CITY OF LOS ALTOS
CITY COUNCIL MEETING
May 12, 2015

INFORMATION ITEM

Agenda Item # 19

SUBJECT: Receive Information Technology Roadmap Report

BACKGROUND

The City engaged the professional services of NexLevel Information Technology, Inc. to prepare an Information Technology Roadmap to identify and prioritize necessary City-wide technology investments over the next 12 to 18 months. To develop the roadmap, NexLevel utilized a strategic planning process that included a thorough review of the City's existing technology infrastructure and meetings with key staff across all departments to understand the current state of technology within the City. This information was analyzed and incorporated into the IT Roadmap (Attachment 1) that provides recommended actions to improve the City's information technology operations and a platform for implementation of the proposed projects.

EXISTING POLICY

None

PREVIOUS COUNCIL CONSIDERATION

None

DISCUSSION

The first section of the IT Roadmap (Introduction and Summary) provides an evaluation of the current state of the City's information technology operations and recommendations of where to focus staff efforts during the next two years. Key findings that summarize the current state of technology operations and provide the basis for the recommended investments are as follows:

- The absence of a plan for continual replacement and maintenance of the City's technology infrastructure, including servers, network, desktop computers and peripheral devices, and business applications has resulted in a backlog of technology needs in every City department
- Technology support within the City has been dramatically diminished due to lack of permanent staff
- Many of the City's business application systems are outdated and need to be upgraded and replaced
- Basic IT practices such as documentation, procedures, and disaster/recovery procedures are not in place
- One highlight that was noted was the success of the tri-city Public Safety Records Management and Dispatch project which has put infrastructure in place to safeguard critical City operations

To address several of the deficiencies noted above, the IT Roadmap provides recommended actions to be implemented. The most critical of these actions is to establish a formal IT organization within the City that includes permanent staff to support and move the City's technology forward. The City's recently hired IT Analyst (January 2015) is a first step towards meeting this objective;

however, additional resources are necessary to adequately address the findings noted above. With permanent staffing in place, City staff can begin to implement many recommended best practices that are currently not in place and provide the foundation to advance the City's technology infrastructure forward.

The Roadmap further identifies "low risk, high value" activities that can be accomplished and maintained with the resources available to the City. These activities focus on three primary objectives:

- Improvements to the City's information technology infrastructure
- Improvements in the IT division service delivery capabilities
- Initiating activities for the procurement of new, core business technology software

The resulting Roadmap outlines 29 projects to be endeavored by the City's Information Technology division over the next two years. The projects are presented in a sequential manner and focus initial efforts on establishing the IT organization and building a reliable IT infrastructure. Once these goals have been met, the focus shifts to City business applications and service delivery projects.

The total cost of the activities identified in the Roadmap is estimated at $2.2 million over the next two fiscal years. This amount represents an early estimate and each proposed activity will be thoroughly reviewed to identify the most cost-effective approach to achieve the objectives outlined.

PUBLIC CONTACT
Posting of the meeting agenda serves as notice to the general public.

FISCAL/RESOURCE IMPACT
None. Staff will provide a more complete presentation of proposed budget actions to meet the objectives identified in the IT Roadmap during the Budget Study Session scheduled for Thursday, May 28, 2015.

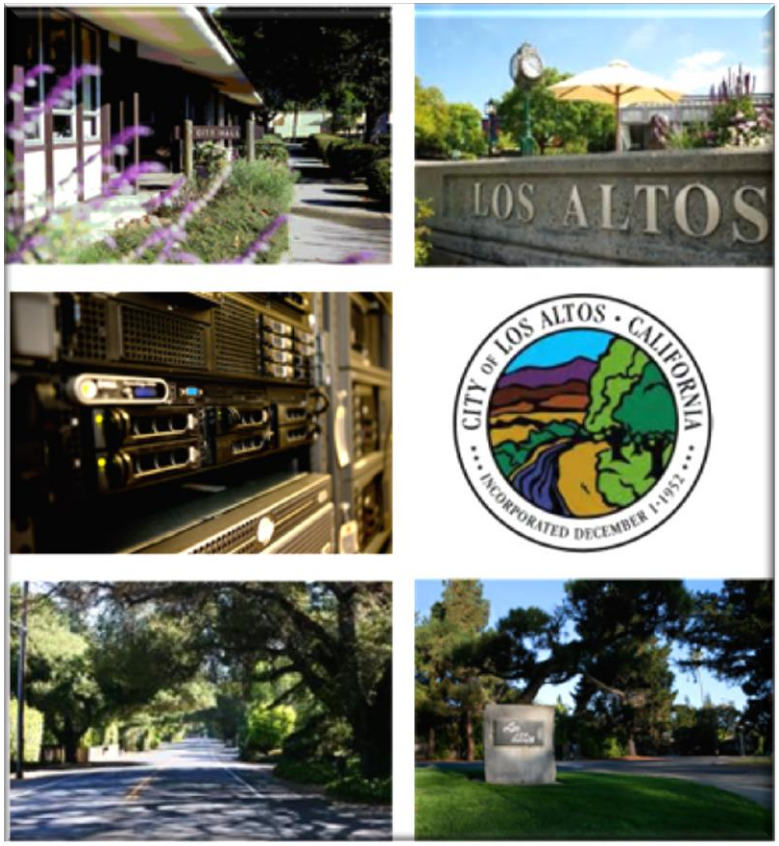
ENVIRONMENTAL REVIEW
Not applicable

RECOMMENDATION
Receive Information Technology Roadmap Report

ALTERNATIVES
Recommend additional changes/edits to the City IT Roadmap Report

Prepared by: Kim Juran-Karageorgiou, Administrative Services Director

ATTACHMENT:
1. The City of Los Altos IT Roadmap Report



The City of Los Altos

IT Roadmap Report

Prepared by:

NEXLEVEL
Information Technology, Inc.

April, 2015

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Introduction and Summary

This deliverable, entitled IT Project Roadmap (IT Roadmap), was prepared for the City of Los Altos (City) by NexLevel Information Technology, Inc., (NexLevel) to document its findings and recommendations.

Scope and Objectives

The IT Roadmap was created by NexLevel for the City to identify technology needs over the next twelve to eighteen months with the objectives of:

- Supporting the City's budget processes in the short-term
- Making recommendations for the improvement of the IT Division's (ITD) day-to-day operation by implementing critical technology best practice initiatives
- Providing the foundation for the development of an Information Technology Strategic Plan (ITSP) in the future.

ITD has been in a state of turmoil over the past several years and not until recently, has the City taken steps to stabilize the organization and services provided. As a result some technology initiatives including infrastructure upgrades, business application upgrades, and the acquisition of new technologies had to be deferred. The primary objective of the IT Roadmap is to provide a prioritized "catch-up" plan to enable the City to strategically program technology expenditures to the areas of greatest need and to obtain the greatest benefit from them.

Methodology

NexLevel used a condensed version of its technology strategic planning methodology for this project as depicted in Figure 1, Project Methodology.

Figure 1 – Project Methodology

This work plan was adapted to "fast track" the development of the IT Project Roadmap as follows:

- In Task 1, Initiate, NexLevel conducted preliminary planning with the Administrative Services Director to review the project steps and discuss department interviews and technology plans. NexLevel requested documentation from the City including prior IT assessments, project requests,

and other artifacts. In addition, the Administrative Services Director completed a NexLevel supplied, Technology Self-Assessment.

- In Task 2, Analyze, NexLevel conducted brief interviews with current IT support personnel and met with key stakeholders to review their current use of information technology, to identify barriers to the effective use of the technology, and to identify anticipated technology needs. In the course of this effort NexLevel interviewed 16 City employees, including representatives from the City Clerk, the City Manager's Office, Community Development, Finance, Human Resources, IT, Recreation, Police, and Public Works.
- In Task 3, Strategize, NexLevel completed this document which contains best practice recommendations and a prioritized project list which supports the objects of the study. The document was reviewed with the Administrative Services Director and modifications were made as directed.

Technology Cost and Value

Figure 2, Technology Infrastructure Cost and Value, provides a general model for the relationships between the components of the City's technology infrastructure and the benefits it derives from them.

In this model NexLevel has defined five components of information technology infrastructure including:

- Shared, city-wide infrastructure
- User infrastructure (primarily desktop PC's and the Office programs that are installed on them)
- Enabling technologies such as document management
- The City's business application systems
- Decision support / analytic systems (not presently a part of the City's information technology infrastructure).

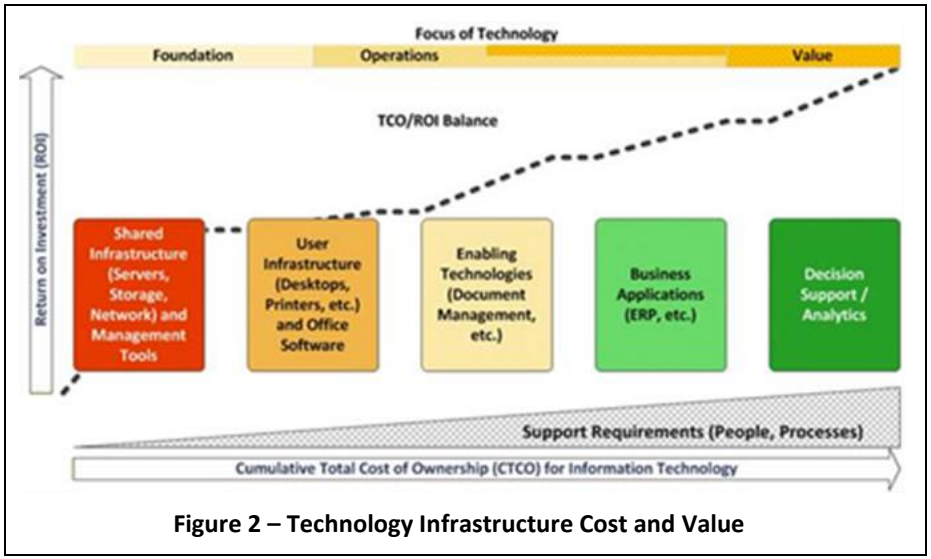

Figure 2 – Technology Infrastructure Cost and Value

The horizontal axis represents the cumulative total cost of ownership (CTCO) for the technology infrastructure based on the assumption that each layer of infrastructure is built on the foundation provided by its predecessor. For example, the implementation of enterprise document management is dependent on the server and desktop computers and the network. The model also reflects the concept that as you add infrastructure components, more staff resources are needed to support them.

The vertical axis represents the return on investment (ROI) for the expenditure on technology, and the dark dotted-line represents the proportional ROI related to each component of the information technology infrastructure. The model illustrates that while the higher components of the infrastructure (business application systems and decision support / analytic systems) deliver the highest ROI, considerable expenditures are required to get there.

This level of investment can prompt some organizations to minimize expenditures on the foundational components, but this makes it difficult to sustain the overall technology infrastructure in the long-term, leading to increased expenditures to shore up the foundational components.

IT Service Management Review

NexLevel has found that the ability of an organization to provide IT services with a high degree of quality, and to sustain that level of service delivery, is highly related to the degree to which the organization has adopted IT best practices. NexLevel uses a model to evaluate the degree of adoption that is based on six dimensions, including:

- Technology Governance – Practices related to the leadership and reporting structure of the IT organization, degree of management overview, and the consistent tracking of the delivery of technology services
- Service Delivery – Practices related to coordinating the processes involved in providing customer support including training, help desk, and service delivery management, and the establishment of service level agreements (SLAs) and tracking of conformance with them
- Business Technology Applications – Practices related to the management and support of the business and operational technologies supporting the City
- Infrastructure – Practices related to acquisition, utilization, and maintenance of the technology equipment, operating systems, support software, and communications network services used within the City
- Security – Practices related to the effective use of policies and standards, user conduct, software tools (filtering, monitoring, etc.), and audits to validate that the City's material and software resources are used only for their intended purposes
- Administration – Practices related to the management of technology in terms of budgets, maintenance agreements, and software licenses as well as the maintenance of current and accurate documentation on all technology activities.

In the course of the development of a full ITSP, NexLevel would conduct a comprehensive assessment for each of these dimensions through a detailed review of technology practices, a user survey, and interviews with City management, department stakeholders, and the IT support staff. Given the abbreviated scope of the IT Project Roadmap, a high-level evaluation was developed based primarily on the interviews with user stakeholders and the technology self-assessment.

Figure 3, Best Practices Compliance, depicts NexLevel's assessment of the degree to which the City has adopted IT best practices. The hexagon is segmented into two halves. The upper half of the hexagon is composed of the best practice categories that involve multiple participants other than ITD; while the lower half of the hexagon is composed of the best practice categories where ITD is the principal party involved in the delivery of the services. The outer most (red) ring represents the lowest level of conformity with best practices and the core of the diagram represents the highest degree of conformity with best practices.

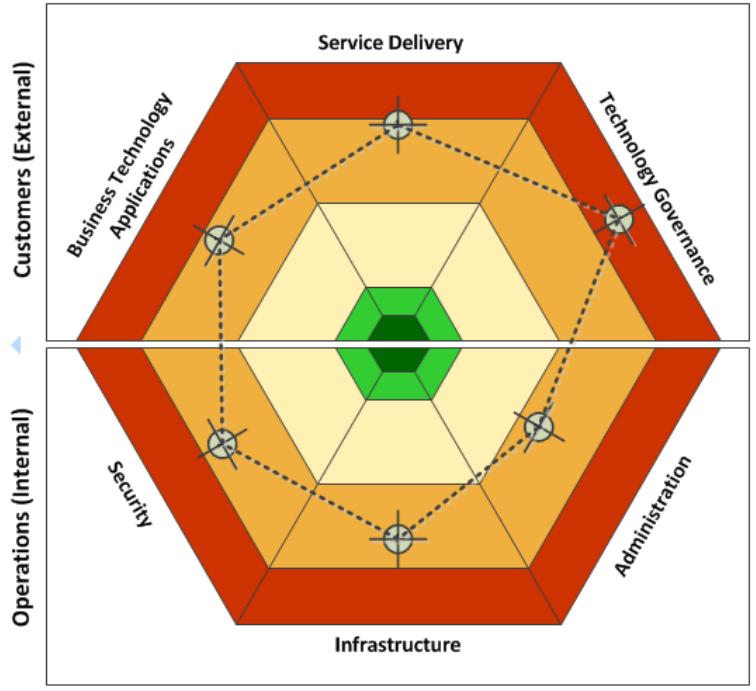

Figure 3 – Best Practices Compliance

NexLevel has plotted the results of the informal assessment for each of the best practice dimensions within the rings (the gray target points) and then connected them together to illustrate the City's present level of best practice adoption.

General Findings

The key findings resulting from the IT Roadmap include:

- The City's information technology infrastructure, including servers, the network, desktop computers and peripheral devices, and business applications have suffered due to the lack of a cohesive plan for on-going refreshment and maintenance which has created a backlog of technology needs in virtually every City Department.
- IT support has similarly deteriorated due to a lack of a formal IT organization, permanent positions, and executive management.
- Many of the business application systems supporting the City are dated and need to be upgraded or replaced. Additionally, the ability of City staff members to use these application systems effectively has been reduced by the loss of trained personnel combined with the absence of training programs.
- The Public Safety consortium (Los Altos, Mountain View, and Palo Alto) has been an effective model to migrate the CAD/RMS application to a new, shared responsibility platform.
- Basic IT best practices are not in place within the technology support organizations. These include documentation, tactical plans, change management, disaster/recovery planning, etc. and are discussed in the following section of this report.

Recommendations

As indicated previously, NexLevel's process evaluates whether the infrastructure and support organization are prepared to support the future technology needs of the City by reviewing six key operational dimensions. The review applies a "best practices" perspective to essential IT delivery components as a weakness in any one particular dimension can adversely influence the overall effectiveness of the entire technology organization.

The objective is not to determine whether the IT organization is doing a satisfactory or unsatisfactory job in providing quality services; but rather it provides constructive advice and alternative methodologies, based on NexLevel's experience and technology best practices, that should be explored to create improved operations and a platform for implementation of the projects identified in the IT Roadmap.

The following recommended actions (not in priority order) can be implemented as resources become available and as windows of opportunity present themselves. It should be noted that several of the recommendations have been placed as "projects" in the IT Roadmap timeline as their implementation is deemed critical to the success of other projects.

Recommendation 1: The City should establish a formal IT organization.

Presently ITD is composed of 1 full-time employee (new January, 2015), 1 full-time support technician (contract employee), and 1 part-time network technician (contract employee - 16 hours/week). In addition, the Police Services Manager provides technology oversight for the City along with project coordination for the CAD replacement project and other technology initiatives within the Police Department. The IT Division is responsible for, and supports, the City's technology infrastructure, communications network, technology hardware (PCs, laptops, telephone, and video) deployment and operation, and software maintenance.

ITD reports to the Administrative Services Director. The current reporting relationship appears to work effectively and since ITD is an enterprise-wide resource, it is well served reporting to Administrative Services which includes Finance and Human Resources.

The IT Division provides adequate support to City users. The user departments that NexLevel talked with generally expressed satisfaction with services currently provided by ITD. However, based on our experience, the current staffing level is below that we see in municipalities of similar size and complexity. Well run and effective technology support organizations typically are able to support approximately 50 users per staff member. Given the City's current staffing level of approximately 130 FTEs, the IT Division's FTE should be of 2.5 - 3.0. Another industry standard, desktop support (desktops and laptops), finds one dedicated technician for every 150 devices.

Local government agencies of the size of Los Altos spend between 3.0% and 5.0% of their annual general fund budget on technology. In a review of the City's Annual Budget for FY 14/15, the IT Division budget represents approximately 2.1% of the City's general fund budget. Therefore, in comparison with best practices, the City is below the average expenditure for technology for public agencies. It should be noted that this percentage assumes all City technology expenditures are included in the ITD budget and as technology usage grows, an additional investment will be required for ongoing support resources, equipment, staffing, and services.

The City should create a formal IT division comprised of 4 full-time FTEs (Supervisor, Desktop Technician, Network Administrator, and Application Architect. General responsibilities for each position include:

Supervisor:

- Oversight, work assignments, performance reviews
- IT Budget
- IT collaboration with departments
- New technology research and testing
- Training
- Planning (Best practices implementation)

Desktop Technician:

- Help Desk
- Hardware deployment/maintenance
- Department technical support
- Technical project support (SAN, fiber expansion, new facilities)
- Phone management

Network Administrator

- Security
- Active Directory (Design, implementation, maintenance)
- Network Infrastructure (Design, implementation, maintenance)
- Exchange Administration
- Telephone management
- Backup and Recovery

Application Architect

- Project management
- Data base administration
- Application interface definition
- Vendor management

The City would also benefit from clear, well-defined, job duties and responsibilities for all ITD positions. Users should clearly understand who is responsible for each department and how ITD will support them. More importantly, ITD staff must clearly understand their role, the functions they are to perform, and the criteria by which they will be evaluated.

NexLevel recommends, over time, the City formally create department-based Business Application Specialists for major business applications (Finance, Community Development, Police (existing), and Public Works) thereby reducing the reliance on ITD for application assistance and to increase department buy-in for application deployment and use. The introduction of new technology should be sponsored and driven by department staff with ITD providing necessary consultation and infrastructure configurations.

End user departments should have staff that are the focal point for how it uses applications, determining the best method of applying the application to meet departmental business needs, interfacing with the support vendor, and overseeing the departmental use of city-wide technology (document management, GIS, etc.). They should help identify technical solutions, research software and technology applications, and interface with ITD for the implementation of technology tools as appropriate. The department-based staff should not repair technology equipment, apply technical patches, or perform ongoing system maintenance. ITD staff, on the other hand, are the infrastructure experts and keep the applications current, the network running at peak efficiency, provide for data security (data backups), answer technical questions and create interfaces between various applications and databases.

Recommendation 2: The City should adopt basic project management tools for major upcoming technology projects.

Project management is the discipline of planning, organizing, securing and managing resources to achieve specific goals. Ineffective project management can result in extended timelines, budget overrun, and project failure.

Projects should be executed following basic standard project management practices and templates that include project charter, project plan, schedule, budget, and status reporting. The City should assign a project manager for all new technology projects who has the skill set and authority to effectively perform these required project duties.

Prior to initiating a project, a formal project charter should be completed to help ensure that the project is well defined. A project charter is essentially an agreement between the IT organization and the users that identifies (among other items) the project's sponsors and stakeholders, the scope and objectives of the effort, the high-level schedule (major milestones and deliverables), the participants, and their respective roles and responsibilities. Clarifying these at the outset of a project helps ensure project success by setting user expectations for their level of effort for activities such as data conversion (including cleaning up information in the legacy system and reviewing the results of data conversion runs), preparation of test cases and acceptance testing, training, and revising processes and procedures to conform to the new system as needed.

Once a project is initiated, the City should have standardized templates for the project manager to track and report on project progress. At a minimum, the project manager should complete the following templates throughout the project.

- Project Plan
- Issue Management
- Risk Management
- Project Schedule and Resource Tracking
- Budget Tracking
- Project Status Reports

The use of a standardized project management framework will help ensure a comprehensive understanding of projects among stakeholders and impacted staff and reduce the project risks.

Recommendation 3: The City should communicate technology project status to City department heads.

The value and benefits of effective technology governance is well documented and undisputed. For organizations, one of the primary benefits of technology governance is that it promotes awareness among administrators and policy makers of the benefits of making investments in technology as well as the consequences of not making them, enabling them to make informed decisions and providing a degree of continuity that might not be otherwise possible. NexLevel has found that technology governance does not have to be complex and bureaucratic to be effective; rather the reverse is true, that lean and agile governance approaches work best and tend to be more robust and survivable in the long-term.

An ad-hoc process makes it difficult to ensure the alignment of the City's technology plans and priorities with its long-term goals. In the absence of a formal technology governance process, technology decisions may not align with business priorities. This results in the diversion of resources from long-term infrastructure projects, additional costs, delays, false starts, the adoption of applications and systems that seem promising at first but that are dead-ends, and create a disagreement among departments as to the allocation of scarce resources.

For the present, the City does not necessarily need to employ a technology governance committee as long as the Administrative Service Director acts as the spokesperson for technology issues at the City Manager's Department head meetings. A standing agenda item might include an update on technology projects, priority setting, and implementation progress. As more technology projects are initiated and the assignment of resources becomes more difficult, the City may want to create a more formal internal governance committee so it can provide a holistic perspective of the City's technology strategy, ensuring that technology is aligned with

business objectives and priorities, and that critical infrastructure priorities are funded.

Recommendation 4: The IT Division should implement a Help Desk call tracking tool.

ITD staff supports over 130 staff that submit service requests via email or a phone call. The IT staff work to resolve issues that are within their control, and if necessary, function as the primary point of contact to escalate issues to the City's outside service providers. Staff attempt to provide timely resolution of issues and often solve a problem during the user's first call for service.

However, the lack of an automated help desk tool is a major deficiency that limits staff effectiveness. The use of this tool can provide insight to the reasons the users are contacting the IT staff in the first place, allow management to direct resources at the root cause (training, hardware failures, software incompatibility, functionality limitations, etc.), and allow users to review the status of their call and progress being made on its resolution.

More importantly, the implementation and effective use of a help desk tool would assist the staff with moving away from being reactive to a more proactive mode. NexLevel recommends ITD acquire a basic tool (e.g. TrackIt, K-Box, ServiceDesk, Web Help Desk, SpiceWorks), properly train each staff member in its use, establish call standards, and require every call for support to be logged into the system. Only with this dedication to entering and closing calls for service can ITD begin to consistently manage its support calls.

Recommendation 5: The IT Division should create a Service Catalog and establish corresponding Service Levels.

ITD does not have a service catalog or service level agreements (SLAs) with City departments. As a result, there is no mechanism to proactively manage user expectations. ITD should create a service catalog with published service levels. The service catalog should describe what ITD supports and what the user can expect.

The old adage "You can't manage (improve) what you can't (don't) measure" directly applies to tracking service metrics for IT organizations. Service metrics are used to drive improvements and help focus staff and resources on what's important but also indicate the City's priorities and provide a window on performance, culture and productivity. Service metrics help determine:

- Where the IT organization has been;
- Where the IT organization is heading;
- Whether something is going wrong;
- When the IT organization reaches specific targets.

Service metrics can be used to effectively:

- Drive the mission of the IT organization
- Focus the IT organization and its staff
- Make decisions
- Drive performance
- Change and mature the IT structure and its services
- Produce good internal and external public relations

Service levels should also be defined in all future maintenance agreements the City negotiated with outside service providers. For those current contracts that do not contain vendor service level agreements, NexLevel recommends service levels be incorporated in the new agreement covering items such as: specified level of service, support options, enforcement or penalty provisions for services not provided, a guaranteed level of system performance as relates to downtime or uptime, a specified level of customer support and what software or hardware will be provided and for what fee.

Recommendation 6: The City should establish a formal technology training program for IT Division staff and on-going application training for department personnel.

Technical training for ITD staff is important in order for support services to remain current on new versions of software and to increase competency for optimum support. Training increases the effectiveness of staff and can result in fewer support issues. In general, training budgets have been reduced due to limited financial resources but remain a critical component for good customer support. Without formal training, staff has had to learn on-the-job which has been time consuming and has, at times, lead to learning by trial and error.

ITD should develop a training budget that allows for at least one formal training class for each employee, each year. This technical training will increase staff competency, improve career development, and support succession planning. Technical training also needs to be incorporated as part of personnel development plans and evaluations in order to provide job enrichment and expanded technical knowledge in an ever-changing technical environment.

As new technology is implemented throughout the City, it is important to provide training to staff in the use of that technology. Many times, it is assumed staff will know how to use the new system and basic instruction may not be provided. IYD must take the time to provide, regular, in-person and written instruction in the proper use of new equipment and software.

Similarly, providing initial and continuing application training for end-users is one of the most effective tools to promote user satisfaction, improve operational performance, and reduce the number of calls to ITD. Continuing training for end-users is especially critical since the training provided during the implementation of new applications is typically rushed, conducted in the midst of other activities including data conversion that demand user attention, and, as a result, is not as effective as it could be. Refresher training is valuable since it promotes user competency and enables them to use applications as effectively as possible. Absent refresher training, users often develop their own short-cuts or adopt practices that are not efficient.

Recommendation 7: The City should establish basic change management and patch management procedures.

Change management is the process that is used to identify, analyze, track, and reconcile changes that may occur over the lifetime of a project including:

- Organizational, procedural, and cultural changes that often accompany major activities such as the introduction of an enterprise information system
- Project scope, organization, and other factors associated with a technology project
- Infrastructure and system configuration modifications

ITD should implement a change management process that isn't complex, yet effective. Many organizations are able to effectively implement and use change management with little more than a standardized form to request changes, a repository to record the change and its status, and a set of procedures to govern how change requests are managed and tracked (including a defined escalation path).

Timely patch management is instrumental for protecting data and ensuring that hardware/software executes as intended. Software vendors frequently issue patches for file servers and desktop computers and the timely installation of patches is important for security and optimum application performance. NexLevel concurs with the recommendation provided in the 2014 Information Systems Review conducted by Maze & Associates that ITD should

establish a more structured procedure for patch management including pre-arranged maintenance windows for all technology hardware updates. The procedure needs to include analysis of patches to assess their priority, testing them in a development environment before applying to production servers, and scheduling the patch application to minimize the impact on ongoing operations.

Recommendation 8: The City should improve connectivity between mobile devices and the communications network.

During the course of NexLevel's interviews, it was stated that connectivity between devices (cell phones, laptops, etc.), along with the lack of City building-wide Wi-Fi, routinely cause issues with staff performing their jobs.

Mobile computing devices (e.g. laptops, notebook PCs, tablets , smartphones, etc.) used with wireless networks present significant opportunities for increasing staff efficiency and providing new avenues to serve citizens and businesses. Easy to use, inexpensive, mobile devices provide opportunities for citizens and businesses to interact with their governments. In fact, there is a growing population that views mobile devices as the preferred method of obtaining information and completing transactions. As public agencies procure technologies, the ability to support employee and public mobile needs is an important consideration.

Today it appears that service coverage for City owned telecommunications devices is not always available or reliable in some areas of the City. Obviously, a reliable signal is, and will continue to be, critical to the execution of assignments in the field. NexLevel recommends the City retain assistance from a qualified communications vendor to evaluate the current service coverage and add or replace equipment so that connectivity issues are eliminated.

Recommendation 9: The IT Division should conduct a general clean-up of its server room and work area.

The main server room is located in an access-controlled area within the Police Department. Network routers and switches are located in various departments and closets within City facilities and access is generally controlled. NexLevel observed that the equipment rooms are cluttered, and unorganized with limited cable labeling and/or documentation. IT staff work areas are also cluttered, unorganized, and in a general state of disrepair.

ITD staff indicate that the server room UPS (uninterruptable power supply) is not adequate for a controlled shutdown of equipment. A properly sized and normal functioning UPS protects the equipment from unstable power and continues to provide a source of power in the event of a power outage. Software can gently shut down equipment without human intervention when the UPS consumes the available battery resource. ITD staff report that current air handling is sufficient for the installed equipment. The building has an emergency generator which supplies adequate power for on-going operation. No remote cameras or environmental monitoring devices are in place.

ITD should conduct a general clean-up of its entire work environment. NexLevel observed a significant amount of unused equipment, cables, paper and waste throughout the ITD office space. A neatly organized work environment goes a long way in improving the attitudes of the staff working within the office and certainly with the customers who visit the office for assistance. The server room and communications closets should be documented, cables labeled and wiring management devices used throughout City facilities. This will take significant time, but will pay dividends during an emergency, staff turnover, or equipment replacement.

Recommendation 10: The City should establish a formal fiscal year equipment refreshment plan.

To ensure a reliable, robust, and high performing technology environment, best practice encourages a formal plan to periodic replace (refresh) of computer hardware and equipment. As hardware and equipment ages, it becomes less reliable resulting in higher support costs and increased staff disruption. In addition, as new technologies are implemented they are generally optimized to run on the most current hardware. Based on our experience, government entities have been replacing desktops and laptops every 3-5 years and servers on a 5-7 year schedule. Given the recent economics, this replacement schedule has been extended to 4-6 years for desktops and laptops and 7-10 years for servers but has led to increased maintenance costs and equipment downtime.

NexLevel recommends the City create formal refreshment policies for all computer equipment (desktops, laptops, servers, SAN, and communication devices) based on the shortest possible replacement cycle.

Recommendation 11: The City should establish formal vendor/contract management procedures.

ITD administers most of the hardware/software maintenance contracts held with the City. Some of the City's application maintenance agreements are included in department budgets. These departments are responsible for maintaining the agreements and ensuring the support service levels meet the City's requirements. Generally, all technology contracts (software licensing, on-going maintenance) should be included in the ITD budget. Consolidation of the City's technology expenditure allows for possible economies of scale, standardization, and vendor leverage.

The successful implementation of many of the recommendations provided in this assessment, as well as the City's continued ability to leverage new and/or renovated applications and their supporting technologies will also depend on ITD's ability to manage projects and work effectively with external service providers (vendors). Industry research confirms that the ability to effectively collaborate with vendors and to facilitate the successful completion of projects must be a core competency for IT organizations.

Vendor management methodology should include:

- Consideration of the ability of vendors to meet the ITD and user requirements for timely delivery and continuing support
- Collaboration with vendors to stay informed of product plans, positioning, and release schedules
- Open, objective, and effective discussion with vendors to resolve issues related to delivery and product performance without rancor
- Statements of work that contain realistic and achievable project schedules and well-defined deliverables
- Timely and successful execution of the project schedules
- Support and other services are provided as contractually required
- Maintenance of a contact list for each vendor including senior executives in the event that an item must be escalated
- Centralized control of all vendor technology contracts including those executed by user departments to ensure conformance with standards and to leverage services.

In order to proactively manage the City's core business application software, IT should enhance and maintain a consolidated vendor contact list, which would include:

- Application name
- Application description
- Modules purchased / licensed
- Modules in production, module version, and last update
- Department(s) using each module
- Number of users
- Key Department contacts
- Vendor support contact information
- End-User License Agreement(s) (particularly information regarding contracted services and service levels)
- Disaster recovery / business continuity information.

Recommendation 12: The IT Division should establish formal inventory processes for technology software and hardware.

ITD is responsible for all software licenses and monitors what is installed on all City computers through manual processes. The City purchases most software through site or enterprise licensing agreements. On an annual basis, and usually tied to the budgeting cycle, ITD ensures adequate licenses exist. In cases where additional licenses are required they are planned and included in the next fiscal year budget.

NexLevel encourages ITD to create complete, well-documented hardware, software, database, and configuration inventories using automated tools. Not only will this material help in new implementation planning, but provides minimum backup in case of a disaster and systems need to be rebuilt or reconfigured.

Recommendation 13: The City should adopt technology policies and procedures.

A core component of technology best practices is the establishment and enforcement of policies and procedures. Effective policies and procedures guide the use of technology to ensure a secure, reliable, and supportable environment. It is important that the City adopt technology policies and enforce their consistent use. NexLevel recommends the following activities to ensure consistent deployment and use of technology throughout the City.

- ITD should review existing technology policies to identify gaps or shortcomings
- Create and/or update existing policies in order to publish a comprehensive technology policy guide to align with best practices. The initial set of policies should address the following:
    - Acceptable Use of Technology: Guidelines for the use of computers, fax machines, telephones, cell phones, BYOD (Bring Your Own Device), portable storage devices, internet, email, and voicemail. Social networking usage guidelines and use of online file storage services not controlled by the City (e.g. Skype, Drop Box, iCloud, Google, SkyDrive, iTunes, other online backup services) should be included.
    - Security: Guidelines for passwords, levels of access to the network, virus/spyware protection, confidentiality, usage of data and data encryption.
    - Technology Standards: Guidelines to determine the type of software, hardware, and systems will be purchased and used within the City, including those that are prohibited (for example, instant messenger or mp3 music download software).
    - Network Set up and Documentation: Guidelines regarding how the network is configured, how to on-board/off-board employees to the network, and permission levels for employees.

- As time permits, develop additional technology policies including:
    - Help Desk
    - Public Information
    - Document Retention
    - Equipment Sanitation/Disposal
    - Software Licensing
    - Green IT
    - Administrative Rights
    - Anti-Virus
    - Change Control - Freezes & Risk Evaluation
    - Desktop Move/Add/Change
    - E-Mail Archiving
    - Inventory
    - Remote Access
    - Removable Media Acceptable Use
    - Social Media
    - Technology Training
    - Third-Party Access
    - Wireless Access Points

Recommendation 14: The IT Division should develop formal planning documents for the day-to-day operation.

ITD does not maintain formal planning documents to guide its day-to-day activities. There is no documented blueprint for technology deployment, implementation of application systems, or replacement strategies for hardware and software.

ITD should allocate the time to create a technical blueprint that documents the existing and planned IT enterprise architecture. This document should be used as a guide for future technology project implementations and hardware acquisitions. At a minimum, this document should include:

- Network topology (updating existing diagram(s);
- Router/switch deployment, configuration and replacement (current, photos, and configuration);
- SAN and/or virtualization refreshment and expansion plans (capacity planning);
- Desktop/laptop migration (new equipment and operating/application software versions);
- Software life cycle planning (business application replacement);
- Tactical operational plans (annual work plan, project plans, and status reports).

Recommendation 15: The City should adopt a formal policy for the use of technology passwords.

From a user perspective, passwords are often considered an inconvenience, but they are a critical component to an organization's security program. Passwords serve to restrict access to computer applications to only those that have authorized access. Passwords are most effective when parameters are established that prevents choices that can be easily hacked (i.e. "password," a common name, 12345, etc.). In today's environment, it is necessary for security practices to extend down to personal devices such as smartphones because these devices can access the City's network and systems.

NexLevel concurs with the recommendation provided in the 2014 Information Systems Review conducted by Maze & Associates that the City strengthen its use of passwords by implementing and enforcing a password policy that requires users to use strong passwords and change them periodically. While this will be viewed as a nuisance by staff, it is necessary to more closely align with best practices.

Recommendation 16: Backups

Ensuring the City's servers are routinely "backed-up" so that systems (databases, programs) can be restored in the event of an unplanned event is a basic tenet of all IT organizations. A detailed evaluation of the current backup methodology, the accuracy of the backups, and current off-site archiving strategy is beyond the scope of this project. IT staff indicated that incremental backups are performed nightly and full system backups are executed weekly which are reasonable precautions. NexLevel recommends the City conduct an assessment of current backup procedures and determine alternatives to the acquisition of hardware (backup appliance) or other tools that be appropriate for the City. Current processes and equipment may be coming to the end-of-life and the time spent to back up system may exceed the current available production window. This study should include the evaluation of cloud services for data backup, long-term data retention and automated retrieval, SAN acquisition, and server replication.

Recommendation 17: The City should create and test a disaster recovery plan.

The City does not have a comprehensive, well-tested, technology disaster recovery plan to cover emergency operational scenarios. NexLevel recommends the City develop a comprehensive Disaster Recovery Plan that would establish the priorities for restoring technology services and ensures adequate processes, procedures, and resources would be available to support an orderly recovery of the City's applications within the defined timeframe and in priorities as deemed by the City departments. Upon completion, ITD should exercise the plan to validate that the servers, operating systems, application software, and databases can be brought into service from the recovery site within the specified timelines, that the applications will function as expected, that network connectivity can be successfully established, and that system performance is acceptable. Provisioning physical systems for recovery, configuring these systems, and recovering applications can be time consuming; as a result, recovery may take from several hours to several days for each system. Successive recovery drills are needed to refine processes to reduce the time required to restore critical information systems.

Technology Trends

In many respects, the City is at a "technology crossroads". Public expectations regarding access to public information and services are continuing to increase as the "technology gap" shrinks and more members of the public have access to the Internet and are comfortable using online services. For the City, this has many advantages including the ability to further reduce the number of positions needed to staff public counters, the ability to make access to information and services available in multiple languages, and the ability to improve transparency and community engagement.

It also; however, has introduced greater complexity as the public continues to adopt a wide range of mobile devices ranging from smart phones to tablets and hackers seek to exploit public portals to gain access to confidential data and to deny access to services.

Technology service offerings are also changing how IT services are procured and delivered. The number and cost-competiveness of web-based ("cloud") service offerings continues to increase with both private and public-sector organizations moving towards the adoption of services including infrastructure as a service (IaaS), desktops as a service (Daas), and applications as a service (AaaS) with the objectives of reducing capital costs, reducing the resources allocated to maintaining the currency of technology, and improving service levels.

The recommendations and projects outlined within this IT Roadmap represent a traditional methodology to improve technology service delivery within the City. Over time, the implementation of these projects will deliver results and provide for an effective IT support organization. The progress may be slow, but it will be successful.

If, on the other hand, the City wants to move at a faster pace, an alternative methodology could be explored which is commonly referred to as a "Cloud First Policy".

Basically this methodology migrates the majority of local IT services into the cloud which is then managed by an outside vendor (or a hybrid solution with some service managed locally and some remotely). It should be noted that the City currently uses cloud services for agenda management (Granicus), the web site (AHA), Web, and, CAD/RMS (3 city consortium). The use of cloud technology provides significant benefits such as:

- Economies of scale
- Reduction in capital costs such as hardware, software or licensing fees
- System access anytime, anywhere via the Internet.
- Flexibility to meet changing needs
- Disaster recovery/continuity of operations outside City's organization
- Collaboration with other government organizations
- Creative work force not having to address "keep-the-lights-on" activities.

For the IT Roadmap, the details of implementing a "Cloud First Policy" are not included as planned projects. However, a project has been included that asks the City to make a decision relative to its cloud policy. This is important as several listed projects (Exchange 2007 migration, creation of a backup/recovery strategy, upgrading Server 2003, etc.) could be eliminated and replaced by the implementation of the cloud strategy. NexLevel recommends this key decision be made prior to implementing any other project within the IT Roadmap. If the City choses "Cloud First", the identified IT Roadmap projects should be re-evaluated, modified, and rescheduled.

IT Roadmap

Introduction

The IT Roadmap represents a vital, first step forward for the City in remediating the issues with its information technology infrastructure, enabling it to obtain greater value from existing business application systems, and in providing a more stable foundation to respond to new requirements and public expectations. The roadmap places a premium on low risk, high value, activities that are achievable with the technology resources available to the City (including City staff and external technology service and resource providers as needed) and sustainable. The focus of the resulting roadmap is on enabling:

- Improvements in the City's information technology infrastructure, including hardware and business application systems
- Improvements in IT service delivery capabilities
- Initiating activities for the acquisition of new, core business technology software (i.e. finance, and document management).

NexLevel is highly committed to the concept that thorough planning is one of the most critical factors in ensuring the timely and successful completion of projects. We are also mindful that research by leading technology advisory firms has emphasized that project delays attributable to the failure to adequately plan are expensive and disruptive. Nonetheless, we recognized that the City has some immediate needs and have sought to strike a balance between planning and implementation in the development of the roadmap.

Project Descriptions, Cost, and Timing

For each project, the roadmap provides:

- A high-level grouping of current projects by category (i.e., IT Organization, IT Infrastructure, Business Application, and IT Service Improvements)
- A description of the overall project and, where applicable, a reference to a specific recommendation within this document
- The activity type (Acquire, Plan, Implement)
- The estimated low and high cost (for budgeted projects)
- The timeline for the project. If a project is comprised of two phases (plan, implement) a cost and timeline has been developed for each activity.

Technology Projects

	Projects	Project Description	Activity Type	FY 14/15 Cost (000's)	FY 15/16 16/17 Cost (000's)	FY 2014/15 4Q	FY 2015/16 1Q	FY 2015/16 2Q	FY 2015/16 3Q	FY 2015/16 4Q	FY 2016/17 1Q	FY 2016/17 2Q	FY 2016/17 3Q	FY 2016/17 4Q
IT Organization														
1	Cloud First	Determine the City's sourcing strategy. Decision affects implementation of projects 2,3,4,5, and 7.	Plan	0	5	■■■								
2	ITD Structure	Establish a formal IT Division within Administrative Services comprised of 4 FTE. (See Recommendation 1).	Plan Implement	0 100	5 150	■■	■■■							
3	Backup Strategy	Create and implement a backup strategy for all servers including the evaluation of replication devices, SAN technology, and cloud services. (See Recommendation 16).	Plan Implement	0 25	5 35	■■	■■■							
IT Infrastructure														
4	UPS Replacement in Server Room	The existing UPS in the main server room is at end of life and should be replaced.	Acquire Install	25	50	■■	■■■							
5	Server 2003 Upgrade	Upgrade existing Server 2003 installations to 2005 or 2008 depending on application compatibility with each device.	Implement	25	50		■■							
6	Exchange 2007 upgrade	Migrate Exchange 2007 to Exchange 2010.	Implement	15	25		■■							
7	Hardware Refreshment Program	Upgrade all desktop/laptop computers and network printers in the inventory every 5 years. (See Recommendation 10).	Implement	25	50		■				■			
8	Win 7 / Office 2010 Migration	Upgrade all desktop/laptop computers through replacement program or in place, standardizing on Windows 7 with Office 2010 or latest versions.	Implement	15	20			■■■	■■■					
9	Hardware currency	Technology Infrastructure Improvements (Servers, Network, etc.) beyond annual hardware replacement program a. Replace dated servers, routers and switches, and UPS in Council Video Room	Implement	25	50		■■■	■■■	■■■	■■■				
10	City Building Wi-Fi Improvements (In-Progress)	Install Cisco Meraki devices to improve Wi-Fi access in City Council chamber and Recreation buildings.	Implement	5	10	■■■								

						FY 2014/15	FY 2015/16				FY 2016/17			
Projects		Project Description	Activity Type	FY 14/15 Cost (000's)	FY 15/16 16/17 Cost (000's)	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Business Applications														
11	PD – CAD/RMS	Complete the Intergraph CAD/RMS system in cooperation with the cities of Palo Alto, Los Altos, and Mountain View.	In Progress Implement	0	0	■■■	■■■	■■■	■■■	■■■				
12	ADM – Finance	Develop a list of functional and technical requirements for procurement of an enterprise financial management system.	Plan	25	50		■■■							
13	CLERK – Document Mgt.	Develop a list of functional and technical requirements for procurement of an enterprise document management system.	Plan	15	30	■■■								
14	REC – PCI Compliance	Complete tasks to ensure current RecTrac software meets PCI compliance requirements.	In Progress Implement	0	10	■■■								
15	REC - RecTrac	Migrate RecTrac production processing to local server.	Implement	0	5			■■■						
16	City-Wide - Telephone	Determine requirements and select replacement telephone system for City-wide deployment.	Plan Implement	0 50	5 75				■■■	■■■	■■■	■■■		
17	ADM - Finance	Develop formal procurement for the acquisition and phased implementation of a finance system, including the preparation of the RFP, solicitation and evaluation of vendor proposals, selection, and contract negotiation	Implement	200	400			■■■	■■■	■■■	■■■			
18	CLERK – Document Mgt.	Develop formal procurement for the acquisition and phased implementation of a content / document management system, including the preparation of the RFP, solicitation and evaluation of vendor proposals, selection, and contract negotiation	Implement	100	150		■■■	■■■						

						FY 2014/15	FY 2015/16				FY 2016/17			
Projects		Project Description	Activity Type	FY 14/15 Cost (000's)	FY 15/16 16/17 Cost (000's)	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
ITD Service Delivery and Planning Projects														
19	Help Desk Tracking (In-Progress)	Acquire and implement a Help Desk tracking tool for call/request management. (See Recommendation 4).	Acquire Implement	5	25	■■ ■■								
20	Project Mgt. Principles	Implement basic project management processes and artifacts for all major technology initiatives. (See Recommendation 2).	Implement	0	5	■■								
21	SAN implementation	As part of the backup strategy (Project 3) implement a Storage Area Network (SAN) for management of server disk space and move efficient use of installed server virtualization.	Acquire Implement	15	25		■■■	■■■						
22	Connectivity Plan	Retain an outside vendor to map and analyze City-wide network connectivity (including Wi-Fi). Implement communications equipment to provide reliable connectivity to technology devices. (See Recommendation 8).	Plan Implement	10 100	15 150		■■■	■■■	■■■					
23	DR Plan	Develop a technology disaster recovery plan for security and recovery of technology services during a time of local or regional emergency. (See Recommendation 17).	Plan	10	15				■■■	■■■				
24	Change/Patch Mgt.	Implement basic change/patch management procedures to document and track changes to technology infrastructure configurations, applications, or software upgrades. (See Recommendation 7).	Implement	0	5		■■							
25	Passwords	Establish a City-wide password policy and enforce its use. (See Recommendation 15).	Implement	0	2			■■■						
26	Tactical Plans	Develop a series of IT operational tactical plans. (See Recommendation 14).	Plan	0	5						■■■	■■■	■■■	■■■
27	Policies/Procedures	Create a series of the most critical technology polices and enforce their use City-wide. (See Recommendation 13).	Implement	0	5				■■■	■■■	■■■			

						FY 2014/15	FY 2015/16				FY 2016/17			
Projects		Project Description	Activity Type	FY 14/15 Cost (000's)	FY 15/16 16/17 Cost (000's)	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
28	HW & SW Inventory	Conduct an initial City-wide inventory of all technical hardware and software and ensure that on-going records are maintained. (See Recommendation 12).	Implement	10	15							■■■	■■■	■■■
29	Clean-up	Conduct a clean-up and organization of IT work areas, server room, and communication closets. (See Recommendation 9).	Implement	5	15	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■	■■■
TOTAL ROPOSED PROJECTS:				**805**	**1,462**									

Future Departmental Projects

Although these projects were not included within the scope of the IT Roadmap, they nonetheless representative Departmental technology needs that are only just less of a priority than the projects in the roadmap. These projects should be considered in future City planning efforts. The projects are listed by Department below.

City Clerk

1 Agenda Management Expansion (Workflow & e-Signatures)
2 Council Chamber Equipment Upgrades
3 Web site expansion (e-Services)
4 Intranet/Collaboration site

Community Development

1 Permits/Planning Replacement
2 Code Enforcement Application
3 GIS Plan

Finance

1 Cashiering system
2 Employee self-service
3 Project Accounting

Human Resources

1 Performance Evaluation System Acquisition & Implementation
2 Applicant Tracking
3 Certification/Training/Safety software

IT Projects

1 Service Catalog & Service Level Agreements (Recommendation 5)
2 City-wide application training (Recommendation 6)
3 Vendor Management (Recommendation 11)
4 Virtual Desktop Infrastructure (VDI)

Police

1 Facility wiring upgrades
2 MDC Upgrades
3 Public Safety specific software (stand alone or with consortium)

Public Works

1 Work Order system
2 Permit Management/Tracking application
3 Access (Key) control system
4 Energy Management/Conservation system