interviews conducted and the recommendations section (Section 6) will offer suggestions for improvement.

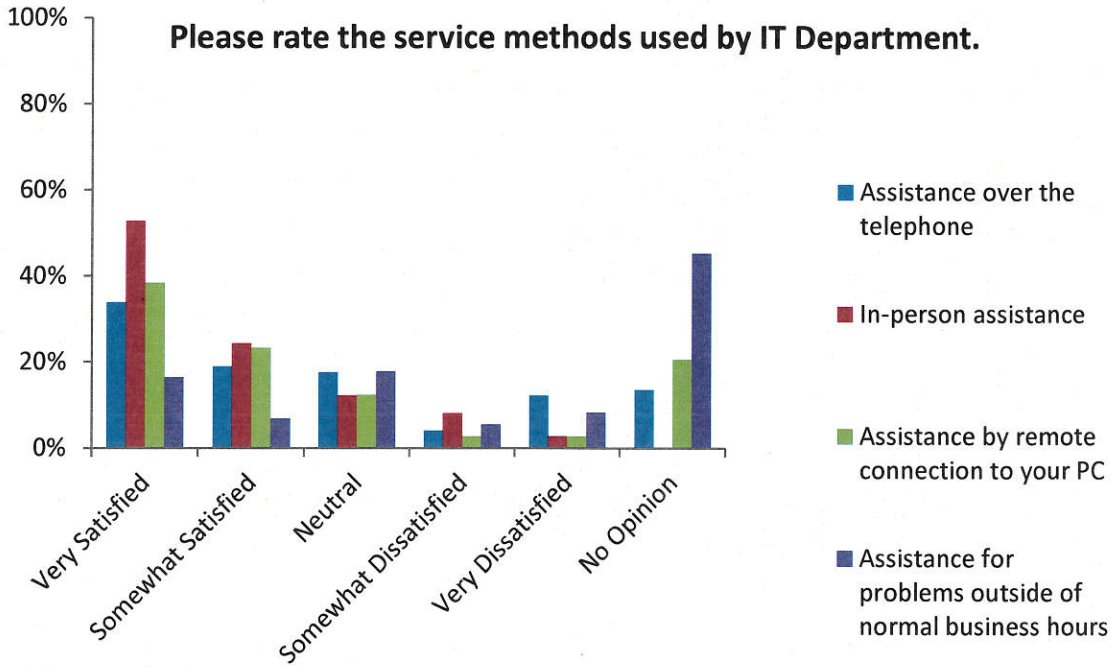
Communication and Service Delivery

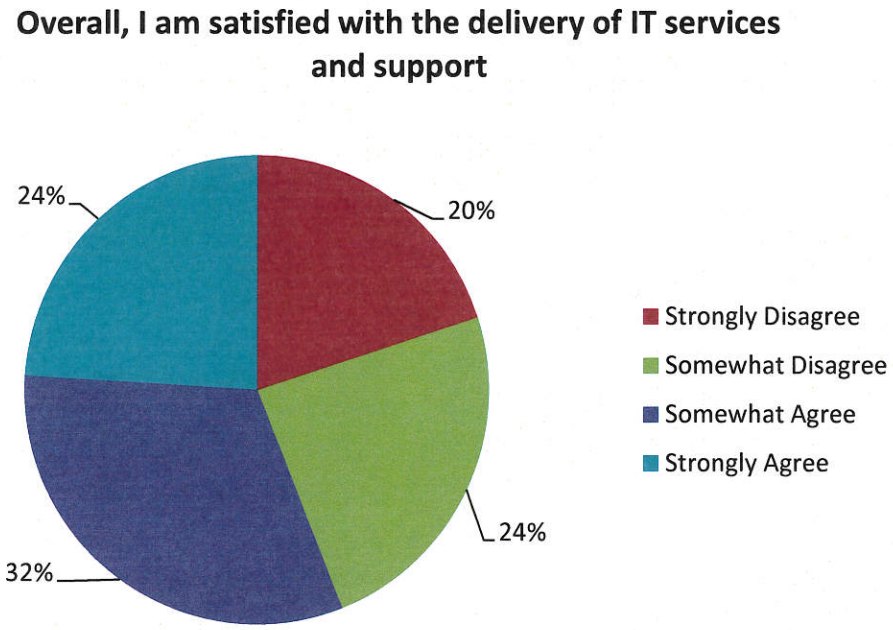
Communication and service delivery major components of describing the end user experience and satisfaction level with a given IT department. In Princeton, communication is one area of concern, as noted by the chart below. While the satisfaction level is moderate (56%), the IT department should strive for a satisfaction rating above 93 percent. Several proposed solutions in Section 6 will address the communication challenges currently found in the Town.

Overall, I am satisfied that the level of communication with IT is effective and sufficient.



In terms of assistance and support offered by the Town of Princeton's IT Department, there is moderate satisfaction across the four types of assistance noted in the chart below. It is important to note the consistency across the in-person, telephone, and remote PC assistance. Currently, the IT department is substantially under-staffed and in order to provide the level of customer assistance, particularly outside of normal business hours as preferred by Town employees, additional staff are mandatory. Section 6 will offer additional input on the current staffing levels within the Town of Princeton.


Please rate the service methods used by IT Department.
100%
80%
60%
40%
20%
0%
Very Satisfied
Somewhat Satisfied
Neutral
Somewhat Dissatisfied
Very Dissatisfied
No Opinion
Assistance over the telephone
In-person assistance
Assistance by remote connection to your PC
Assistance for problems outside of normal business hours



Finally, as noted in the chart above, fifty-six percent (56%) of respondents are satisfied with the delivery of IT services and support. There are areas of weakness across the IT organization, based on information gathered from interviews and focus groups, but the general consensus of satisfaction is a positive and encouraging baseline data point. The following sections will address potential solutions and opportunities as identified by the survey and Town staff interviews.

Comparative Data

In addition to the internal customer satisfaction survey, an additional comparative survey was conducted to create peer-based benchmarks. The organizations included in the benchmarking snapshot include similar sized organizations in New Jersey, as well as a comparable university town.

IT Staffing Levels

In terms of IT staffing levels, Princeton has the smallest number of IT staff (2.5 FTEs, as noted on the graph below), even compared to slightly smaller jurisdictions.

Town	Total Employees (or Supported Devices) (approximate)	Total Number of IT Staff within IT Department (FTEs)
Princeton Library	100 supported devices	2.25
Princeton	225 employees	2.5
Chapel Hill	550	9 (Police has 2 separate IT staff not included in count)
Franklin Township	235	3 (Police has additional support person outside IT)

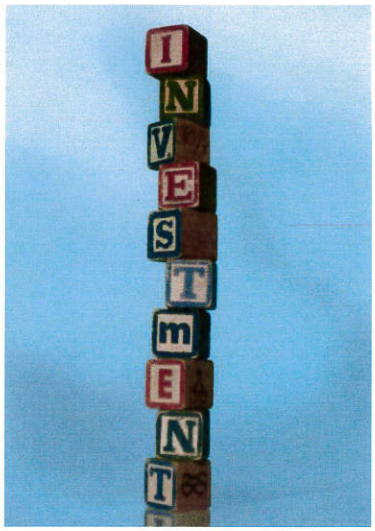
It is also important to note that as a function of consolidation (additional users, new systems, etc), the number of Help Desk tickets rose from 981 in 2011 to 4130 tickets in 2013. The number of Help Desk tickets indicate that additional resources are needed to provide high-quality customer service for daily support and maintenance issues, as well as allow the Town to perform large technology-enabled projects, like new software implementations.

IT Capacity Levels

Staffing areas of notable concern related to the benchmarking data include technical support staff (Help Desk functions) and networking staff capacity (currently outsourced). Possible opportunities for shared services and other alternative proposals for funding additional staffing are noted in the Recommendations Section (Section 6). .

SECTION 5: SERVICE ALIGNED IT INVESTMENT STRATEGY

The Vision



The technology vision for the Town of Princeton capitalizes on the benefits derived from strategic technology planning and investment, both for internal departments and external customers. The vision is aligned with Council and staff goals, objectives, and strategies in an effort to stay focused on service aligned investments. In the service aligned investment model, IT investments are driven by citizen and departmental needs and focus on agility in the provision of services. Success in this service-aligned model is dependent on a clear understanding of Town of Princeton priorities and how business is conducted by Town departments and the citizens who interact with those departments.

In order to facilitate this understanding, the Town IT Department needs to establish Business Relationship Manager roles within its department, similar to the current role performed for the Police Department. In order to establish these critical roles, additional IT staff are required to ensure that service levels do not deteriorate as the Business Relationship Managers work with departments to gather mission-critical knowledge. The Business Relationship Managers work closely with departments, developing knowledge and understanding of their business processes, objectives and technology needs. By employing strong business skills to support equally strong technical capabilities, the IT department can achieve a holistic understanding of how services are consumed by the business, how IT's actions affect departmental productivity, and how to provide innovative solutions. The IT Department can review and enhance its service offerings and capacity using these resources.

Furthermore, it is critical that strategic technology planning become an integral part of each department's annual planning process, as well as a key component in the long-range planning of the Town. It is important to note that this strategic technology review is not limited to technological infrastructure, hardware, and software, but rather, encompasses all strategic information management functions. Therefore, the strategic technology vision for Princeton includes:

- The adoption of a strategic technology investment strategy that aligns functional Town Council and departmental goals, objectives, and needs with technological solutions. In essence, the business of government will become enabled by technology instead of technology driving the business changes.

- Creating, extending, upgrading, and maintaining of the technology infrastructure to allow the Town to effectively and efficiently communicate between locations, departments, and individuals.
- Build upon and extend the utilization of performance metrics and customer service commitment to ascertain progress.
- Utilize IT service management as a mechanism to provide superior, equitable customer service and problem resolution.
- Enterprise approaches to strategic IT investments are also central to leveraging economies of scale and holistic solutions.
- Provide Town residents and staff with more convenient, open access to information in order to facilitate decision-making.
- Recognize and embrace the value of innovation as a critical means to improving services.

The driving vision for information technology (IT) within the Town includes the development of an enterprise-wide focus on IT, a focus on the customer and the use of IT as an enabler in efficient and effective customer service.

Achieving Excellence through Technology

Operational Excellence Foundation

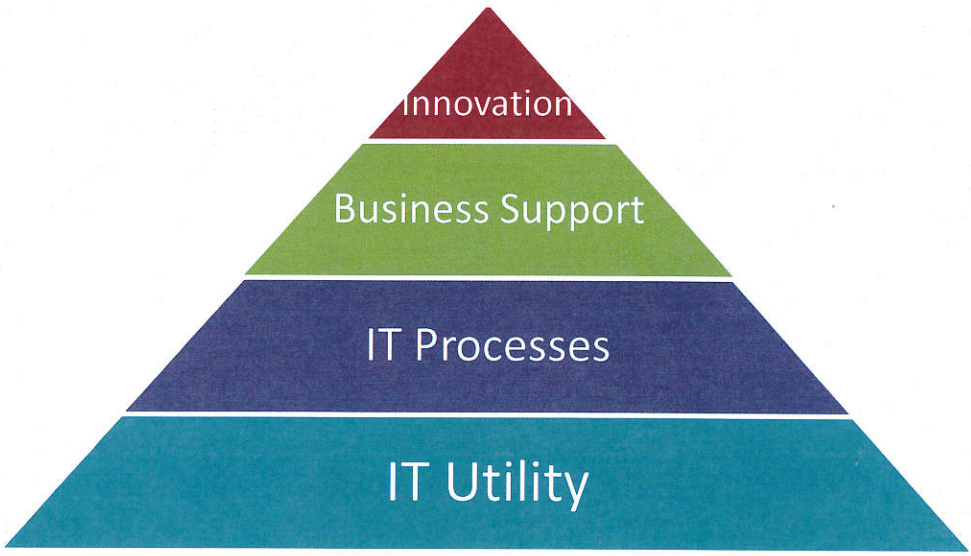
As service-aligned IT evolves in Princeton, the Town IT Department will operate from a foundation of operational excellence, as outlined in the following table. These criteria are part of the IT department's objectives and are simply noted to offer guidance and reference to the service-aligned IT model.

Provide Excellent Customer Service	Leadership	Ensure Strategic Use of Technology	Education	Decision Support
✓ Ensure stable and productive technology environment that supports departments in the performance of their missions	✓ Set technology direction and standards based on service aligned investment methodology	✓ Ensure software purchases and development are consistent with existing technology standards	✓ Ensure users are properly trained on essential technologies	✓ Assist Town departments in assessing software purchases
✓ Respond to requests for service within specified timeframe	✓ Staff the Town IT Governance Committee	✓ Ensure support for enterprise solutions	✓ Provide tutorials for self-paced learning	✓ Evaluate buy vs. build software solutions
✓ Provide deliverables within promised timeframes	✓ Develop a vision for technology in the Town	✓ Determine interface requirements to existing systems	✓ Make e-learning opportunities available	✓ Ensure contractual standards of support
✓ Defining clear scope of expectations with end users	✓ Facilitate organizational process improvements	✓ Identify emerging technologies which will meet the organization's needs	✓ Provide documentation for key processes	✓ Assist departments in management and service delivery
✓ Assist end users in identifying needs and understanding requirements				

SECTION 6: STRATEGIC ENTERPRISE TECHNOLOGY INVESTMENTS

Overview

As information technology investments increase across the Town of Princeton, **there is a marked need to increase the level of staffing, funding and support** for these value-add services. The most critical components to ensuring the success of the projects in the coming pages are related to the base level IT investment noted in the schematic below:



The IT Utility function is the base of support for all technological impacts, including efficiency and effectiveness gains, as well as innovation and enhanced service delivery. In order to engender success for current and future IT investments, the Town must increase the current staffing level of the IT department. It is impossible to overstate the importance of increasing the current staffing level prior to engaging in the majority of the recommended, high-impact projects that will enable the Town to be a leader in citizen service and effective and efficient government. **Without increasing IT staff, the bulk of the projects contained in the following pages should not be undertaken, as they will increase risks for Princeton in economic, legal, and political arenas.**

The technology priorities center on specific categories of enterprise projects. Priority rankings of projects are offered in each categorical area for the Town of Princeton to consider. These priorities should be assessed by the recommended IT Governance Council and be revised as deemed appropriate. Priority ranking levels are described in the table below:

Priority Level Ranking	Description
Level One	A Level One project should be started within the next year in order to meet critical business support requirements.
Level Two	A Level Two project should be started within the next two years in order to further citizen and employee impact needs.
Level Three	A Level Three project should be assessed and started within the next three years to ensure innovation and technological advancement are occurring within Princeton.

As the recommendations are presented, please recognize the multi-faceted nature of IT investments and how many areas outside of the IT department are critical to making such investments successful. In the following pages, investments related to information technology will be offered for consideration.

PRIORITY LEVEL ONE PROJECTS

Shared Services Agreements:

The Town of Princeton has several opportunities to create Shared Services Agreements with surrounding organizations and communities. During the course of interviews with IT staff, Town Administration, and the Library Director, a clear opportunity for shared services was identified. Currently the library has 2.25 FTEs supporting its operation (and the Town has 2.5 FTEs). Both organizations could benefit from collaborative ventures, such as the Town offering email services to the library through the existing Town cloud solution. The library could pay for the additional licenses and it would eliminate the current server and management of the email application by in-house library staff. Furthermore, the Town and Library should explore the opportunity to share IT personnel through one centralized department in order to provide more continuity and support for both entities with lower overall costs. As shared services are considered, it is recommended that the Town CIO manage the staff included in this model and those staff are incorporated into the existing Town IT Department.

Another opportunity for shared services exists with Princeton Public Schools. Currently the school system shares a network engineer with another school system. The Town and school system should work together to determine the feasibility of a jointly funded network engineer to serve both entities, given their physical proximity and shared tax base. Other opportunities for partnering in areas such as redundant data centers for disaster recovery purposes should also be explored. In all cases of shared services, it is imperative that strong Service Level Agreements are negotiated at the onset to ensure proper response times and prioritization for issues effecting the individual entities.

As shared services are negotiated, the Town should also take the opportunity to develop a policy for all non-Town departments and entities currently supported by the Town's IT Department. These entities are currently provided free IT support, and given the insufficient staffing levels within IT, there should be a cost model developed for such support. Some of the entities currently served at no cost to the respective organizations include Sustainable Princeton and the Susan B. Paterson Senior Center, among others. Appendix D is offered as a sample model for cost allocation across departments and other supported entities.

Staffing Needs within IT Department:

There is a clear need for additional staff within the IT Department. In order for the department to operate as a high-performing organization, individual staff need to have areas of expertise and specialization. In order to optimize the organization, the specialization of current staff indicates a need for training and certification among the IT staff, as well as an

increase in staff to provide additional services to the end users in the departments. Assuming the Town restructures the IT Department as suggested in the previous section (service-aligned model), there are specific positions that need to be considered for priority hiring. The most critical positions include: 1) making the current temporary IT staff position permanent; 2) a network administrator; 3) an additional technical support staff member (Help Desk); and, 4) a shared network engineer resource. Other positions are also needed as expansion occurs, but the greatest sources of concern are found in the areas previously noted due to concerns about staff redundancy and potential impact to the Town employees and citizens. As noted above, some of the suggested positions could be accomplished through a shared services model, which would be less costly for the Town and a strategic use of taxpayer dollars.

Information Technology Department Structure:

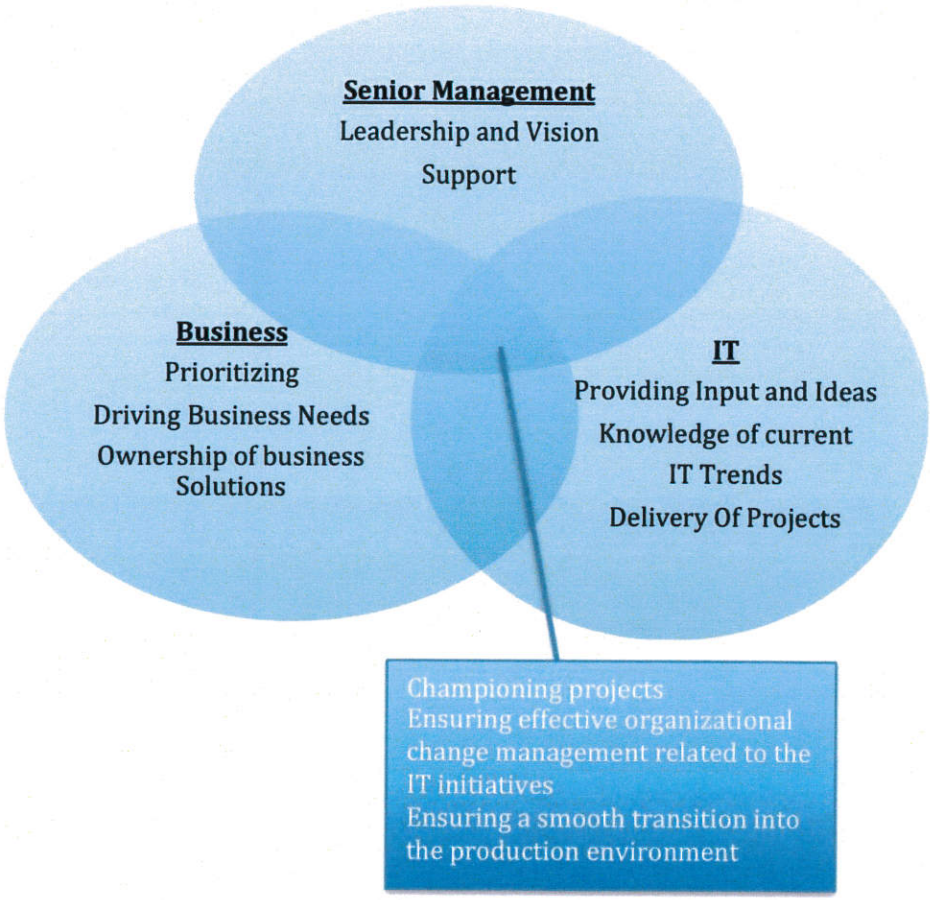
The IT Department is currently structured in a less than optimal format, with IT functions dependent upon individuals and limited shared knowledge. Increasing pressures on IT staff, coupled with the Town's desire to utilize technology to improve service delivery, enhance efficiencies, and ensure effectiveness, require Princeton to reposition the IT Department into a service alignment model. The first step in this process is to move the Town's Chief Information Officer (CIO) into a Director position, in order to ensure that all departmental requests for IT-related projects are discussed in Director-level meetings to ensure adequate understanding of resource availability. Furthermore, the new role of the CIO and the service-aligned structure will provide the IT Department with the organizational clout and buy-in with other department heads to provide the best technology solutions to departmental and enterprise needs and challenges. The current department and staff can be restructured into the new model but there is a significant need for additional position development and subsequent staffing in order to allow the IT department to focus on strategic initiatives and providing technology solutions to the business challenges faced by the Town and its various departments.

Accountability and Authority:

There are two major issues related to the accountability and authority of the Town of Princeton IT Director. First, the CIO needs to be given more authority over all departments within the Town with respect to information technology projects. The IT Director is the senior technology leader of the organization. Per the job description, the IT Director is accountable for all computing, communications and network technology across the organization. In addition, the position is responsible for long and short range planning efforts, establishment of new information technology policies, and to provide the leadership and vision for the Town of Princeton with respect to information technology. Second, the IT Director needs the full support of the senior leadership of the Town with respect to exerting authority. Currently, the IT Department's efforts for standardization and centralization have been circumvented due to autonomous decision-making at the departmental level. Together, the exertion of the position's authority and support from senior Town leadership can lead to more efficient and

effective service delivery from the IT Department. Several methods to increase the authority of the position can be adopted.

One mechanism for asserting this authority is to develop policies and procedures for adoption and use by the departments, with sufficient enforcement from senior administration. While policies and procedures do currently exist, those policies are not consistently implemented or followed across departments. The interviews revealed that many departments are aware of policies, such as time and attendance logging requirements, but have been given informal authorization by either department leadership or Town administration to operate outside of the required procedures. The suggested model is to develop policies and procedures, submit the documentation to Human Resources, and then Human Resources submits the recommendations to the Town Administrator for review, acceptance, and dissemination to the Town employees. Currently, the IT Director is perceived to be accountable for information technology across the organization but the position does not have the authority to ensure success. Additional efforts to improve this perception should be undertaken, such as clear policy directives, authored and supported by senior leadership, which indicate the leadership position of the IT Director. The following chart demonstrates the ideal relationship for IT as a strategic partner within the Town of Princeton.



Senior Management Support and Involvement:

The number one predictor of an IT project's success is top management support. Given the current leadership within the Town, there is ample opportunity to have more involvement from the technology-savvy management team. Many department heads, as well as IT staff members, noted a lack of political support for technology investments from the Town Council. However, the management team could provide the support and impetus to further accelerate Princeton' status as a technology leader across the state through its involvement in the IT Governance structure. Senior management support and involvement does not require additional IT staffing.

Connectivity and Network Extension:

Fiber and wireless networks are the future of the public sector. Improvement of the Town's network infrastructure is a major priority investment for the Town. As the Town continues to expand its service locations and increase service provision, it is essential that investments in capital technology infrastructure are included in such extensions. Clearly, fiber investments are critical to Princeton, in terms of connecting geographically dispersed governmental buildings and should be planned and budgeted for, as part of the capital budgeting process. It is especially critical to consider the installation of fiber loops across the Town, particularly to remote locations, for redundancy, continuity of business operations, and public safety. As new facilities are built for the Town, IT requirements, such as fiber optics, should be included at the onset of planning.

In areas where there is limited network connectivity or cost-prohibitive fiber installation, wireless investments (Wi-Fi, Wi-Max, or licensed spectrum point-to-point) may prove to be more cost-effective than fiber. In addition, the interest in the mobile workforce, as expressed by many departments, requires the utilization of existing wireless networks or the creation of new networks dedicated to public sector utilization as currently exists in Witherspoon Hall. A variety of efforts at the federal level are increasing the opportunities for local governments to access dedicated public sector spectrum for use in the creation of such wireless networks. The application of wireless networks has demonstrated an incredible return on investment, in terms of man hours and citizen perceptions. As the network extensions occur, mobile applications that run on wireless networks should be increasingly procured. One area of noted interest among government employees is the installation of internal wireless within the various Town buildings and locations.

Printing and Multi-function Devices:

The Town of Princeton should move to networked printers and multi-function devices exclusively. Currently the cost for ink cartridge replacement is in excess of $50,000 annually, compared to Franklin Township whose costs are roughly $10,000 annually due to eliminating desktop printers and requiring use of networked devices. As the Town moves in this direction, the IT department should no longer be in charge of ink cartridge replacement (ordering or installation). These costs should be part of each department's individual budget as part of office supplies, as the current staffing levels within IT cannot support the effort involved with ordering, managing, and installing individual desktop printer cartridges. Once networked printing is installed and required throughout the Town, a managed service contract for support and maintenance of the machines is recommended.

Website Improvements and Content Management:

The Website is the hallmark of the Town, in terms of its public facing presence. There is substantial dissatisfaction with the Town of Princeton's website according to the Town Commissioners and departmental staff. The site is deemed dated and static. While the Town improved the website within the past few years, making it more functional and user-friendly, continued refreshment and redesign is strongly encouraged and desired.

First, a comprehensive evaluation, including a usability study and detailed feedback analysis, should occur to determine the areas of concern related to the website. The Town should examine its website and compare the site to those of similar government units across the country, in order to determine what upgrades and changes may be valuable to the citizens and provide Princeton with a more attractive, user-friendly Web presence.

In addition, the departments are unsatisfied with the current content update and page creation process. It is recommended that the Town assess its current website and business processes should be examined to determine how the website update process can be made more efficient, including investment in a more user-friendly Content Management System. Additionally, the Town departments should be required to commit staff to maintaining and updating the web pages and content specific to each department if an investment in a Content Management System is made, as it is not the role of the IT department to perform such content generation. If a migration of the website occurs to a Content Management System, the demand on the IT department will likely increase when departmental staff need support or encounter issues. This impact should be factored into the report for either increasing IT staffing levels or ensuring other types of support and required departmental ownership of the website. Finally, pages targeted to specific events within the Town which generate significant citizen, business, and visitor engagement opportunities should be featured and streamlined for easier access.

Server Virtualization:

The Town should continue to invest in the consolidation and virtualization of its server environment. In server virtualization efforts, many small physical servers are replaced by one larger physical server, to increase the utilization of costly hardware resources such as CPUs. Server Virtualization will allow for a reduction in the total number of servers. As a general rule, one virtualized server can replace up to ten servers. By creating a virtual server environment, Princeton can improve its total cost of server ownership through reduced hardware maintenance costs, and reduced energy costs. In addition, the movement to a virtual environment is essential for disaster recovery and business continuity.

Information Technology Governance Structure:

IT Governance is becoming an increasingly important topic in the public sector. The role of the IT Governance is to ensure that IT is aligned with the business and delivers value, its performance is measured, its resources properly allocated and its risks mitigated. The IT Governance structure should be established by the IT Department, but the Town should ensure that senior management is involved in the Governance process, serving as Governance Chairperson for at least the first year of the endeavor. In addition, the governance structure should be composed of department heads and senior leadership in order to assist the Information Technology Department with project prioritization, goal alignment, and risk management. The ideal size of the IT Governance Council ranges between five and nine individuals. The IT Governance Council can be established and formalized without additional IT staff. Additional information on the suggested IT Governance Structure is found in Appendix C.

Project Justification Methodology:

The Town of Princeton should create a formalized project justification methodology that will be administered by the IT Governance structure. The project justification methodology will assess issues such as enterprise impact, timing of the project, cost of project, man hours required to complete, and mandatory nature (i.e. statutory requirement). Currently, the Information Technology Department is tasked with such decisions about resource allocation, but the oversight on project selection and prioritization needs to be conducted by a Governance structure. The project justification methodology can be created and implemented by the IT Governance Council without additional IT staffing.

Customer Service:

One area for improvement within the IT Department is customer service. Many of the interviewees and survey respondents noted dissatisfaction with customer services from many of the divisions within the department. The most frequent complaints were related to the departmental staff not responding to questions or requests in a friendly, helpful manner, or having difficulty resolving an issue due to the person who performs the task being unavailable. Additionally, single points of failure in the current IT staffing structure (due to insufficient staffing levels) are part of the root cause of the customer service issue.

Communications Process:

One area for improvement is external communication between the IT Department and Town departmental staff. Improved communication tools and procedures are critical to the continued success of the Town of Princeton' IT Department. The IT staff offer a unique opportunity to discern potential problems or challenge approaches, which can lead to improved processes and products upon completion. Furthermore, better communications will improve trust among staff, both with management and with peers. A renewed effort around communications with other departments can be conducted without additional IT staffing. However, in order to reap the greatest benefits for the departments and the citizens, the IT staff should be increased to allow service enhancement and more detailed and frequent communications.

An investment in and use of a Town Intranet or other collaborative tools should allow ubiquitous employee access to project materials, contracts, purchase orders, and other forms of documentation. Finally, IT leadership have engaged in consistent communications with other department heads, in order to increase knowledge of Town policies and procedures, but this knowledge is not transmitted to line staff within Town Departments. The Town of Princeton needs to focus on transparency and openness internally, as a means to provide

complete, accurate information to as many Town staff as possible. As the IT Department progresses, it is essential for the senior IT staff to regularly meet with the Town departments to determine their needs, analyze their business processes, and offer ideas for innovation and performance enhancement through technology solutions.

Network and PC Replacement:

The Town should invest in PC and network equipment refreshment and replacement schedule to ensure that that Town remains on a stable, supported infrastructure. Replacement of hardware and equipment (PC, server, and network) is considered to be routine maintenance and is often funded from capital budgets. Following an industry standard replacement cycle is critical to maintaining warranties, as well as equipping Town staff with sufficient infrastructure to support their increasingly technology-dependent work.

Document Imaging and Management System:

The Town of Princeton should invest in a document imaging and management system for enterprise use. Currently Police, Code Enforcement and Zoning have disparate imaging systems but the Town should examine enterprise alternatives like LaserFiche to truly gain the benefits of imaging and document management. This system enables the organization to create, profile, search, check out, check -in, save, and locate documents stored electronically. In most document management systems, the documents are profiled with attribute information and are retrievable using key words or phrases found in either the full text or the document profile. Version control, security, and storage management functions are also features that will benefit the Town and should be part of the document management system.

Social Media:

Across the country, local governments are utilizing Facebook, Twitter, Nixle, YouTube, and other forms of social media to engage their citizens, solicit feedback, and provide additional outlets for information. Princeton currently has an official social media presence for the Town, but individual departments should be allowed some flexibility to develop targeted social media tools to best reach their specific audiences. Clearly, all social media should leverage a consistent brand and the tools should be linked to the Town website.

In terms of social media presence, Facebook is the most commonly used application in government, with organizations choosing to create Fan Pages for information sharing purposes. Due to the current Facebook policies, individuals are allowed to comment on any postings made by the organization. The Town of Princeton needs to create a Social Media Policy to govern the organization's and employees' use of such tools. A sample policy is offered in Appendix E for Town consideration.

Overall Training and Utilization of Current Investments:

The Town of Princeton has made significant investments in a variety of quality software applications. Prior to the procurement and deployment of new systems and applications, a concerted effort to increase end user utilization of the full functionality of such programs should be encouraged. Most individuals in any given organization only use about fifteen percent of a given software's functionality, and the end users in the Town appear to have similar utilization rates, although some departments expressed significantly lower rates of utilization and understanding of deployed software functionality. End user training, as well as IT staff training, is critical to improving software functionality utilization rates. The Town needs to re-invigorate end user training offerings by the IT Department.

Legal and Regulatory Compliance Training

An area of notable concern is related to the legal and regulatory compliance training for all Town employees and elected officials. Princeton should consider implementing annual training on public records laws, Town and State retention requirements, HIPAA and PHI compliance (related to personal health information), Red Flag Rules compliance, and PCI compliance (related to securing cardholder data in debit and credit transactions).

Basic Computer Literacy/Proficiency Testing for All Employees

Another area of concern is the limited basic computer proficiency of some Town employees. The Town should require basic computer proficiency assessments for all applicants prior to hiring into positions that require use of Microsoft Office products, email system, or network folder access. Additionally, all current employees should take the required proficiency assessments with remedial training offered for those who do not pass at an acceptable level.

PRIORITY LEVEL TWO

Help Desk Personnel and Process:

The improvement of the current Help Desk structure is central to the success of the Town's IT Department. The Help Desk, when appropriately staffed with trained personnel, creates a knowledge base, develop usable performance metrics, and engage in business analytics. The Town should invest in a Level One Help Desk technician who can answer calls with technical answers upon the initial customer contact. This will allow the promotion of current Help Desk staff to higher-skilled work, to facilitate with project and service backlog. The implementation of a Help Desk format with Level One and Two Support will lead to faster response times to end user problems, as well as better escalation patterns to be tied to the Service Level Agreements. Currently the Town CIO serves as Level Two Help Desk Support, which substantially impedes the ability to effectively work on projects for the Town and its departments.

Security Audit:

The Town needs to invest in a full-scale security audit. The audit should include vulnerability assessments, penetration testing to ascertain security holes in the Town's infrastructure, examination of operating system settings, network analysis, and social engineering vulnerabilities. The audit should be conducted by an external, independent security auditing firm, thus requiring no additional IT staffing.

Service Level Agreements:

Many public sector agencies are moving toward the establishment of Service Level Agreements. SLAs are contracts between a customer and provider that indicate the terms of service that will be provided. For example, many Technology Departments create service level agreements with their internal customers (departments) in order to set standards around response time to requests, server uptime, or network reliability. Princeton' IT Department should consider the role of SLAs in the organization, in particular, as a means of communicating customer service standards for internal clients. In alignment with IT Service Management, it is recommended that Princeton move toward the establishment of Service Level Agreements.

Disaster Recovery/Business Continuity:

Disaster Recovery and Business Continuity Planning is critical to local governments. As the Town continues to extend its technology investments, consideration of infrastructure and application continuity and redundancy must occur. Princeton needs a comprehensive Business Continuity Plan, supplemented by a Technical Disaster Recovery Plan, in order to ensure continuity of operations regardless of natural or man-made disasters, pandemics, or other large-scale operational events. The current relationship with Franklin Township for redundancy and disaster recovery is an excellent first step and could be extended to partnerships with the school system and library to serve as a redundant location for those entities as well.

Centralization of IT Functions:

Princeton has a primarily centralized IT structure, but some staff in other departments perform IT functions and GIS is located outside of the IT Department. In an effort to standardize the work currently occurring in the Town, as well as to prevent single points of failure when there is only one IT person serving a given department, it is advised that Princeton develop a fully centralized approach to IT services, including GIS. Ideally, if appropriate personnel are allocated to the IT Department, the conversion to a fully centralized IT structure should occur within the next three years.

In addition, the Town IT Department should develop a standard set of operating procedures, system requirements, network configurations, and other required standards applicable to technology investments. It is critical that all Town departments are required to act in accordance with the developed standards and such standards are enforced by the Town Administrator and supported by the Town Council in order to ensure legal and regulatory compliance.

As the Town continues to progress with centralizing IT services, there needs to be a conscious effort to develop "power users" in each department, as a mechanism to offer on-site, first-level support for non-critical issues. Furthermore, the implementation of power users will increase the diffusion of knowledge about systems and applications across the Town. Leveraging power users will require the IT department to relinquish some control, particularly related to administrative rights and access. Policies will enforce proper actions and discipline in the event of improper activity, but shared control is essential for this model.

Network Access Control Solution:

Network Access Control (NAC) solutions control access to the Town's network via policies, including pre-admission endpoint security policy checks and post-admission controls over where users and devices can go on a network and what they can do. NAC solutions prevent

devices lacking antivirus, patches, or host intrusion prevention software from accessing the network and placing other computers at risk of cross-contamination of viruses and worms. The solutions also allow IT management to define policies, such as the types of computers or roles of users allowed to access areas of the network, and enforce them in switches and routers. Finally, most NAC solutions operate based on authenticated user identities which will be critical for compliance for many current and pending regulations, such as CJIS v5.1.

Townwide Dashboard:

Town Administration and Town Council Members seek to be more informed about the work within Princeton. As a result, many governments are moving toward project and performance dashboards, which give a high-level overview of various projects in a given government and indicate the status of the project, with respect to time, budget, and user satisfaction. The Town of Princeton has been working with Revelstone to develop performance metrics and a dashboard. This work should include metrics and reporting on IT-based investments.

Geographic Information Systems (GIS):

The Town of Princeton, like governments across the United States, has become increasingly reliant on Geographic Information Systems (GIS) as a tool for visually displaying spatial information, making accurate decisions based on timely data, and forecasting potential opportunities and impacts on its services and citizens. GIS work is highly desired and valued across the Town, as well as by peer institutions.

However, the Town needs to increase its GIS functionality and use across the organization. One major area of concern is the lack of a centralized GIS group. GIS is currently decentralized across several Town departments. As the criticality of GIS to all departmental and enterprise functions has increased, the location and reporting structure for the GIS division should be examined. Comparing Princeton with peer cities, based on size, the scope of GIS work, and the staffing within the GIS division, the most common location for GIS is within the Information Technology Department. The current Town staff who administer the GIS system are talented employees, but there should be additional cross-training and succession planning in order to ensure the viability of Princeton GIS in the event of a staff member's departure.

Required Use of Technology in Departments:

A common misconception stems from the belief that IT departments can enforce user departments to adopt new technologies to improve work efficiencies and effectiveness. In fact, Town Administration is the proper vehicle to ensure the adoption of new technologies, as the IT department is a customer service organization, focused on delivering value-add products to its users. By requiring Town department heads and line staff to adopt new or enhanced technologies, Princeton will significantly improve its technology utilization rate, as well as become more effective in its operations and citizen services. As Town management works with department heads and staff to enforce the adoption of technology, performance evaluations must reflect such requirements.

IT Staff Cross-Training:

One area of major concern within the Town of Princeton IT Department is the number of single points of failure due to localized knowledge. Many of the work processes and jobs performed by Town IT staff are done in isolation without other staff being cross-trained in the efforts. The over-reliance on individual staff is a substantial risk for the organization and needs to be ameliorated by mentoring, cross-training, required documentation of processes and changes, as well as through hiring additional staff in key areas.

The Town IT staff possess a variety of skill sets and should be routinely encouraged to attend training opportunities to further their professional knowledge bases. One of the major opportunities identified for the Town is to use education to cross-train current and future IT staff to ensure no single points of failure, as well as to provide back-up support during times of illness, vacation, or other absences. There is substantial research that indicates that training of IT staff can provide a 575% return on investment to the organization, due to reduced levels of rework and experimentation, as well as engender departmental service orientation. The training opportunities for the IT staff are critical to capitalizing on the strategic IT investments being made by Princeton.

Mobile Access and Applications:

The most often requested application among all department heads and line staff is mobile access, including laptops, smart phones, and a wireless network. Many Town department heads and employees work from remote, field locations, and/or after-hours and desire the ability to access their programs and files through a VPN client or similar solution. However, the security issues related to such remote access are important to address and can be managed through a combination of technical solutions and in-depth end user training.

Standardization of Applications and Data:

As the Town continues to invest in technology to gain efficiencies, increase effectiveness, and enhance transparency and accountability, standardization becomes more critical. Stand-alone systems are still being used across Princeton departments, limiting the utility and cross-functionality of data sharing and importation between business units. The Town of Princeton should seek to standardize as many applications as reasonable, or at least standardize data elements in order to encourage seamless data transfer between applications.

The technology components of the Town of Princeton should be functioning on a common architecture and be standards-based. This will ensure the interoperability (ability to share information and resources) and communication among systems while reducing support and training costs and increasing employee skills and knowledge. Standardization will include hardware, software, and infrastructure. Documentation of these standards should be widely distributed to department heads for decision-making purposes. However, standardization should not eliminate some departmental discretion. Departments should be allowed to determine the appropriate software, hardware, and technology solutions within the limitations of the prescribed standards. This level of discretion will allow the end user to receive the full functionality their work may require, while minimizing customization required by the IT Department.

In addition, Princeton should move to a standardized data environment where data is collected once and utilized many times. This "capture once, use many" concept reduce duplication, inconsistencies and errors. The standardization of data elements is often the most difficult policy to implement within disparate business units, but it allows the creation of centralized data warehouses, reduction in redundant data entry, and more effective management of information flows within the organization.

Security Policies:

The Town of Princeton has invested in security technology to protect its data assets and manage its risks. The Town has also moved to a formalized security management structure and process that is consistent with industry best practices. The formalized security structure and process allows for improvements in accountability, transparency, and risk management. Implementing an effective security practices and polices is an ongoing commitment by the organization. Good security practices and policies require discipline and awareness by all employees of the Town, even with devices as simple as flash drives. In order to have effective security polices in Princeton, a security education program should be put into place to enhance the culture of security and strengthen the security management process. However, an over-

reliance on security is an equally detrimental issue. It is important to balance technology investments and end user satisfaction with security policies and procedures.

Acceptable Use Policies:

Acceptable Use Policies (AUP) or Fair Use Policies are designed to restrict the ways that a Town network can be used. In order for the AUP to be most effective, the Town needs to offer training on the AUP during new employee orientation, as well as require an annual review of the policy by all Town employees, along with a signed and dated document indicated that the review was completed. This training could be conducted in a seamless manner by recording a tutorial video that would be placed on the Intranet and viewed by the new employee within a designated timeframe.

In addition to the AUP, the Town of Princeton utilizes an Internet filtering solution to prevent employees from accessing inappropriate or high-risk content. There is limited understanding among Town staff as to what is blocked, why it is blocked, and how to gain access to currently blocked content when required by one's job. The IT Department needs to provide an overview document for all employees on the basics of Internet filtering, including how to request access to blocked Internet sites.

Privacy Policies:

In addition to the various policies mentioned in this report, it is important for the Town of Princeton to provide ongoing reminders about the lack of privacy on the Town network, Town-owned equipment, and the Town email system. The Town should provide a reminder statement and acceptance requirement about limited employee privacy in order to access the Town network or email system. Many organizations have a policy statement at the point of system logon, which simply reminds the staff of their limited privacy and, in order to login to the Town network, requires acceptance of the statement.

Metrics:

The following metrics are offered as a means to evaluate Town IT performance. The implementation of performance metrics is a Priority Level Two project.

Internal Business Process Metrics:

- IT Support Cost per Employee: IT staff salary and fringes divided by the total number of Town employees they support

- IT Maintenance and Support Cost per Employee: same formula as above, but add in the total maintenance costs for the Town and then divide by the total number of Town employees
- Percentage of PCs currently under manufacturer warranty

Customer/Stakeholder Metrics:

- Customer Satisfaction Survey: conducted annually or every six months
    - Supplement this with monthly customer satisfaction surveys based on help desk tickets
- Infrastructure Incident Resolution Index (SLA): Incidents resolved with SLA / Total Incidents
- Incident resolution within SLA target
- Percentage of problems resolved within 4 hours, 8 hours, 24 hours, 48 hours (per SLA)
- System Availability by application priority level:
    - Measured as percentage of employees affected by outages, based on application priority level (as established by the IT Governance Council)
    - Measured as percentage of business hours affected by outages, based on application priority level (as established by the IT Steering Committee)
- Percentage of help desk calls resolved at the time of the call
- Percentage of project requests addressed:
    - On Time, On Budget, To User Satisfaction
- Average time required to repair pc/printer
- Cost-Benefit of Efficiency Improvements, including Cost Savings from Efficiency Improvements

Business Alignment:

- Percentage of IT Hours Allocated by Business Priority
- Percentage of IT Hours By Business Initiative
- Expenditure by Business Initiative

Learning/Innovation Metrics:

- Number of innovations implemented (divided by) Number of innovation ideas generated per IT employee over a given period
- Training days per employee: demonstrates increased skill-sets
- Certifications per IT personnel: demonstrates knowledge gains

PRIORITY LEVEL THREE

Inventory and Asset Management System:

Inventory and asset management systems lead to increased economies of scale, just-in-time inventory, positioning of capital funds for technology purchases, and lead to better cost accounting for IT resources. The IT Department should conduct informal interviews to determine the needs of the departments and then evaluate various solutions, including consideration of integration with SeeClickFix or simply use of SeeClickFix if the functionality is adequate. Additionally, the IT Department should conduct IT asset discoveries on an annual basis, in order to maintain a current listing of resources.

Town Intranet:

The Town of Princeton should consider the creation of an Intranet for all employees, through a system like Microsoft SharePoint server. The Intranet is a centralized web-based repository for pertinent employee information, such as training modules, address change forms, and benefits information. In addition to the Intranet, Town staff need shared directory options with common mapping structures in order to facilitate the transfer of data between staff members. The first step in this process involves moving all former Borough and Township staff to the same domains.

Project Management Office:

Project management is a common area of concern and challenge for IT departments. In fact, many end users in Princeton noted concerns about project management and cited examples of poor planning, limited communication, and insufficient stakeholder involvement in IT projects as well as other areas. The Town should consider implementing an Enterprise Project Management Office within the Town Administrator's Office to manage all large-scale projects, like the financial system replacement. In addition, the IT Department should create a designated project manager position to ensure that technology expenditures and projects are providing the greatest return on investment possible. Additionally, all IT staff should receive basic project management training as part of their professional development.

ITIL (IT Service Management):

One popular way to organize IT Service Management is through the implementation of Information Technology Infrastructure Library (ITIL). ITIL contains codes of practice for quality management of IT services and infrastructure and it defines quality as "matched to business needs and user requirements as these evolve." ITIL goals include: services that meet business, customer, and user demands; cost-justifiable service quality; role and responsibility definition; and demonstrable performance indicators. Princeton should consider investing in training on ITIL principles to determine if the framework would add value to the Help Desk and Knowledge Base.

Additionally, as the Town looks toward implementing IT Service Management, Operational Level Agreements (OLAs) and Underpining Contracts (UCs) should be implemented. OLAs define how the IT Department (and other IT groups within the Town) work together to meet IT service level requirements. An OLA often includes hours of operation, responsibilities, authorities, response times, supported systems, etc. OLAs are internal agreements that ensure the IT staff (centralized and within departments) support the common goal of providing superior customer service. UCs are legal, contractual agreements between third party suppliers of IT Support to the Town IT Department. These contracts must be kept up to date and ensure that the third party will provide required levels of support as necessary.

Research and Development Funding:

IT Departments are learning laboratories and there is a significant need for the department staff to test new technologies as they are considered for implementation in the user departments. The Town needs to ensure that adequate investments are being made to allow the IT staff to use new hardware and software as "test beds" for innovation. Additionally, providing current technology to the IT staff will increase staff satisfaction, potentially reduce turnover, and improve the success rate of enterprise technologies, due to a priori testing.

Business and Process Analyst Model:

One noted process area of improvement within IT staffing can be facilitated by establishing a business and process analyst model within the Princeton Information Technology Department. In this model, IT staff will rotate between departments to assess business process, gain better working knowledge of daily operations, and partner with departmental staff to create technical solutions and enhancements to operational, tactical, and strategic issues. Essentially, the business and process analysts will assist in developing proactive solutions to business unit problems or challenges, versus the often reactive process used currently. The adoption of this

model does presume an increase of IT Department's FTEs in order to achieve the level of service expected by the departments.

IT Skill Sets:

Current IT staff have a variety of skill sets and are readily encouraged to attend training opportunities to further their professional knowledge bases. It is common across local governments to cut training budgets in period of economic downturn, so Princeton should be commended for their commitment to professional training. There is substantial research that indicates that training of IT staff can provide a 575% return on investment to the organization, due to reduced levels of rework and experimentation, as well as engender departmental service orientation. The training opportunities for the IT staff are critical to capitalizing on the strategic IT investments being made by the Town.

Enterprise Architecture and Service-Oriented Architecture:

The current investment in Enterprise Architecture and Service-Oriented Architecture models across a variety of public and private sector institutions is worth mention. These models require that technology components are standardized and operate on common platforms. But, more importantly, the models encourage shared services, modularized and reusable application development, and improved communication within the enterprise. In addition, these models ensure the interoperability (ability to share information and resources) and communication among systems while reducing support and training costs and increasing employee skills and knowledge.

Training Lab and Training Staff

An investment in a centralized training lab (or a lab with mobile options) should be made. The creation of an in-house training lab will facilitate end user training, as well as increased the opportunities for employee engagement and participation. The addition of the training lab and trainer will reduce the total cost of outside training expenditures while further advancing staff knowledge.

Priority Level Four: Emerging Issues

Data Analytics Strategy

The big data movement (also referred to as data analytics and business intelligence) has become a multi-billion dollar industry and continues to expand as organizations seek to leverage value from the volumes of data collected and stored over the past decade. In order to effectively generate value from data warehouses, the creation of a data analytics strategy becomes paramount.

It is imperative to understand the data strategies that currently exist and determine which strategies or combination of strategies fit within an organization. As the Town of Princeton develops its data analytics strategy, it first needs to determine the business objectives. One area of business objectives commonly identified in data analytics is measurement. In these analytic efforts, the organization knows what questions it seeks to answer and identifies data to demonstrate the value. The other common business objective is experimentation, in which the organization develops hypotheses and mines data and applies scientific methods to test such hypotheses. In terms of strategy creation, both objectives are useful but typically the measurement objectives are the starting point for analytics programs.

The identification of which business objectives are paramount lead to requisite identification of the data types in the organization. When developing a data analytics strategy, it is essential to understand the types of data stores, as well as the resulting analytics from each. Two major data types are: transactional and non-transactional data. Transactional data is the bulk of what most organizations collect as part of their routine operations, such as customer demographics, banking account information, etc. Typically transactional data is captured in a database that has a predefined schema or structure. Non-transactional data is typically unstructured, such as social media data. In order to develop a data analytics strategy, the Town of Princeton should identify the types of data currently collected and in what structure, as well as what business objectives are trying to be met. Four major data analytics strategies are formed from the intersection of the business objectives and the data types.

Strategy 1: Performance Management (Transactional Data):

Performance management is one of the most common data analytics strategies because it relies on transactional data within the organization's data stores combined with the business objective of measurement. Performance management uses pre-determined queries and multidimensional analysis. One example would be a grocery chain examining years of customer activity, inventory levels and turnover. Answers to questions such as most profitable customer segments can discerned in real-time to inform short and long term business decisions.

Performance management (business intelligence) tools allow users to choose which queries to run, and can filter and rank the report output by certain dimensions (e.g., region) as well as drill down/up on the data. Multiple types of reports and graphs make it easy to look at trends, as well as integrate different aspects of business data including HR, marketing, sales, customer service, and manufacturing data, and get multiple perspectives of how the business is doing.

Strategy 2: Data Exploration (Transactional Data)

Data exploration involves using transactional data and statistical analysis to experiment and identify answers to questions that may have not been considered previously. This approach leverages predictive modeling techniques to predict user behavior based on their previous business transactions and preferences. Cluster analysis can be used to segment customers into groups based on similar attributes not previously identified and then allows the organization to perform targeted actions such as customizing messages, cross-selling, or predicting which group of users may "drop out" and then developing targeted retention strategies. Other common uses of data exploration include offering two different options of websites to user groups to experiment and test which content, events, and landing pages are preferred in order to produce more attractive options to existing customers and prospects.

While the statistical tools, techniques and technologies are wide-spread, there are some challenges associated with data exploration strategies. The big challenge is the lack of qualified statisticians with expertise in the latest business analytical techniques. Another challenge is around data privacy/policy issues, which is of particular concern for governmental agencies. If the Town of Princeton pursues data exploration, the organization should think through the most effective way to use the results of their data mining techniques to improve the customer experiences without violating customer privacy.

Strategy 3: Social Analytics (Non-Transactional Data)

Social analytics measure the vast amount of non-transactional data existing on social media platforms, such as Facebook, Twitter, and Yelp. Social analytics measure three broad categories: awareness, engagement, and word-of-mouth or reach. Awareness looks at the exposure or mentions of social content and often involves metrics such as the number of video views and the number of followers or community members. Engagement measures the level of activity and interaction among platform members, such as the frequency of user-generated content. More recently, mobile applications and platforms such as Foursquare provide organizations with location-based data that can measure brand awareness and engagement, including the number and frequency of check-ins, with active users rewarded with badges. Finally, reach measures the extent to which content is disseminated to other users across social platforms. Reach can be measured with variables such as the number of retweets on Twitter and shared likes on Facebook. Social metrics are critical since they help inform

organizations of the success of their external and internal social digital campaigns and activities.

Social analytics strategies need a clear understanding of what they are measuring, recognizing that awareness is not necessarily a good measure or predictor of engagement and interaction. Additionally, the social metrics are largely non-financial and short or intermediate term versus true long-term correlations. These considerations should be balanced when social analytics are used to drive business decisions in order to avoid over-reaction to peaking events.

Strategy 4: Decision Science (Non-Transactional Data)

Decision science involves experiments and analysis of non-transactional data, such as consumer-generated ideas and reviews, to improve the decision-making process. For example, crowdsourcing, including idea generation and polling, enables organizations to pose questions to the community about its products and brands. Decision scientists determine the value, validity, feasibility and fit of these ideas for organizational implementation. Common decision science techniques involve text and segment analysis. This area of data analytics is still in its infancy in terms of tools and technologies, but the concept of crowdsourcing to test assumptions and ideas is valid across all markets.

The following chart provides an overview of popular data analytics techniques based on data type, to help guide the data analytics strategic investments for Princeton.

Transactional Data	Technique
	Business Intelligence (BI)/Online Analytical Processing (OLAP): ○ **users interactively analyze multidimensional data** ○ **users can roll-up, drill-down, and slice data** ○ **BI tools provide dashboard and report capabilities**
	Cluster Analysis: ○ **segment objects (e.g., users) into groups based on similar properties or attributes**
	Data Mining: ○ **process to discover and extract new patterns in large data sets**
	Predictive Modeling: ○ **a model is created to best predict the probability of an outcome**
	SQL: ○ **a computer language that manages (e.g., query, insert, delete, extract) data from a relational database**
	A/B Testing:

- **A method of testing in which a control group is compared to test groups to determine if there is an improvement based on the test condition**
- **Often used in website design to test for higher conversion rates**

Non-transactional Social Data

Crowdsourcing:

- **A process for collecting data from a large community or distributed group of people**
- **Idea submission is a common crowdsourcing activity**

Textual Analysis:

- **Computer algorithms that analyze natural language**
- **Topics can be extracted from text along with their linkages**

Sentiment Analysis:

- **A form of textual analysis that determines a positive, negative, or neutral reaction**
- **Often used in marketing brand campaigns**

Network analysis:

- **A methodology to analyze the relationship among nodes (e.g., people)**
- **On social media platforms, it can be used to create the social graph of follower and friends' connections among users**

Source: Parise, Iyer Vesset

1. Integrate multiple big data strategies.

Leveraging multiple big data strategies is essential for capitalizing on data analytics investments. For example, many banking institutions leverage both Social Analytics (non-transactional, social data) and Performance Management (business intelligence using transactional data) strategies to shape and guide their customer service strategies. Metrics such as number and balance of accounts are combined with social metrics such as mentioning and promoting the banking institution via social channels in order to determine which customers should be considered for high-level service programs.

2. Build capabilities for big data.

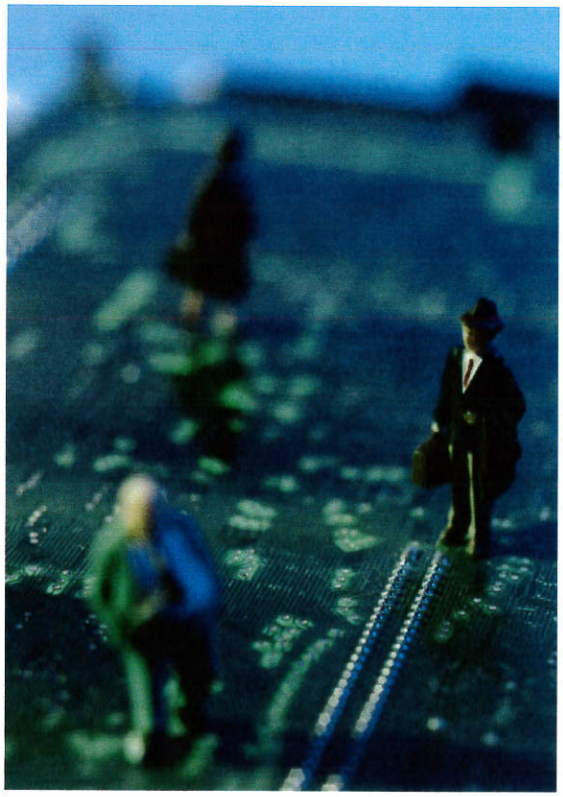
Capabilities for leveraging big data include roles, technologies, processes, and culture. In particular, the Town of Princeton needs to invest in the roles, particularly the expertise and experience necessary to develop and implement data strategies. These roles and skillsets are found in the following areas:

a. Statisticians skilled in the latest statistical techniques;
b. Analysts/decision scientists with strong business measurement understanding, who serve as brokers between statisticians and business managers;
c. The IT division, which helps guide the selection of data analytics tools/technologies and integrates business intelligence tools and transactional systems (like Customer Relationship Management or Web analytics); and,
d. Business managers and knowledge workers who own the business processes.

3. Create a big data policy.

It is imperative that the Town of Princeton proactively create a set of policies and guidelines around the use of big data, particularly as security, compliance, and privacy concerns become more paramount. Communication strategies for informing customers about how personal data is used should also be developed.

SECTION 7: CONCLUSION



The Town of Princeton Strategic Information Technology Review and Recommended Options provides a framework for the effective management of Information Technology. It offers a customer-focused approach to implementing and managing IT and uses employee suggestions to provide a roadmap for future technology efforts. The report also includes a comprehensive view of Town accomplishments over the past decade, as well as examines the current state of technology in Princeton and its peer local governments.

Information Technology can be used to provide higher quality services in a more cost efficient manner by providing improved service access, reduced transaction costs, and improved internal efficiencies. As the Town strives to be more customer-oriented and to provide effective services, technology investments become essential.

Despite the potential impact of technology, it is critical to understand that the application of technology to poor or inefficient processes will not produce the requisite cost savings or effectiveness gains. Technology is a tool used to improve customer service but the administration, policies, and procedures surrounding a given function or process must be revised and fine-tuned in order to provide the highest quality of service. As a result of this necessary coupling between technology and business process, it is imperative that all technology projects and investments are tightly integrated with and continually measured against the Princeton' articulated business goals and vision.

Project Prioritization

The aforementioned projects and solutions are offered for consideration by the Town. The projects noted are largely enterprise in nature and are not comprehensive of all requests made by Council or departmental staff. The appendices contain the specific requests collected during the interview process for reference and use by the IT Governance Council. As part of continuous improvement around engagement and communication with Town staff, the IT Department and Town Administration will work with the IT Governance Council to verify prioritization of the suggested projects. In addition, after prioritization is confirmed, cost estimates will be generated for projects within the prioritization framework by the IT department.

Prior to undertaking the projects requested, it is imperative that additional IT staff are hired in order to facilitate successful delivery of all prioritized projects. If staff increases are not appropriated, then the projects should be evaluated against the current requirements of on-going maintenance and support of the existing infrastructure to determine which efforts are feasible and to establish timelines which are reasonable and reflective of the over-committed, under-resourced IT department.

Investment Strategies

Although technology investment is necessary as a means of maintaining efficient and effective services, as well as competing in the local government marketplace, several steps can be taken to ensure wise investments. First, a cost-benefit analysis of projects should be undertaken, along with a clear, multi-year understanding of the total cost of ownership for a given project. The total cost of ownership includes hardware and software maintenance, ongoing training, support and operations and allows the government to plan its expenditures in an appropriate manner without neglecting the funding requirements of the project in the years to come. In addition, upgrades and replacement plans for systems are imperative and must be included in the budget. Ideally, the Town should separate its budget requests and funding for ongoing IT infrastructure and maintenance from the IT project budget requests and funding (typically focused on user departments).

Princeton is a successful, technology-friendly government and should continue investing in technology to enhance the internal and external services of the organization. As the Town keeps its eye on growth and the future, it is imperative that technology investments keep pace with that vision. One area of caution is outsourcing of critical functions. While strategic sourcing, or multi-sector sourcing, involving the identification of specific cost centers or lines of business within IT where privatization offers the greatest opportunities to generate cost savings, can be beneficial, complete privatization or outsourcing of all IT functions has not proven to be successful in most municipal governments with the size and population sophistication found in Princeton. Cost savings are rarely accomplished when privatization occurs, regardless of initial contract assurances, especially given the level of 24/7 service expected by Town staff. The Town of Princeton is moving into another exciting period of growth and renewal and it is critical that technology serve as a tool for improving efficiency and effectiveness. Furthermore, technology will allow the Town to grow quickly and respond to increase customer demands.

> "The number one benefit of information technology is that it empowers people to do what they want to do. It lets people be creative. It lets people be productive. It lets people learn things they didn't think they could learn before, and so in a sense it is all about potential."
>
> *Steve Ballmer, Microsoft CEO*