CITY OF SAN JOSE
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Office of the City Auditor

Report to the City Council
City of San José

TECHNOLOGY DEPLOYMENTS: PROCESSES CAN BE IMPROVED TO ENSURE LONG-TERM SUCCESS OF THE CITY'S TECHNOLOGY VISION

Report 19-10
November 2019

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November 26, 2019

Honorable Mayor and Members
Of the City Council
200 East Santa Clara Street
San José, CA 95113

Technology Deployments: Processes Can Be Improved to Ensure Long-term Success of the City's Technology Vision

The City of San José uses a multitude of technology systems for its service delivery, internal operations, and communications with the public. Implementing or deploying these systems occurs across the City and may involve multiple departments or work groups. These include the individual departments that use the systems, the Information Technology Department (ITD), the Finance Department's Purchasing Division, and others. The technology deployment process is complex and can be lengthy. In some cases, the City has seen deployments delayed past initial timelines, higher than expected costs, and scope changes. In some of those instances, projects have undergone resets to redefine and refocus the work.

This audit is a follow-up to our 2016 *Audit of Technology Deployments* and the objective was to review the management and timeliness of the City's technology deployment process. Since the 2016 audit, there have been several developments in the City to promote technology initiatives, including the approval of San José's Smart City Vision, the formation of the Office of Civic Innovation and Digital Strategy, and the creation of the Smart Cities and Service Improvements Committee. In addition, ITD created its Portfolio-Products-Projects Office (C3PO) to manage ITD-led technology initiatives, and the City has begun using an Agile management approach for some of its IT deployments.

As part of our review, we selected five recent technology deployments based on auditor-determined risk criteria, which included cost, number of amendments to vendor agreements, length of the procurement process, and whether the project was public-facing. The selected projects include the Finance Department's new Business Tax System (BTS), the City's My San José platform, the new Integrated Permitting System (IPS), the City Website replacement, and the Department of Transportation's new Parking Access and Revenue Control System (PARCS).

Finding 1: Improved Planning Can Increase the Likelihood of Project Success. The City can benefit from a more thorough planning phase in its technology deployments. Most projects that we reviewed appeared to be significantly over their projected timelines and, in some instances, exceeded their original projected budgets. In some cases, projects did not clearly define the project scope, did not

adequately engage stakeholders at the beginning of the project, or changed project approaches during implementation.

In several instances, after project delays, ITD and the City Manager's Office (CMO) became more involved to create project charters to redefine and clarify project purposes, plans, and the additional resources needed. While this has benefited these projects, these approaches should be formalized and applied to other projects as well. To that end, the City should update its technology-related policies to require project charters for technology deployments and require staff to tie core and secondary product features to defined business needs. Also, staff should define the project approach at the inception of the project, ensure that vendor agreements align with the approach, and identify and engage key stakeholders early in the deployment so that their input is incorporated into the final product requirements.

Finding 2: A Formalized Governance Structure and Appropriate Staffing Is Critical for Complex, Interdepartmental Projects. Technology deployments are often complex and interdepartmental, affecting the daily activities of employees, residents, programs, and existing systems. Some of the projects reviewed appeared to lack the appropriate staffing to manage that complexity, leading to hampered decision making and project resets. While some deployments have changed staffing and governance structures to address challenges, it is important to consider staffing and governance at the beginning of deployments. Having the right governance structure and the appropriate number and type of staff with adequate decision-making authority is important, especially for larger and more challenging interdepartmental projects.

ITD's role should also be better defined. ITD currently reviews certain technical specifications of projects in the RFP process—such as architecture, cybersecurity, and ability to function in the City's infrastructure environment. However, this review is initiated by departments, typically through the process of submitting Help Desk tickets to ITD. During the implementation phases of several projects, ITD became more involved as it filled gaps in technical and project management expertise. City policy should be updated to reflect this expanded role.
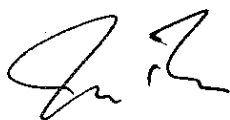
Finally, lack of documentation and mid-project turnover in key staff positions on the City's and vendor's sides contributed to delays and loss of institutional knowledge in projects. To mitigate the effects of future turnover, the Administration should require appropriate documentation surrounding key milestones and decision points, and modify City agreements to enable the City to provide input in vendor staffing.

Finding 3: Reporting on Project Status Can Be Improved. Regular, accurate reporting is essential to help policymakers provide oversight and the Administration to steer projects toward their intended outcomes, adjust when needed, and avoid delays and increased costs. In recent years, the City has started to report on projects identified in the Smart Cities Roadmap. While this roadmap has provided a starting ground for regular monitoring of many major projects in the City, it can be expanded to provide a more quantitative display of project status. Despite missed deadlines and increasing costs, projects were not always regularly reported in detail at the City Council's Smart Cities Committee. Moreover, the only projects that receive regular, public reporting to the Committee are those on the Smart Cities Roadmap. The City's Parking Access and Revenue Control System (PARCS), for example, is not included on the Roadmap, nor is it required to be reported to another committee, even though it is a $6.3 million public-facing project. To improve transparency for policymakers and residents, the Administration should establish reporting guidelines and criteria that identify when and for what projects regular reporting to

relevant Council Committee(s) should be required, as well as create a dashboard to track and report the progress of projects.

This report has 10 recommendations to strengthen the City's technology deployment process. We plan to present this report at the December 5, 2019 meeting of the Smart Cities and Service Improvements Committee of the City Council. We would like to thank the Information Technology Department; the City Manager's Office of Civic Innovation and Digital Strategy; the Department of Transportation; the Finance Department; Planning, Building, and Code Enforcement; the Department of Public Works; the City Manager's Office of Communications; and the City Attorney's Office for their time and insight during the audit process. The Administration has reviewed the information in this report, and their response is shown on the yellow pages.

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Respectfully submitted,

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City Auditor

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Background

Technology deployments refer to the implementation or creation of a unique product, service, or business solution related to technology in the City of San José (City). These occur across the City and may involve multiple departments or work groups during each phase of the implementation. Examples of current or recent technology deployments include the City's new Website, the Finance Department's Business Tax System (BTS), and the Department of Transportation's new Parking Access and Revenue Control System (PARCS)—all of which are examined in this report. For a glossary of key terms and definitions refer to Appendix B.

In March 2016, this Office published the audit of *Technology Deployments: Additional Resources Needed to Shorten Deployment Timelines.*[1] The audit highlighted some areas of concerns. These included:

- A lack of a strategy to replace key technology systems,

- A need for dedicated staffing and project management to ensure timeliness and success of technology implementation, and

- A lack of sufficient procedures to facilitate technology procurement.

Since publication in 2016, the Information Technology Department (ITD) and the newly formed Office of Civic Innovation and Digital Strategy (referred to later as the Office of Civic Innovation) have made changes to the City's technology deployment environment to address the recommendations from the audit and areas of concern in the City's technology deployment process. These include:

- Creation of the Innovation and Technology Advisory Board to provide input and focus on high-level technology approaches and strategic planning.[2]

- Approval of the Information Technology (IT) Strategic Plan in March 2017. This Plan outlined the City's approach as it renewed investment in its technological environment to achieve San José's Smart City Vision. Per ITD staff, the Plan provided strategic direction and included initiatives that were priorities of the City Council.

- Creation of the City's Portfolio-Products-Projects Office (C3PO) in FY 2017-18 to manage technology initiatives in ITD. The project managers work closely with departments on some high priority deployments. More

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[1] http://www.sanjoseca.gov/DocumentCenter/View/54889

[2] The Innovation and Technology Advisory Board became inactive in March 2018. It appears that much of the work from this group has been continued through the Office of Civic Innovation.

recently, six more positions were added to C3PO at the direction of the Mayor's June Budget Message.

- Development of a Smart City Vision,[3] the goals of which are to leverage technology to increase safety, ensure inclusiveness, increase the City's responsiveness to community demands, and address climate challenges to enable sustainability goals.

- Establishment of the Smart Cities and Service Improvements Committee (referred to later in the report as the Smart Cities Committee) in 2017 to "achieve the strategic goals of San José's Smart City Vision by advancing innovation projects at scale, demonstration/pilot projects, and strategy and policy initiatives that deliver community benefits, optimize resources, improve service delivery, and build capacity for future success."

- Development of a Smart Cities Roadmap, the first iteration of which was developed by the Innovation and Technology Advisory Board and included 21 priority projects. As of November 2019, the roadmap included 49 projects.

- Formation of the Office of Civic Innovation in the City Manager's Office. The Office has become involved in major technology deployments throughout the City, and maintains the Smart Cities Roadmap.

- Changes in the technology deployment process for some high priority deployments which included: establishment of project charters for projects over 40 hours managed by C3PO, ongoing reporting on the current status of the projects on the Smart Cities Roadmap, and development of a reporting framework (red, yellow, green—described in Finding 3) to identify the status of the project.

Steps in a Technology Deployment

There are generally five main phases of a technology deployment in the City. These are:

1. **Conception and initiation:** Individual departments determine the need for a technology solution and develop technical and functional requirements based on business needs and processes.

2. **Planning and analysis**: Based on the project concept determined in the previous phase, the departments conduct an analysis to plan and determine resources needed to complete the deployment. Budget Office approval for funding is required before the project can move to the next phase.

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[3] In March 2017, the City Council approved a plan to transform the City to become the most innovative city in the U.S. by 2020. According to the Mayor's Office, "Becoming a 'smart city' means that game-changing technologies and data-driven decision-making will drive continuous improvement in how City Hall serves our community, and to promote concrete benefits in safety, sustainability, economic opportunity, and quality of life for our constituents."

3. **Procurement and vendor selection**: The project goes through a competitive procurement. Contract negotiations with selected technology vendors follow this process. Generally, for technology procurements, departments work with the Finance Department's Purchasing Division for both processes. The Finance Department's Purchasing division has seven staff to support complex procurements and contract management activities Citywide, including technology purchases. The City Attorney's Office advises departments during the procurement and the contract negotiation phases, as well as when finalizing contract terms with the vendor.

4. **Implementation**: This phase includes working with outside vendors during the rollout of hardware and software associated with the deployment, as well as user testing, data transfer, and other analyses. In some cases, ITD dedicates a project manager from C3PO to the project. In most cases, however, individual departments assign lead staff to manage the project. This often is in addition to that staff person's other responsibilities.

5. **Ongoing support**: City staff may maintain the system on an ongoing basis with some back-end support from an outside vendor. This support and ongoing maintenance is often included in the City's agreement with the vendor. Depending on the system, there may be significant changes to a department's staffing structure or support practices.

Technology Deployments Involve Multiple Departments and Offices

Depending on the technology deployment, there are various departments and offices involved in the process. These include:

- **Individual departments** who plan and conceptualize technology projects, create requests for proposals (RFPs), and are primarily responsible for implementation. Different departments have varying levels of IT-related staff to support deployments.

- **ITD** provides technical, project management, or other expertise in technology deployments. In FY 2018-19, ITD had 80 full-time equivalent staff. Because the IT function is decentralized in the City (described later in the Background), many large departments have their own technology staff that provide this expertise and support. We noted at least 64 IT-related staff across nine departments Citywide.

- The **Finance Department's Purchasing Division** facilitates the RFP process and vendor selection and is involved in contract negotiations.

- The **City Attorney's Office** reviews contracts and addresses legal issues in the procurement process.

- The **Office of Civic Innovation** monitors and regularly reports on projects included on the Smart Cities Roadmap to the City's Smart Cities

Committee, in addition to assisting with implementation of certain projects.

While the level of involvement of different groups vary across deployments, the department needing the technology typically takes the lead, with support from other groups. Some projects also have steering committees, which make high-level decisions about a project. Council committees ensure public accountability for projects by receiving external reports from City staff. Exhibit 1 shows the various roles of the different players throughout a technology deployment.

Exhibit 1: A Technology Deployment Typically Involves Multiple Departments/Offices

Department(s)	Finance Department's Purchasing Division	City Attorney's Office (CAO)	Information Technology Department (ITD) including C3PO	Civic Innovation Office (CMO)	Steering Committees	Council and Committees
Plan and scope the project	Leads RFP process	Develop standard contract terms	Preliminary technical approval	Public reporting	Executive-level decisions	Receive and approve public reports
Create RFP	Aid in vendor selection	Contract review	Project management	Project monitoring		
Select vendor	Leads contract negotiations	Assists during contract negations	Technical expertise			
Implement technology	Monitor contract end dates	Legal support in procurement				
Ensure ongoing support						

Key: All Projects   Some Projects

Source: Auditor analysis of City Policy 5.1.9, review of City documents, and interviews with staff.

The City Has a Decentralized IT Function

As mentioned earlier, ITD is the City's central technology department with 80 budgeted FTE in FY 2018-19. However, over the years, the City has moved to a decentralized model with many larger departments having their own IT function. We observed as many as 64 additional IT-related staff in various departments across the City, including the Police Department, Fire Department, Department of Transportation, Environmental Services Department, and the San José Mineta Airport. While ITD must approve the request for a technology procurement, all phases of the deployment are generally managed by a department's internal IT staff.

Exhibit 2: IT Staffing Is Both Centralized and Decentralized
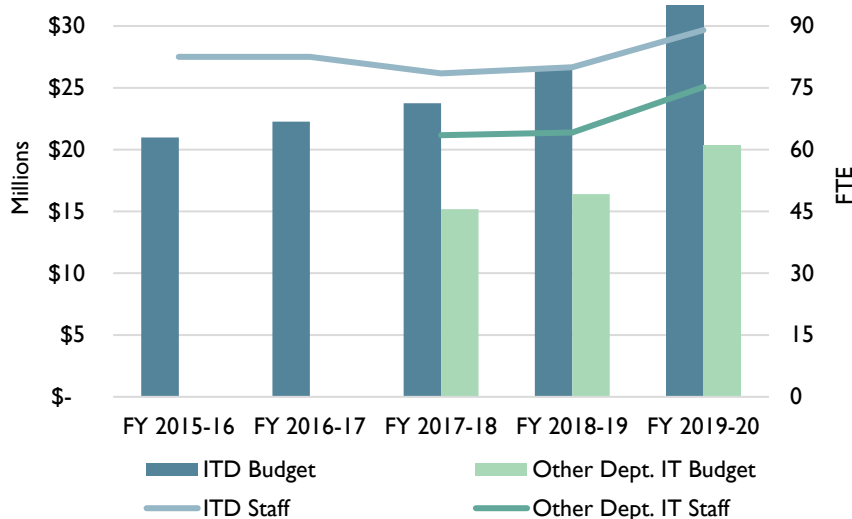
Source: Auditor analysis of Adopted Operating Budgets. In FY 2015-16 and FY 2016-17, department IT budget and staffing were not separately identified.

Various City Policies Provide Guidelines on Procuring Technologies

The Municipal Code govern certain aspects of the technology deployment process.

Section 4.12.120 of the San José Municipal Code designates the Finance Director as the procurement authority for: [4] 1) contracts for the purchases of supplies, materials and equipment; 2) contracts for services; and 3) contracts for information technology. The Code requires a competitive process for the purchase of goods and services above $10,000.

Section 2.04.3020 of the Municipal Code designates the Director of the Information Technology Department (also the Chief Information Officer) to 1) administer the central computer systems and functions; 2) provide advice and recommendations to computer system maintenance and planning; and 3) assist in the creation of master plans, policies, and documentation requirements relating to computer systems in the city, among other functions.

Additionally, the *Procurement of Information Technology Policy* (CPM 5.1.9)[5] outlines the internal process of procuring information technology that cannot be purchased via a Citywide open purchase order or through a City procurement card.

Since 2009, the City has been operating under guidelines published in a City memo for technology procurements. These guidelines give departments the purchasing

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[4] In addition to the Director of Finance, the Municipal Code notes that the procurement authority can also be the City Manager, Council Appointee, or other such person who has been duly authorized to procure a contract.

[5] This policy is later referred to as the Technology Procurement policy.

authority for certain lower priced items (up to $20,000) that do not require installation and are purchased using an existing Citywide Purchase Order, such as printers, scanners, and projectors; standard desktop software; and all maintenance renewals. ITD approval is required for other types purchases such as servers, desktop computers, monitors and laptops; new maintenance/support agreements; purchase requests with an unbudgeted ongoing component (e.g. maintenance, annual upgrades, etc.); and any product greater than $10,000 that is not available through existing purchase orders.

Procurement Improvement and Readiness Program

Due to concerns related to staff prioritization of procurements and timeliness, the Finance Department has recently begun working with the Office of Civic Innovation on a Procurement Improvement and Readiness Program. This Program will entail engaging a consultant to work on complex procurements and make recommendations on improving the speed and business value delivery of the procurement process.

One area the City Administration has begun to address is the prioritization of procurements, which will be done through a newly created Procurement Prioritization Board (PPB). Given the limited staffing available to work on the City's many procurements, the PPB's goal is to ensure that City staff prioritize the most significant or pressing ones. The PPB is composed of the Assistant City Manager, the Finance Director, and the Budget Director, and intends to meet no less than on a monthly basis, but will meet more frequently as needed.

Departments wishing to procure technology services greater than $120,000 will be required to respond to questions on a procurement prioritization sheet for the Board's review. These questions touch on the areas of readiness, degree of complexity, alignment with current City priorities, opportunity cost, and time since the expiration of the initial agreement.

Finding I   Improved Planning Can Increase the Likelihood of Project Success

Summary

The City can benefit from a more thorough planning phase in its technology deployments. Most projects that we reviewed appeared to be significantly over their projected timelines and, in some instances, exceeded their original projected budgets. In some cases, projects did not clearly define the project scope, did not adequately engage stakeholders at the beginning of the project, or changed project approaches during implementation.

In several instances, after project delays, ITD and the City Manager's Office (CMO) became more involved to create project charters to redefine and clarify project purposes, plans, and the additional resources needed. While this has benefited these projects, these approaches should be formalized and applied to other projects as well. To that end, the City should update its technology-related policies to require project charters for technology deployments and require staff to tie core and secondary product features to defined business needs. Also, staff should define the project approach at the inception of the project, ensure that vendor agreements align with the approach, and identify and engage key stakeholders early in the deployment so that their input is incorporated into the final product requirements.

Projects Reviewed Were Delayed, Exceeded Budgets, and Faced Implementation Hurdles

Based on auditor-determined risk criteria, we selected five technology projects for review.[6] These included:

1. The Finance Department's new **Business Tax System (BTS)**, a single tax billing and management application to manage about 85,000 business tax and other tax accounts, such as cardroom, cannabis, and transient occupancy taxes.

2. The City's **My San José** platform is a customer relationship management system, mobile application, and online portal to facilitate resident-to-City communication and streamline reporting of service delivery issues in five service categories: abandoned vehicles, graffiti, illegal dumping, potholes,

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[6] Risk criteria included value of vendor contracts, whether an RFP was reissued during deployment, number of options and amendments to vendor agreements, length of the procurement process, length of the contract, and whether the project was public facing.

and streetlight outages. The platform was launched in 2017 and has since gone through eight iterations.

3. The new **Integrated Permitting System (IPS)** is to replace the existing development services' permitting software system and incorporate enhancements to the system, including a new geographical mapping system for property data.

4. The replacement of the **City Website**, the digital front door to the City of San José. The goals of the project in redesigning the City's website include creating a more service-focused site that reflects San José's Smart City Vision, and improving the efficiency and effectiveness of maintaining the site by City staff.

5. The Department of Transportation's new **Parking Access and Revenue Control System (PARCS)** is intended to replace an older, legacy parking system that was first installed over ten years ago in the City's downtown parking garages. Equipment failure, data security concerns, and outdated technology motivated the City to release a new RFP for its replacement and to include other modernized features, such as Automated License Plate Recognition (ALPR) technology.

As described below, each project faced issues in successfully accomplishing all of its intended goals.

Elements of Project Success

Project success can be analyzed through four key elements, which can elucidate the driving factors behind the project's outcome. To measure project success, the following questions can be asked. Was the project:

- Appropriate in addressing the business need?

- Within its defined scope?

- Completed timely?

- Within the projected budget?

A project that is completed on time and within budget but that fails to meet the business need is not considered a success. For a project to qualify as successful, its scope must meet the defined business need.

Exhibit 3: Elements of Project Success
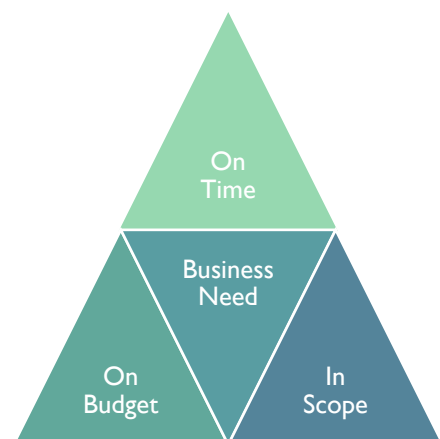
Source: Auditor adaption of IT best practices.

All the projects reviewed did not meet its objectives in at least one of the above areas, for various reasons. These reasons are described throughout this report.

Projects Reviewed Have Been Delayed From Original Timelines, Resulting in Increased Expenditures

Most projects that we reviewed appeared to be significantly over their projected timelines and, in some instances, exceeded their original projected budgets. For example:

- The **City Website** originally had a projected timeline of nine months, which has since been prolonged to more than two years. City staff anticipate the first iteration of the Website to launch November 30, 2019.

- The implementation of **BTS** lasted four times longer than the original timeline, extending from less than one year to four years.[7] It was ultimately discontinued.

- **PARCS** was projected to be completed in September 2019, but now has an estimated completion date of early 2020.

- **IPS** is over a year past the original estimated timeline; the upgrade to AMANDA 7 went live November 4, 2019.[8]

Exhibit 4: Timeline Delays
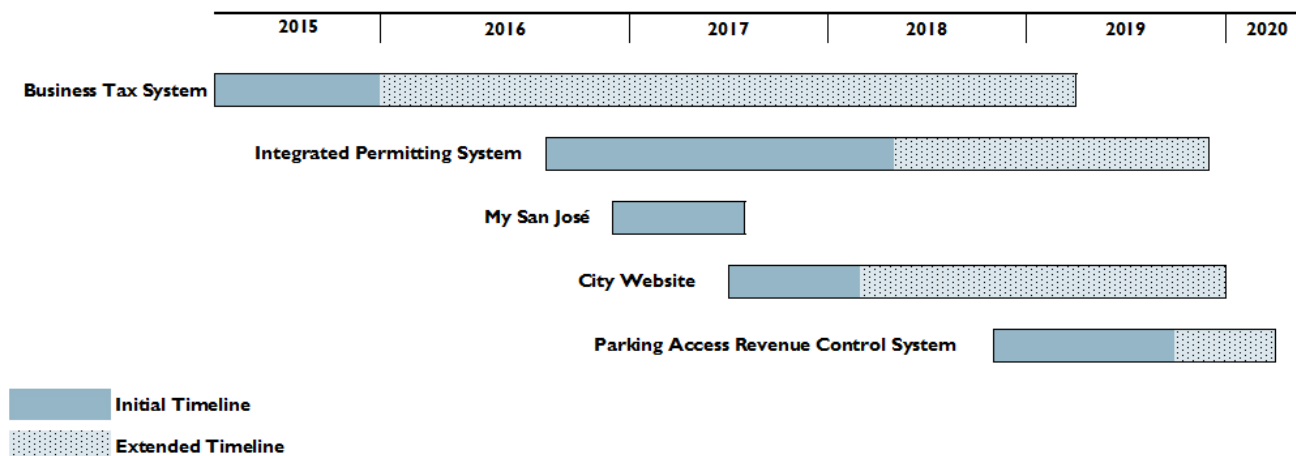
Source: Auditor analysis of vendor agreements and other City documents.

Note: These timelines only reflect the initial implementation phases of the projects. While the initial deployment for My San José was completed ahead of schedule, the first version did not include all the agreed-upon features. Many of these were completed in later upgrades to the system. See Appendix C for more comprehensive project timelines.

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[7] This timeline is based on start date of the contract to when the City reached a final settlement agreement with the vendor (March 2019).

[8] Staff notes that additional work and features will be incorporated at a later time.

While unanticipated delays can occur in implementations, better planning and more appropriate resourcing could have helped mitigate the effects of these significant delays.

Project Delays Lead to Higher Project Costs

Project delays are often accompanied by increased project costs. In many of the projects, costs rose above what was originally expected. For example, the agreement amount for the consultant project manager for IPS rose from $270,000 to $630,000 and the agreement term increased by more than two years. In the case of the City Website, City staff still must support the current website while maintaining the content of the new website as the team works towards deployment.

Delays in projects also increase the maintenance costs of current systems. The BTS project was intended to replace the City's end-of-life Oracle/PeopleSoft Enterprise Revenue Manager system. However, because the new BTS was never implemented, the City continues to pay an Oracle renewal license fee for the old system (which receives a minimum level of support).

Additionally, delays can impact service delivery due to the potential failure or loss of support of older software and equipment. For PARCS, the old system requires ongoing maintenance at a rate of $181,000 per year, prorated when each facility is upgraded to the new system. In addition, because the equipment is old, City staff have had to search for replacement parts—in one case purchasing them inexpensively from the City of Sacramento.

The City's Planning for Technology Projects Is Not Always Consistent

The COBIT 5 (Control Objectives for Information and Related Technology) framework from ISACA[9] notes that for successful implementation,

> there has to be a plan that should enable measurement, help track progress and enable corrective action to be taken at the right time to keep the execution on track.

Such a plan can take the form of a project charter, which is a critical planning document that outlines what is needed to deploy a project. Key information— such as purpose of the project, staff and budget resources, anticipated timeline, scope, and approvals from the project members—can all reside in this charter.

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[9] ISACA (formerly known as the Information Systems Audit and Control Association) is an organization that "engages in the development, adoption, and use of globally accepted, industry-leading knowledge and practices for information systems."

According to ITD staff, the Department began utilizing project charters for major projects in 2017. The main components of ITD's project charters include:

- **Project description**: Proposed timeline, budget, business need, and impact on other systems

- **Scope and requirements**: Major milestones, stakeholders, recovery plan, data and security requirements, and risks and assumptions

- **Staffing**: Roles, responsibilities, and organizational structure

ITD's project charter template is included in Appendix D of this report.

Only **1 out of the 5** projects reviewed had an established project charter when initializing deployment.

Creating a project charter is a crucial step in the deployment process. It enables the organization to clearly and concisely define project goals and delineate assumptions and constraints, as well as provides those leading the projects with a clear understanding of roles and authority to drive the project forward. Only one of the five projects reviewed during this audit had developed a charter at the beginning of its deployment.

Scope Changes Occurred in Some Projects

Without a project charter, a project can suffer from a lack of vision and appropriate resources, which can lead to disagreements, delays, or reductions in scopes. The City Website, My San José, and IPS each experienced delays or changes in project scopes. For example:

- **City Website:** The first RFP for the City Website was released in February 2016. The goal of this RFP was to procure a "web-based Content Management System" with "a new responsive web design for both the Internet and intranet websites." In September 2016, the City released a second RFP with a revised scope that removed the internal intranet site from the project. After the vendor was selected and the agreement began in June 2017, certain elements, such as project visioning and user testing, were added to the agreement. In 2019, the project underwent a reset in which ITD and the Office of Civic Innovation joined the project to help reprioritize features and provide additional resources.

- **My San José**: The City reduced the initial scope of My San José by excluding language accessibility features in favor of prioritizing other features for the initial go-live product.

- **IPS:** This project experienced a significant scope change in the services it was intending to implement. Staff reprioritized components of the project to include only those that were necessary for the initial launch, as well as

deprioritizing components that were deemed as not adding significant benefit to the project.

In these cases, planning measures such as developing project charters, establishing core product features, and engaging stakeholders could have helped avoid these issues.

The Benefit of a Structured Chartering Process and Establishing Core Features[10]

A structured chartering process can help project staff define the purpose of the technology early and assists the City in allocating the appropriate staff and budget resources for the deployment. Agreeing on core features focuses the rest of the deployment, lowers the likelihood for subsequent scope changes, provides predictability to stakeholders, and assures that the project offers value to the City and the public.

Further, defining business needs and tying them to corresponding core features increases a project's chances of success by minimizing the complexity of the technology solution. Doing so clarifies a project's scope by defining the features essential for product launch, with the potential for additional features to be added later. For example, in the PARCS deployment, features were prioritized by categorizing them as "Mandatory," "Highly Preferred," or "Preferred." In the procurement process, potential vendors specified what features they could provide and whether customization would be necessary.

Some projects have begun to incorporate a more "modular" approach to their agreements. They do this by outlining the minimum scope and specifying additional, optional features. For example, the City's agreement for a Library Discovery Layer,[11] has two parts: 1) the base product to meet the Library's business need and 2) optional modules the Library can later add to enhance the product. Having this flexibility built into the agreement streamlines the deployment by having the vendor focus first on the minimum scope and protects the City from dedicating resources to additional features before the initial launch.

As mentioned earlier, ITD's C3PO product-project managers regularly use project charters.[12] In four of the five projects we reviewed, ITD and the CMO became more involved as projects saw delays or other problems. ITD and the CMO helped create project charters to redefine and clarify project purposes, plans, and the additional resources needed. This led to crucial project-wide discussions on

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[10] What we describe as the *core features* is the minimum scope necessary to meet the City's business need. The minimum scope may be similar to a minimum viable product (MVP), defined as the simplest working version of a product used to gather user feedback in order to be modified and expanded upon in later iterations.

[11] Library Discovery Layer is an online public access catalog designed to interface with the Library's Integrated Library System that provides library customers with thousands of eResources.

[12] Product-project managers take part in managing both the process of a project and in managing product development.

staffing, scope, and other areas. As a result, some of these projects have been realigned and are projected to be deployed according to their revised timelines.

Despite its benefits, the practice of project chartering has yet to be expanded to all technology deployments. To standardize this process, the Administration should update the City's Procurement of Information Technology policy (CPM 5.1.9) or create a new policy to include guidance on developing project charters prior to initiating a project.

Recommendation #1: To address Citywide technology deployments and project management, the Administration should update the Procurement of Information Technology Policy (CPM 5.1.9) or develop a new Technology Deployment Policy to:

    a. **Require project charters for technology projects (potentially reviewed and approved by ITD or CMO) prior to the procurement process.**

    b. **Clearly define the essential and secondary features that address business need within this project charter.**

Stakeholder Engagement Can Ensure Products Align with Business Needs

The City can better identify its stakeholders to help define the business need of a technology deployment. Stakeholders include users of the technology inside and outside of the City, as well as organizations that may be affected by the technology deployment (e.g., San José Downtown Association for the PARCS project). Soliciting feedback from stakeholders early in the process can avoid delays caused by revisiting project requirements to account for stakeholder needs, and ensure that resources are spent on technologies that are designed with adequate end-user feedback.

Some projects did not engage important stakeholders until late in the process, resulting in products that were not fully aligned with the business need. Subsequent adjustments contributed to prolonged project timelines and additional expenditures.

For example, the IPS team did not conduct extensive stakeholder engagement until after the project's reset in 2018, leading to changes in product design. The original plans included a mobile application for Code Enforcement inspectors to use in the field. Upon understanding the inspectors' needs during the reset, the City realized that the procured application would not be sufficient for their needs and instead opted to provide inspectors with laptops and tablets that would allow them greater access to the system in the field.

Stakeholders for the City's Website were also not fully engaged until after the vendor selection. Specifically, the vendor agreement, which was executed in July 2017, required the vendor to "conduct in-depth usability testing to assess the needs of the users who visit the City's website, identify what information they are looking for, and understand how they prefer to access such information." City staff conducted supplementary usability testing in 2019 to further respond to stakeholder needs. The results of this testing elevated additional areas requiring greater analysis, such as user navigation, search engine, visual layout, and page load times.

Identifying Stakeholders and User Groups

Identifying types of stakeholders, user groups, and their role(s) can benefit the project planning process and help the City determine what is needed from the technology solution.

As an illustration, the PARCS project team solicited the views and feedback of multiple stakeholder groups early in the process. Among these groups were the Downtown Parking Board, Team San Jose, the San José Downtown Association, hotels, various City departments, and Council District 3 staff—all stakeholders involved in downtown parking. The PARCS team incorporated this feedback into the RFP process, adding requirements such as a downtown parking loyalty program, license plate recognition, mobile parking validation options, and valet system integrations.

Exhibit 5: Stakeholders and User Groups in the PARCS Deployment
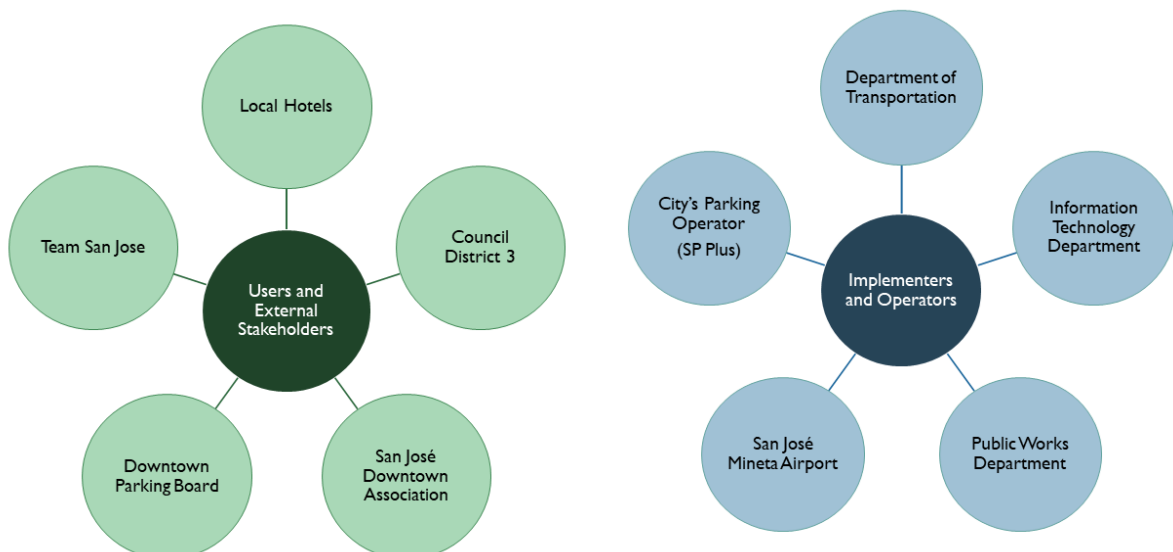
Source: Auditor analysis of staff presentation to City Council and internal City documents.

It is best practice in a technology deployment to distinguish the various types of user groups. For instance, "power users" are individuals who use the system to a higher degree than regular users, often working closely with the system in their daily responsibilities. ITD's project charter template prompts project staff to document stakeholders (internal and external). This step could be beneficial for City departments to regularly incorporate into their project planning process.

> **Recommendation #2: In the Administration's policy update for technology deployments (see Recommendation #1), require departments to identify and engage all relevant levels of product users and stakeholders in the project chartering process.**

Vendor Agreement Structures Did Not Always Align with Changes in Project Approach

The City has recently begun transitioning from primarily using a traditional *Waterfall* implementation methodology towards more *Agile* approaches in its technology deployments. Waterfall and Agile are different project management techniques for software deployments.

Waterfall breaks up the deployment process into sequential phases of analysis, design, coding, and testing. Agile divides the process into short sprints (typically two-week intervals) that alternate between analysis, development, and deployment. It emphasizes an incremental delivery model and offers room for continuous feedback and adjustment, allowing teams more flexibility in implementation.

IPS and BTS both experienced **project resets**, in which project staff re-evaluated, among other things, implementation approaches.

Exhibit 6: Differences in a Waterfall and Agile Deployments

Waterfall:

Agile:
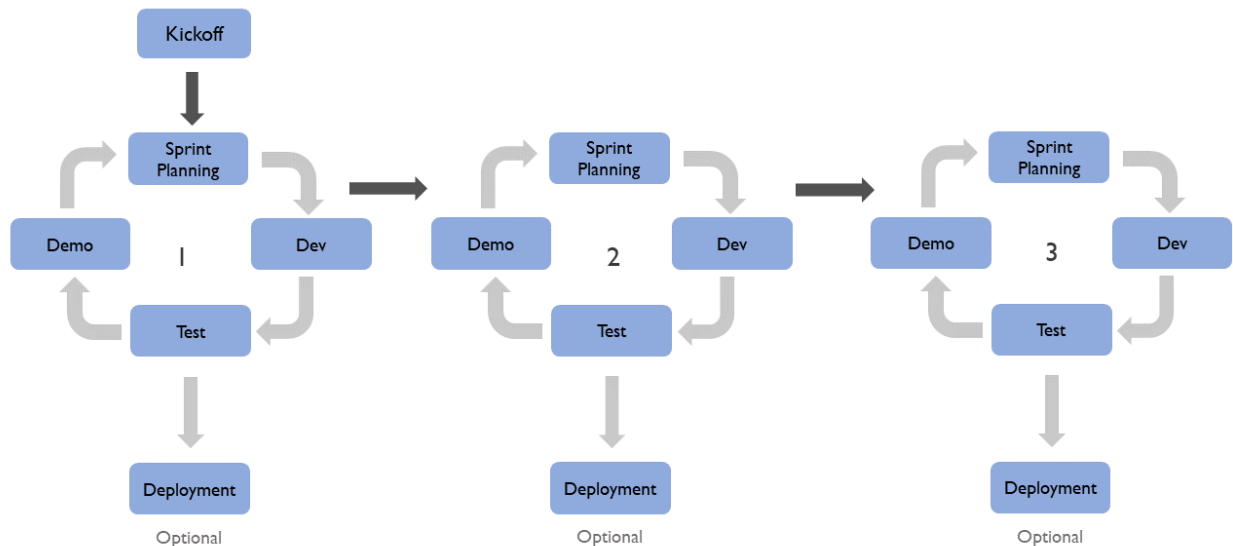
Source: Auditor adaption from BTS lessons learned figures ("Demo" = Demonstration; "Dev" = Development).

Research conducted by the Standish Group International, Inc. found that when comparing 10,000 software projects, projects completed using an Agile method had a greater rate of success than those using a Waterfall method, regardless of project size.[13]

While Agile approaches do not require teams to get everything correct at the beginning, it does demand more active involvement from City staff than a Waterfall project. Rather than the vendor building the product independently, City staff must be present to collaborate with and offer feedback to the vendor as the team develops and deploys the product. Agile therefore requires greater staffing resources, a product owner (on the City's side),[14] and agreements that reflect the iterative nature of the approach.

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[13] The Standish Group International, Inc. is an organization that conducts IT research. This information is from its 2015 CHAOS report. It is based on a breakdown of all software projects from FY 2011–2015 within the CHAOS database, segmented by Agile and Waterfall methods.
https://www.standishgroup.com/sample_research_files/CHAOSReport2015-Final.pdf

[14] A product owner is primarily responsible for leading decisions on scope and ensuring that the product is aligned with the business need. This is discussed further in Finding 2.

The City historically has used the Waterfall approach, and vendor agreements are typically structured with larger milestones over greater intervals of time and substantial payment amounts as compared to an Agile approach. The City's standard project management techniques, agreements, and staffing roles and responsibilities are more aligned with the waterfall approach. However, these structures may not be as amenable to Agile approaches, which emphasizes ongoing improvements and "incremental wins."

In 2018, the City engaged a consultant (Gartner) to perform a health check on the IPS project. The consultant found important elements of Agile to be missing from the project and the vendor agreement, such as having a product owner and tailoring payment milestones to the approach. As a result, the City adjusted the scope of work. These changes included:

- Incorporation of two- to three-week sprint sessions with the vendor onsite, and

- Changes to milestones management by using smaller, more targeted objectives and key results in sprint sessions.

In addition to incorporating project approach into vendor agreements, the approach should also be considered in the vendor selection stage. To execute an Agile project, for instance, the vendor should be trained in Agile. Otherwise, a vendor that is unfamiliar with the chosen methodology can hinder the City from using that approach.

As the City moves forward with more Agile approaches for technology deployments, it will be critical to identify the approach at the start of the project and ensure that agreements and vendor selection align accordingly.

> **Recommendation #3: In the Administration's policy update for technology deployments (see Recommendation #1), require departments to identify the appropriate project approach (e.g., Agile or Waterfall) in the project chartering process. These approaches should be incorporated into both the procurement process and in vendor agreements.**

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Finding 2   A Formalized Governance Structure and Appropriate Staffing Is Critical for Complex, Interdepartmental Projects

Summary

Technology deployments are often complex and interdepartmental, affecting the daily activities of employees, residents, programs, and existing systems. Some of the projects reviewed appeared to lack the appropriate staffing to manage that complexity, leading to hampered decision making and project resets. While some deployments have changed staffing and governance structures to address challenges, it is important to consider staffing and governance at the beginning of deployments. Having the right governance structure and the appropriate number and type of staff with adequate decision-making authority is important, especially for larger and more challenging interdepartmental projects.

ITD's role should also be better defined. ITD currently reviews certain technical specifications of projects in the RFP process—such as architecture, cybersecurity, and ability to function in the City's infrastructure environment. However, this review is initiated by departments, typically through the process of submitting Help Desk tickets to ITD. During the implementation phases of several projects, ITD became more involved as it filled gaps in technical and project management expertise. City policy should be updated to reflect this expanded role.

Finally, lack of documentation and mid-project turnover in key staff positions on the City's and vendor's sides contributed to delays and loss of institutional knowledge in projects. To mitigate the effects of future turnover, the Administration should require appropriate documentation surrounding key milestones and decision points, and modify City agreements to enable the City to provide input in vendor staffing.

Interdepartmental Projects Create Complexity

As a complex, interdepartmental project, IPS initially faced many problems related to staffing roles and responsibilities. Prior to 2018, there was no central figure with sufficient decision-making authority to shape what the product would look like. Project management was led by a consultant and there was no formal product owner to provide leadership and make decisions on product features.

Consequently, staff from various departments did not share a consensus on the purpose of the project, with some focusing on the upgrade of the current system and others focusing on additional features. The lack of uniform vision gave rise to inconsistent scope management practices, contributing to delays in the project.

The City Website project also had competing visions of how the website should look and perform. The project was initially led by two staff members who, in addition to having to complete their other daily job responsibilities, did not wield sufficient decision-making authority within the City to enforce consistent standards across departments (e.g., use and size of images). The project also had no dedicated staff to manage technical elements related to integrations and online services.

Once additional staff resources were added, technical testing on the City Website revealed problems with the page load speed and performance on mobile devices.[15] According to ITD staff, these issues were due to the size of the images selected by departments, services integrated into pages, and host site variables—a problem that could have been identified earlier with technical system testing. The new cross-departmental project team is working to address these issues.

A Decentralized IT Structure May Also Add Complexity

As discussed in the Background, the City's decentralized IT structure means that departments rely on their own IT staff to provide technical expertise for their deployments. The Municipal Code gives the City's Chief Information Officer (CIO), who also is the Director of ITD, the authority to:

- Administer the central computer systems and functions;

- Provide advice and recommendations to computer system maintenance and planning; and

- Assist in the creation of master plans, policies, and documentation requirements relating to computer systems in the City, among other functions.

Performing the above role can be challenging for ITD in a decentralized IT environment, in which each department maintains and procures its own technology systems. Even though ITD is required to approve all technology procurements within certain categories (as explained in the Background), this approval does not necessarily extend to providing technical support during the actual procurement and implementation of a system.

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[15] Unlike its current site, the City's new website is designed to be mobile-responsive, meaning that it will be more user-friendly than the old site when viewed on a mobile device.

Governance Structures Changed During Project Resets

Along with having the right number of staff, staffing with the appropriate authority is important, especially for larger and more complex interdepartmental projects. For example, the staffing plan for IPS was revised to address certain staffing problems. The new staffing structure includes roles such as a project sponsor, product owner, and technical and functional leads, many of which were previously absent in the project. These are defined in Exhibit 7.

Exhibit 7: IPS Defined Project Roles and Responsibilities (After Reset)

Role	Responsibility
Project Sponsor	Approves project charter, assigns resources, and clears hurdles to progress in the organization, while serving as the project advocate in the City
Product Owner	Leads decisions on scope and ensures that the product is aligned with the business need
Technical Lead	Designs code, database, interfaces, and other technical requirements; sets development standards; and designs how the product will fit within the program architecture
Functional/Business Lead	Ensures the new technology process will work for users and collaborate with subject matter experts for user acceptance, testing, and training
Project Manager[16]	Manages project requirements and prioritizations, supports sprints to ensure delivery within requirements, and monitors communication with the project team

Source: Auditor adaption of ITD's charter template and the AMANDA 7/IPS project charter.

IPS now has dedicated staff with varying spheres of decision-making authority. The product owner has decision-making authority among the core leadership team, and likewise the project sponsor has the majority of the vote among the executive committee. Staff report that having this type of clear organizational structure and authority has helped to move the project forward.

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[16] In some cases, the project manager is also called the Project/Scrum Master. This is based on the implementation management technique of Agile approaches.

Exhibit 8: IPS Revised Reporting Structure
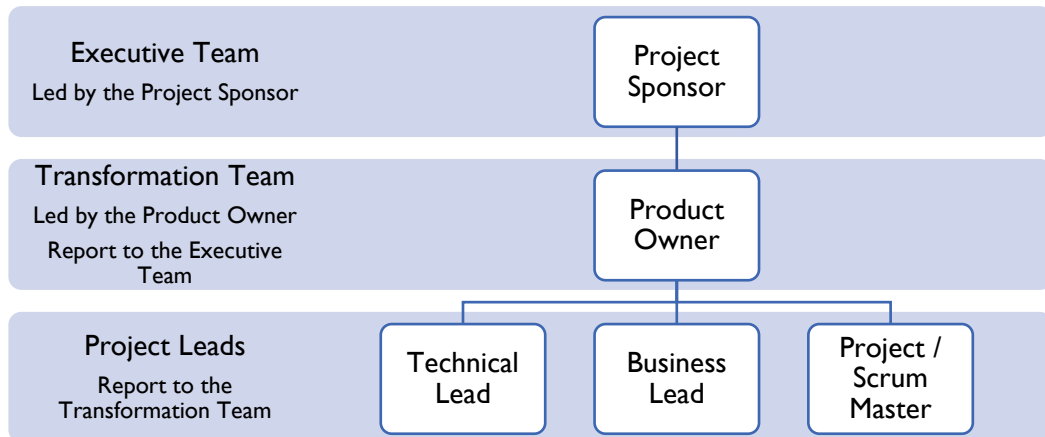
Source: Auditor adaption of the Amanda 7/IPS project charter.

Importance of an Appropriate Governance Model

Designating a clear decision-making process and providing the proper individuals and committees the formal authority to make decisions can preserve integrity of product vision, incorporate consistent scope management practices, and facilitate decision-making, especially if multiple departments and stakeholders are involved. As was demonstrated in IPS, key project staff, such as those described in Exhibit 7, as well as a dedicated project manager, user experience lead, and executive committee can be beneficial to a project's success.

While it will vary from project to project, a typical staffing structure will include a project manager, a product owner, project sponsor, and executive committee— each with well-defined roles and appropriate decision-making authority.

The Role of the City Manager's Office

When projects went off-track, the CMO became involved and reviewed and changed the governance structures of the projects to clarify roles and authorize appropriate decision-making authority to the right staff at the right level. In some cases, this meant involvement from executive level individuals within the CMO. Executive staff observed that this involvement was particularly helpful in assigning staff, prioritizing tasks, and making final decisions when there were disagreements among staff from different departments. The involvement from the CMO may be especially important when the project is a complex, interdepartmental project.

Staffing Appeared to Be Insufficient to Meet Project Timelines

Multiple projects appeared to lack appropriate staffing, which hampered decision-making and resulted in project resets. When staffing plans were re-evaluated, resources were reallocated and became better aligned with the project goals.

> "One of the most important elements is to have qualified personnel available to lead the implementation."
>
> - ISACA Article on COBIT

For example, the project team for the City Website deployment was initially insufficient to deploy the new site in a timely manner. The deployment began with a project manager/webmaster in the City Manager's Communications Office. Later, the team expanded, with the Communications Director acting as the project sponsor along with contacts in other departments (e.g., user experience support from the Office of Civic Innovation and technical support from ITD). In March 2019, the City performed a project reset in which the CMO and ITD assessed the staff resourcing levels necessary for project success. The new project team includes over nine staff and four advisors across three areas—governance/branding, technology, and usability—with a lead in each area to make decisions.

Exhibit 9: Website Staffing Structure Before and After Project Reset
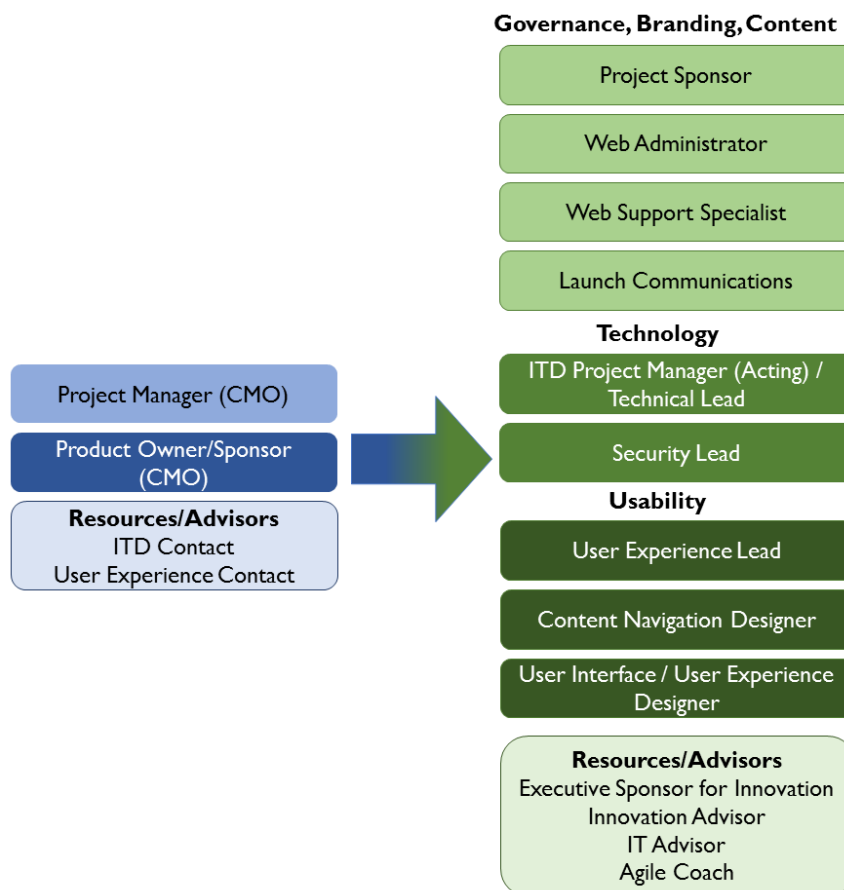
Source: Interviews and review of City documents, including the project charter and presentations to City Council.

In other projects, City staff carrying out deployments still had to attend to their daily responsibilities, which reduced their capacity to dedicate themselves to the project. The City's point person for BTS had responsibilities that were distributed across multiple projects—the implementation of two billing systems—on top of their daily duties and management of a large team of staff in the Finance department.

The PARCS project is currently being managed by staff in the Department of Transportation (DOT) with other responsibilities. During the RFP, vendor selection, and contract negotiations stages, the project manager spent around 30 to 50 percent of their time on the project.

In general, limited staff capacity was one of the factors limiting project progress, illustrating the importance of realistically resourcing a technology deployment—especially projects that are complex and span across different departments.

> **Recommendation #4: To ensure appropriate staffing with the right decision-making authority is designated to a technology project, the Administration's policy update for technology deployments (see Recommendation #1) should require:**
>
> a. **Clear governance structures for complex and interdepartmental technology projects, which include well-defined roles, responsibilities, decision-making authority, and the role of the City Manager's Office.**
>
> b. **Allocation of appropriate staffing resources based on project timelines, complexity, and approach.**

ITD's Support Is Important in Technology Deployments

City Policy 5.1.9 requires approval for technology procurements of $100,000 or greater through an IT Planning Board. This Board is currently inactive and has not existed for more than a decade. Guidelines issued by the Administration in a 2009 memo require ITD approval for technology procurements in certain categories, as described in the Background. However, this step is not currently formalized in policy.

ITD reviews technical specifications of projects in the RFP process, covering aspects such as cybersecurity and ability to function in the City's infrastructure environment. This review is initiated by departments, typically through the process of submitting Help Desk tickets to ITD staff. Complex project approvals are done at a high level, such as by the CIO, Assistant CIO, Deputy CIOs, and/or the City's Information Security Officer (CISO). There is currently no standardized process for ITD to be involved in a technology deployment beyond this level of review.

Projects Lacked ITD's Ongoing Technical Support and Coordination

Multiple projects appeared to lack technical support from ITD at the beginning of the deployment. Once ITD became more involved (typically due to projects beginning to fail), it was able to provide technical expertise and project management support that helped move projects forward.

For example, City staff receiving the technical specifications from the BTS vendor lacked the expertise to assess the quality of these specifications. With the addition of an ITD project manager, the team gained a clearer picture of the vendor's ability to deliver a robust business tax platform. This understanding later informed the City's decision to discontinue with the vendor.

In another example, following the departure of the City Website project manager, concerns were raised that the team did not have sufficient staffing resources or project management expertise to achieve the projected launch date. In their combined assessment, ITD and the Office of Civic Innovation noted that the project did not have a sufficient governance structure, project charter, steering committee, or clearly defined roles and responsibilities. Further, there were other concerns relating to cybersecurity and site performance (e.g., page load times).

To address these issues, ITD and the Office of Civic Innovation worked with the Communications Office to determine the appropriate staffing required to successfully complete the project. As a result, ITD provided additional team members to serve in the roles of the Acting IT project manager, Technical Lead, and Testing Interns (see Exhibit 9 on Website staffing changes). ITD continues to be involved in the project.

Similarly, ITD provided project managers and upper-level ITD staff to contribute technical expertise and vendor management support for the IPS project.

Outdated Technology Procurement Policy

As discussed earlier, the City does not currently have a policy on the deployment of technology. The only Citywide policy providing guidance is the Technology Procurement policy. As evidenced by the wide-ranging roles of ITD and the CMO, the Procurement of Information Technology policy is outdated and does not reflect the City's current practices.[17] Though internal City guidelines require ITD to approve all technology procurements within certain categories, this requirement is not built into City policy. Rather, the policy only requires the currently inactive Information Technology Planning Board to approve projects over $100,000. The City has formed a Procurement Prioritization Board (discussed in the Background) that would serve in a similar approval capacity. These changes and other internal policy directives should be reflected in City policy. Finally, the current policy provides guidance on technology procurement but is silent on the technology deployment process.

> **Recommendation #5: The Administration's policy update for technology deployments (see Recommendation #1) should:**
>
> a. **Formalize the role of the Information Technology Department (ITD) in technology deployments in initial project planning.**
>
> b. **Identify an ITD liaison for the entirety of the project, as appropriate.**
>
> c. **Formalize the role of the Procurement Planning Board in prioritizing technology procurements.**

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[17] This policy was last revised in 2008.

Consultant Project Management Requires Oversight

As highlighted in the 2016 audit, strengthening the City's project management is a crucial step to ensuring the success of technology deployments. In response to the 2016 audit recommendations, the Administration formed the City Portfolio-Products-Projects Office (C3PO) within ITD. However, C3PO oversees a limited number of technology deployments. In addition, there is limited technology project management expertise in other departments. As a result, some projects have utilized consultants as project managers.

Neither IPS nor BTS, which both used external consultants as project managers, made significant progress before they faced project resets. Project management in BTS was not successful in driving the project forward. Despite not being able to devise an effective turnaround strategy, the consultants remained on this project for more than a year. IPS too suffered from major delays, with phases lagging behind by as long as two years. In both projects, the City discontinued the consultants after the resets.

City staff raised concerns that the payment structure of consultant agreements was not tied to project success. Consultants were compensated based on a time and materials structure, which can incentivize a consultant to prolong the project timeline without substantial progress.

In IPS and BTS, both consultant project managers saw significant increases to their contracts. The consultant project manager for IPS had a one-year, $270,000 agreement that rose to a three-and-a-half-year, $630,000 agreement. Similarly, the value of the BTS consultant agreement increased from $1.1 million to $1.35 million.[18] The contract amendments did not clearly explain the reasons for the increase in compensation.

Further, the City had limited capacity to monitor the consultants. For IPS, the project lead was not directly responsible for managing the consultant project manager. In BTS, City staff managing the consultant were also involved with other projects and regular job responsibilities. Ultimately, the consultant project managers in BTS and IPS were replaced by City staff in C3PO who had greater institutional knowledge and familiarity with the City's technology environment.

If the City decides to continue working with consultant project managers with a time and materials incentive structure, it will be critical to closely monitor consultant performance tied to the progress of a project. The City Council also recently approved the budget to hire six additional product-project managers for C3PO in FY 2019-20. The additional project management staffing can be leveraged

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[18] The master agreement with the BTS consultant includes professional services to support the implementation of the City's new utility billing solution, in addition to the business tax system.

to manage technology deployments across the City, reducing the need for consultants.

> **Recommendation #6: In order to ensure that complex technology projects are adequately managed:**
>
> a. **Departments should work with the City's Portfolio-Product-Projects Office (C3PO) to evaluate internal project management capacity within the project chartering process.**
>
> b. **If internal capacity is lacking and the project needs to use a consultant project manager, departments should identify staff at the beginning of the process to monitor and assess consultant performance and tie expenditures to overall project progress.**
>
> c. **Require consultant project managers to report project progress on a regular basis to an appropriate governing body (e.g., the executive steering committee).**

Staff Turnover Creates a Need for Succession Planning

Technology deployments suffer when key team members depart, taking their institutional knowledge of the business need, product, and vendor with them.

As an example, when the project manager spearheading My San José left, there was no documentation indicating agreed-upon changes to the product or how software bugs would be addressed. In one instance, the project manager and vendor negotiated removing requirements related to language accessibility as the vendor was not delivering adequate translations, instead agreeing to divert efforts to another component of the project. This change was not documented. Additionally, many of the successive versions of My San José addressed bugs in the system. However, in the face of staff turnover, the lack of documentation prevented new staff from knowing if the bug fixes should have been a part of the original implementation or should be paid for in an additional change order.

Regular documentation can mitigate the loss of institutional knowledge when a staff member leaves. To further encourage information sharing, some projects are utilizing shared work spaces and document sharing tools, such as SharePoint, Microsoft Teams, and Trello. Requiring project staff—including vendors—to use collaborative project management tools may alleviate knowledge loss when experienced staff leave.

> **Recommendation #7: To limit loss of knowledge when key project staff leave the City, the Administration should develop procedures to require project staff Citywide to document (potentially using a shared platform) key technology deployment decision points, which include:**
>
> - **Approval of specifications**
> - **Product customizations and their approvals**
> - **Progress against project plans**
> - **Changes to agreed-upon features**
> - **Key communications with the vendor**

Vendor Staff Turnover Has Also Occurred on Multiple Projects

Vendor staff qualifications play an important role in the vendor selection. Vendor staff turnover has impacted projects as vendor staff leave the company or are shifted to other projects.

Turnover in vendor staff on the BTS project may have contributed to delays as new vendor staff who were less familiar with the City's business taxes stepped into the project. In other cases, while vendor staff may not formally leave the company, they may be pulled from the City's deployments to work on other projects or responsibilities within the company. This occurred for PARCS when the vendor went through an acquisition. Project staff for PARCS reported that as a result, the vendor changed how staffing was deployed, causing delays in the project.

When vendor staff leave the company, the City generally does not have a say on who their replacements will be. Airport IT-related agreements include a section related to employee selection and turnover that authorizes the City to require the vendor to provide dedicated and technically qualified staff on the project. The agreement enables the City to initiate replacement of a vendor employee if the employee's performance is deemed inadequate. This way, the Airport can ensure that vendor staff or proposed replacement staff have the "skill, knowledge, or training to perform at the required level" to do the work. Incorporating such a clause into agreements with technology vendors can allow the City input or recourse in the case of turnover among vendor staff.

> **Recommendation #8: To ensure key vendor staff have adequate knowledge, skills, and expertise as turnover occurs, the Administration should work with the City Attorney's Office to include a clause in future vendor agreements for technology projects to ensure the City has input on the selection and replacement of key vendor staff.**

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Finding 3   Reporting on Project Status Can Be Improved

Summary

Regular, accurate reporting is essential to help policymakers provide oversight and the Administration to steer projects toward their intended outcomes, adjust when needed, and avoid delays and increased costs. In recent years, the City has started to report on projects identified in the Smart Cities Roadmap. While this roadmap has provided a starting ground for regular monitoring of many major projects in the City, it can be expanded to provide a more quantitative display of project status. Despite missed deadlines and increasing costs, projects were not always regularly reported in detail at the City Council's Smart Cities Committee. Moreover, the only projects that receive regular, public reporting to the Committee are those on the Smart Cities Roadmap. The City's Parking Access and Revenue Control System (PARCS), for example, is not included on the Roadmap, nor is it required to be reported to another committee, even though it is a $6.3 million public-facing project. To improve transparency for policymakers and residents, the Administration should establish reporting guidelines and criteria that identify when and for what projects regular reporting to relevant Council Committee(s) should be required, as well as create a dashboard to track and report the progress of projects.

Guidelines for External Reporting Can Improve Transparency and Accountability

Over the past three years, the Smart Cities Committee has provided a forum for departments and offices to report on various technology projects. Currently, according to its criteria, the Smart Cities Committee receives reports on projects that are core to the City, important to the community, and have the ability to be expanded upon in the future, as displayed in Exhibit 10.

Reporting is done through the Smart Cities Roadmap. As of November 2019, this Roadmap contained 49 projects, which included four of the projects described in this report—BTS, IPS, the City Website, and My San José.

Exhibit 10: Important Components for the Smart Cities Roadmap
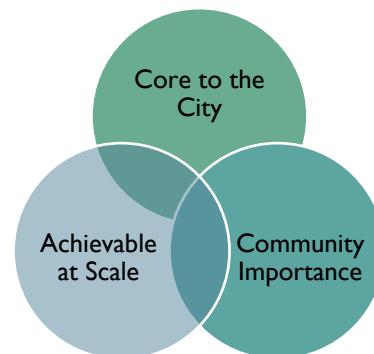
Source: Auditor adaption based on Smart Cities Roadmap criteria.

The Office of Civic Innovation maintains this roadmap and updates the Smart Cities Committee at their regular meetings.[19]

While this Roadmap has provided a starting ground for regular monitoring of many major projects in the City, it can be expanded upon to provide a more quantitative display of project status. The City's current status updates are limited and do not provide an ongoing, comprehensive picture of major technology deployments. Namely, they do not always include explicit reporting on key project health factors such as cost and timelines. In our review, some issues with projects did not surface to policymakers until much later, after problems were escalated to the CMO.

The Roadmap reporting methodology employs color coding system in which, staff rate projects "red", "yellow", or "green," depending on the status of the project. In this case, "green" signifies that a project is on track according to its budget, schedule, and scope. In contrast, "red" signifies the project is in need of help, potentially in the form of resources or prioritization.

Exhibit 11: Project Status Reported at Committee

Green	Project is on track.

•The project is moving as it should in budget and timeline.

Yellow	Project has issues with schedule, budget, or scope.

•A change order may be sufficient to resolve minor issues.

Red	Project is at risk, with corrective action needed.

•More support for the deployment is needed.

Source: Auditor adaptation of information provided to the Smart Cities Committee.

While having a simple color system can be beneficial, this system has not always accurately reflected the status of a project. Improving accuracy of reporting may require a cultural shift in the organization so that staff feel empowered to report the actual project status. To this end, the City must emphasize that a "yellow" or "red" status may reflect a lack of resources, not necessarily staff capability.

Status Reports Did Not Provide Sufficient Updates on Delayed Projects

High profile projects that were falling behind schedule were not reported on in-depth at the Smart Cities Committee. For example, the City Website, which was experiencing delays, was not reported on in detail at the Smart Cities Committee for at least ten months. In that meeting, the reported target go-live date was for

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[19] ITD also provides updates on the Information Technology Strategic Plan to the Committee. This contains information about some additional technology projects occurring in the City.

January 2019. However, as this go-live date passed, the project remained "yellow", and was never marked as needing corrective action.

Similarly, as the project was conducting its second reset, BTS was first reported to the Smart Cities Committee in September 2017, when it was marked as "red", indicating the project had major issues and was at risk of failing. However, updates were not provided again on this project until eight months later in May 2018. At that time, staff reported that the project was experiencing delays but that it was set to deliver within budget. Staff reported that the original completion date would be pushed back but did not provide an updated timeline. Ten months later, in March 2019, staff announced their decision to discontinue with the vendor. Between the updates, there were no intermediate external reports to describe the trajectory of the project.

In contrast, when projects deviate from their expected timelines or budgets by at least 10 percent, the State of California Department of Technology requires staff to explain what action is being taken to address the deviation. This requirement can create accountability for projects to remain on-track as much as possible.

Regular Reports on Status of High Visibility Projects Are Not Required

Not all projects require reporting to Council Committees. Despite being a $6.3 million, transformative, and public-facing project, PARCS does not currently report to a Council Committee. DOT staff provides verbal updates on the project's status to the Downtown Parking Board.[20] Currently, there is no requirement for a project such as PARCS to provide updates to any Council Committee.

The project is currently behind schedule, with an estimated completion date of early 2020 (its original planned completion date was set for September 2019). Out of the eight parking garages, three—Market Street, Convention Center, and Third Street Garages—have hardware installed. Testing has stalled and the vendor is still working to complete the initial milestones of the project.

Guidelines on reporting are limited. Specifically, most projects reported to the Smart Cities Committee are limited to those on the Smart Cities Roadmap, which excludes other high visibility and public facing projects. Considering that it is a high-cost technology system that continuously interfaces with the public, a project like PARCS may benefit from external reporting, either in the Smart Cities Committee or another Council Committee.

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[20] Board minutes are available at http://www.sanjoseca.gov/index.aspx?NID=350

Quantitative Measures of Success Are Not Explicitly Displayed in Reporting

In its current form, the reporting guidelines have a subjective element to it. The guidelines do not specify what metrics or types of information will be presented, nor what will determine whether a project receives in-depth reporting at a Council Committee. While the color reporting of the Roadmap considers budget and timeline into a project's color, it does not indicate how much above or below budget a project is, how far off the project has deviated from its timeline, or if the timeline and budget were adjusted to accommodate issues.

As an example, the IPS project was not marked as "red" on the Smart Cities Roadmap to reflect the project's underlying issues. It was only after the project missed its planned go-live date that concerns were raised by senior staff, prompting the health check initiated by the CMO and ITD. This health check found significant issues with the project and deemed that it was at risk of failing and needed significant corrective action. Given this situation, the project should have been reported as "red" to ensure that policymakers were appropriately informed of this status.

> "The IPS project appears to be a 'watermelon' project – it appears green on the project dashboard based on standard budget and schedule-based status metrics (in this case a re-baselined schedule), but should actually be red in some areas given some underlying project problems."
>
> - Gartner Health Check

In most cases, the project statuses presented at the Smart Cities Committee do not include a comprehensive report of the project, including key project success metrics such as the degree to which the project is on-budget and on-time.

Moreover, as discussed in Finding 1, because budgets and timelines—which may be adjusted throughout a deployment—are key indicators of a project health, it is important for these metrics to be included in the reporting relative to the original and adjusted timelines and budgets. Significant deviations from either should raise concerns about a project's viability.

As the Gartner Health Check of IPS stated,

> *Delays to-date need to be acknowledged. Brushing the past under the rug may increase the likelihood of the same issue happening again on this project in the future.*

The City should therefore develop guidelines for quantitative metrics that would accurately portray a project's progress.

An Online Tool Can Improve Project Monitoring and Availability of Information

Currently, information on the status of major projects is formally made available through Council and Committee presentations. Given the intervals between meetings (i.e., the Smart Cities Committee meets only once a month), opportunities for updates are limited.

The State of California has an online tool to display the status of certain IT projects.[21] It provides the cost, color status, and critical level of the project and includes key indicators such as overall assessments of the project health, time, cost, scope management, and resources. The tool, which is accessible to the public, also includes project approval documents at different stages of the deployment process.

Similarly, the City's Planning, Building, and Code Enforcement Department (PBCE) publicly posts the status and related documents of construction projects that are of high public interest on its website.[22] This allows for a higher level of transparency and accountability.

Using a similar tool for projects that are high dollar value or have a high level of public interest would improve transparency and accountability. The City should create an online tool to provide ongoing updates of major technology projects through the C3PO and the Office of Civic Innovation.

Recommendation #9: For transparency on the status of technology projects above a certain threshold of complexity, dollar value, or public impact, the Administration should develop guidelines to:

   a. **Require regular and detailed reporting to the appropriate Council Committee(s).**

   b. **Include budget and time metrics, as well as deviations from original estimates in reporting.**

   c. **Create a dashboard, or other online tool, to track and publicly display the progress of key technology projects, incorporating metrics that are critical to the success of the deployment.**

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[21] https://cdt.ca.gov/policy/it-project-tracking/

[22] http://www.sanjoseca.gov/index.aspx?NID=3896

Tracking Technology Assets in the City Should Be Improved

There is currently no comprehensive catalogue of technology projects throughout the City. While partial lists exist, such as the Smart Cities Roadmap and the IT Strategic Plan, they do not reflect an exhaustive list of all technological products in the City. The lack of such a catalogue makes it difficult for the City to centrally monitor its technology and anticipate when a system is reaching its end-of-life or at risk of losing vendor support.

The absence of such a list inhibits the City from monitoring existing vendor agreements. For example, DOT staff were not aware that the initial contract period end was approaching, and the option to extend the PARCS agreement was not signed until the day before the original agreement term ended. While the procurement team in the Finance Department maintains a list with dates of expiration, options, amendments, and contract amount, it is incomplete.

Additionally, requests become increasingly urgent and rushed as systems reach the end of their agreements and lifecycles. For instance, in June 2019, ITD received a request to renew the license and support for an asset management system in the Police Department that was about to expire.[23] The request was marked as urgent and required ITD to approve the technology prior to being able to renew this system. This urgency can be mitigated if ITD is actively tracking these systems.

Finally, understanding what projects exist throughout the organization can help the City better leverage existing agreements. For example, the Finance Department's Purchasing Division helped the Airport piggyback on DOT's agreement with the PARCS vendor, as the Airport uses the same type of technology for its garages. Finance also helped the Police Department leverage the City's existing RFP for a new website to include the Police Department's pages. These examples illustrate the potential synergies possible when departments are aware of similar projects in other parts of the City.

> **Recommendation #10: The Information Technology Department should work with City departments to compile and continuously update a comprehensive inventory of technology assets/systems Citywide and establish criteria for monitoring key events in the technology's lifecycle (e.g., contract expiration, vendor end support dates).**

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[23] The urgency of this request was noted, and promptly approved by ITD.

Conclusion

Technology deployments refer to the implementation or creation of a unique product, service, or business solution related to technology in the City. This audit is a follow-up to our previous audit of *Technology Deployments: Additional Resources Needed to Shorten Deployment Timelines* (2016) and the objective was to review the management and timeliness of the City's technology deployment process. Since the audit, there have been several developments in the City to promote technology initiatives, including the approval of San José's Smart City Vision, the formation of the Office of Civic Innovation and Digital Strategy, and the creation of the Smart Cities and Service Improvements Committee.

In our review of technology deployments, we found several projects that were significantly over their projected timelines and, in some instances, exceeded their original projected budgets. We identified many areas where the City can improve in its project planning, including establishing project charters, identifying users and stakeholders, staffing resources, and project approach. Further, the City would benefit from better reporting guidelines to ensure project statuses are accurately reported.

RECOMMENDATIONS

Finding 1: Improved Planning Can Increase the Likelihood of Project Success

Recommendation #1: To address Citywide technology deployments and project management, the Administration should update the Procurement of Information Technology Policy (CPM 5.1.9) or develop a new Technology Deployment Policy to:

a. Require project charters for technology projects (potentially reviewed and approved by ITD or CMO) prior to the procurement process.

b. Clearly define the essential and secondary features that address business need within this project charter.

Recommendation #2: In the Administration's policy update for technology deployments (see Recommendation #1), require departments to identify and engage all relevant levels of product users and stakeholders in the project chartering process.

Recommendation #3: In the Administration's policy update for technology deployments (see Recommendation #1), require departments to identify the appropriate project approach (e.g., Agile or Waterfall) in the project chartering process. These approaches should be incorporated into both the procurement process and in vendor agreements.

Finding 2: A Formalized Governance Structure and Appropriate Staffing Is Critical for Complex, Interdepartmental Projects

Recommendation #4: To ensure appropriate staffing with the right decision-making authority is designated to a technology project, the Administration's policy update for technology deployments (see Recommendation #1) should require:

   a. Clear governance structures for complex and interdepartmental technology projects, which include well-defined roles, responsibilities, decision-making authority, and the role of the City Manager's Office.

   b. Allocation of appropriate staffing resources based on project timelines, complexity, and approach.

Recommendation #5: The Administration's policy update for technology deployments (see Recommendation #1) should:

   a. Formalize the role of the Information Technology Department (ITD) in technology deployments in initial project planning.

   b. Identify an ITD liaison for the entirety of the project, as appropriate.

   c. Formalize the role of the Procurement Planning Board in prioritizing technology procurements.

Recommendation #6: In order to ensure that complex technology projects are adequately managed:

   a. Departments should work with the City's Portfolio-Product-Projects Office (C3PO) to evaluate internal project management capacity within the project chartering process.

   b. If internal capacity is lacking and the project needs to use a consultant project manager, departments should identify staff at the beginning of the process to monitor and assess consultant performance and tie expenditures to overall project progress.

   c. Require consultant project managers to report project progress on a regular basis to an appropriate governing body (e.g., the executive steering committee).

Recommendation #7: To limit loss of knowledge when key project staff leave the City, the Administration should develop procedures to require project staff Citywide to document (potentially using a shared platform) key technology deployment decision points, which include:

   • Approval of specifications

   • Product customizations and their approvals

   • Progress against project plans

   • Changes to agreed-upon features

   • Key communications with the vendor

Recommendation #8: To ensure key vendor staff have adequate knowledge, skills, and expertise as turnover occurs, the Administration should work with the City Attorney's Office to include a clause in future vendor agreements for technology projects to ensure the City has input on the selection and replacement of key vendor staff.

Finding 3: Reporting on Project Status Can Be Improved

Recommendation #9: For transparency on the status of technology projects above a certain threshold of complexity, dollar value, or public impact, the Administration should develop guidelines to:

a. Require regular and detailed reporting to the appropriate Council Committee(s).

b. Include budget and time metrics, as well as deviations from original estimates in reporting.

c. Create a dashboard, or other online tool, to track and publicly display the progress of key technology projects, incorporating metrics that are critical to the success of the deployment.

Recommendation #10: The Information Technology Department should work with City departments to compile and continuously update a comprehensive inventory of technology assets/systems Citywide and establish criteria for monitoring key events in the technology's lifecycle (e.g., contract expiration, vendor end support dates).

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APPENDIX A

Audit Objective, Scope, and Methodology

The mission of the City Auditor's Office is to independently assess and report on City operations and services. The audit function is an essential element of San José's public accountability, and our audits provide the City Council, City management, and the general public with independent and objective information regarding the economy, efficiency, and effectiveness of City operations and services. In accordance with the City Auditor's Fiscal Year (FY) 2019-20 Work Plan, we have completed an audit of technology deployments.

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

The objective of this audit was to follow-up on our 2016 Audit of Technology Deployment and to review management and timeliness of the City's technology deployment process. We reviewed the current status and timeliness of the following technology deployments:

1. The Finance Department's new **Business Tax System (BTS)**, a single tax billing and management application to manage about 85,000 business tax and other tax accounts, such as cardroom, cannabis, and transient occupancy taxes.

2. The City's **My San José** platform is a customer relationship management system, mobile application, and online portal to facilitate resident-to-City communication and streamline reporting of service delivery issues in five service categories: abandoned vehicles, graffiti, illegal dumping, potholes, and streetlight outages. The platform was launched in 2017 and has since gone through eight iterations.

3. The new **Integrated Permitting System (IPS)** is to replace the existing development services' permitting software system and incorporate enhancements to the system, including a new geographical mapping system for property data.

4. The replacement of the **City Website**, the digital front door to the City of San José. The goals of the project in redesigning the City's website include creating a more service-focused site that reflects San José's (Smart City Vision), and improving the efficiency and effectiveness of maintaining the site by City staff

5. The Department of Transportation's new **Parking Access and Revenue Control System (PARCS)** is intended to replace an older, legacy parking system that was first installed over ten years ago in the City's downtown parking garages. Equipment failure, data security concerns, and outdated technology motivated the City to release a new RFP for its replacement and to include other modernized features, such as Automated License Plate Recognition (ALPR) technology.

Using a risk-based approach we selected these five projects to review based on: contract amount, if the RFP was reissued, number of amendments and options to extend, timing of the RFP closing to the contract start date, the length of the contract, if it was a recent project, and whether it was public facing.

We focused on the technology deployment process which included: project planning, staff assignment, delays and causes of those delays, project resets and changes in strategy, initial and final approved budgets and expenditures and project close-out and results.

To meet our objectives, we did the following:
- Interviewed staff from departments/offices including:
    - Information Technology Department (including C3PO)
    - Public Works Department
    - City Manager's Office
        - Office of Civic Innovation and Digital Strategy
        - Office of Communications
    - Department of Transportation
    - Finance Department
    - San José Police Department
    - Airport Department
- Interviewed the City Attorney's Office and Finance's Purchasing Division to understand their roles.
- Reviewed lessons learned, consultant reports, and various City staff updates on these deployments, including reports at the City's Smart Cities Committee.
- Observed staff "sprints" for the City's Website and for the Integrated Permitting System, as well as the project closure meeting for the My San José upgrade.
- Reviewed current and past requests for proposals and requests for information related to these deployments.
- Reviewed contracts for the deployment vendors and consultants associated with the selected projects.
- Compiled timelines of selected deployments based on public reports and internal documents.
- Reviewed the City's Financial Management System (FMS) reports on expenditures for selected projects.
- Reviewed City procurement policies, manuals, and related City Charter and Municipal Code sections.
- Reviewed various best practices in technology deployments, including:
    - CHAOS Report 2015 by the Standish Group International, Inc.
    - ISACA's COBIT Framework

- o Various resources from the Project Management Institute
- o The California Department of Technology's process on technology process approval and oversight
- Reviewed ITD's data on Technology Procurement Requests for FY 2017-18 through FY 2018-19.

We would like to thank the Information Technology Department; the City Manager's Office of Civic Innovation and Digital Strategy; the Department of Transportation; the Finance Department; Planning, Building, and Code Enforcement; the Department of Public Works; the City Manager's Office of Communications; and the City Attorney's Office for their time and insight during the audit process.

APPENDIX B

Key Terms and Definitions

Agile: A family of project implementation methodologies that emphasizes ongoing, iterative improvements on a product, allowing room for continuous feedback and adjustment in implementation.

Business Tax System (BTS): A single tax billing and management application to manage about 85,000 business tax and other tax accounts, such as cardroom, cannabis, and transient occupancy taxes.

City Portfolio-Product-Project Office (C3PO): Formed in response to a 2016 audit recommendation, this Office manages several high-profile technology initiatives in the City and is located within the Information Technology Department (ITD).

City Website Replacement: A project involving the replacement of the City Website, the digital front door to the City of San José.

Executive Steering Committee: A committee comprising of project stakeholders who are tasked with making high-level decisions about the direction of a deployment.

Innovation and Technology Advisory Board: Active until March 2018, a group comprising of City decision-makers and representatives from local technology companies. It provided input on the City's high-level technology approaches and strategic planning and developed the first iteration of the Smart Cities Roadmap.

Integrated Permitting System (IPS): The replacement of the existing development services' permitting software system.

IT Planning Board: An entity described in the City's *Procurement of Information Technology Policy* (CPM 5.1.9) as being required to approve procurements of $100,000 or greater in the City. Currently, the Board does not exist.

My San José: A customer relationship management system, mobile application, and online portal to facilitate resident-to-City communication and streamline reporting of service delivery issues in five service categories: abandoned vehicles, graffiti, illegal dumping, potholes, and streetlight outages.

Office of Civic Innovation and Digital Strategy (Office of Civic Innovation): Located within the City Manager's Office, the Office is focused on "improving the efficiency and effectiveness of City services and executing the City's Smart City Vision."

Parking Access and Revenue Control System (PARCS): A system handling the collection of parking revenue in downtown parking garages. The new PARCS is intended to replace the older, legacy system first installed ten years ago.

Procurement Prioritization Board (PPB): Created as part of the City's new Procurement Improvement and Readiness Program, the Board is intended to help the City prioritize its numerous procurements.

Product Owner: An individual responsible for leading decisions on project scope and ensures that the product is aligned with the business need.

Product-Project Manager: A position in C3PO which provides project management expertise to a selection of projects throughout the City.

Product Sponsor: An individual responsible for approving the project charter, assigning resources, advocating for the project, and clearing hurdles in the organization to project progress.

Project Charter: A critical planning document that outlines what is needed to deploy a project. This includes key information, such as project purpose, staff and budget resources, timeline, and scope.

Project Manager: An individual responsible for managing requirements and prioritizations, supporting project delivery, and monitoring communications in the project team.

Smart Cities and Service Improvements Committee (Smart Cities Committee): A Council Committee whose goal is to help the City achieve its Smart City Vision by receiving regular reports and providing strategic direction on the City's technology initiatives.

Smart Cities Roadmap: A compilation of technology projects in the City whose high-level status is reported on a regular basis to the Smart Cities Committee. As of November 2019, there were 49 projects on the Roadmap.

Smart City Vision: Approved by City Council in 2016, the Smart City Vision outlines strategic goals "towards making San José the most innovative city in the United States by 2020."

Waterfall Methodology: A traditional project implementation methodology that consists of a sequence of distinct steps: requirement gathering, design, coding, testing, and deployment.

APPENDIX C

Timelines and Key Events of Reviewed Projects Through November 4, 2019

My San José

Timeline (2014–2019): Aug — Customer Call Handling Audit Recommendation; Nov — RFP Issued; Jan — RFP Closed; Jun — Selected RFP to Council Delayed; Aug — Rejected Proposals, New RFP Consideration; Nov/Dec — Selected RFP; RFP; Original Agreement; May — Alpha Launch; Jul — Official Launch; Sep/Oct — Version 1.2, Version 1.3; Jan — Version 1.4 and Change Order #1; May/Jun — Version 1.5, Version 1.6 and Change Order #2; Apr/May — First Amendment, Version 1.7

Integrated Permitting System

Timeline (2011–2019): Dec — RFI Issued; ~43 Months~; Aug — RFP Issued; Oct — RFP Closed; RFP; Mar — RFP Awarded; Aug/Sep — Vendor Agreement Start; ~8 Months~; Jun — Consultant PM Amendment; Planned Implementation; Consultant Project Manager (PM) Agreement; Apr/May — Planned Go-Live; Jul — Gartner Health Check; Extended Implementation Timeline; Consultant PM Last Payment; Feb — ~8 Months~; Nov — AMANDA Launch

City Website

	2016		2017		2018		2019

Feb Mar — **RFP**
RFP Open
RFP Closed

Jul
Intent to Award Initial RFP

Sept Nov — **RFP**
RFP Reissued
RFP Closed

Jun Jul — **Planned Implementation**
Vendor Contract Start
Awarded Revised RFP

Jan Feb — **Extended Implementation Timeline**

Feb
Website Soft Launch (Testing)

Business Tax System

2014	2015	2016	2017	2018	2019

Jan Mar ~11 Months~ — **RFP**
RFP Issued
RFP Closed

Mar — **Planned Implementation**
Vendor Agreement Start

Consultant Project Manager Agreement

First Target Date

Sept Nov Dec Jan — **Extended Implementation Timeline**
Extended Contract Term

Change Order #1 (Vendor)
Measure G Passes
Project Escalates to IT
Change Order #2 (Vendor)

Apr ~11 Months~ Apr May Jun ~8 Months~ Mar
Vendor Management Changes
Second Target Date
Change Order #3 (Vendor)
Third Target Date
Project Discontinued

Parking Access and Revenue Control System

2017	2018	2019

Jun Sept — **RFP**
RFP Issued
RFP Closed

Oct Nov — **Planned Implementation**
Council Approval
Vendor Agreement Start

Sept Oct
Option to Extend Issued

Source: Auditor analysis of City documents from GILES and BidSync.

C-2

APPENDIX D

Project Charter Template Used by the Information Technology Department

Project Charter

Project Charter
Project: XXXX

DOCUMENT FILE NAME (XXXX.DOCX)
AUTHOR: FIRST LAST

D-1

Using This Template

All Sections are required to be addressed, however if a section or subsection is not needed mark as N/A. If content exceeds two pages for any section, consider creating an external document as reference.

.

To create a deliverable from this template:

1. Replace [bracketed text] on the cover, footer, and in sections as appropriate.

2. Modify stakeholders and sign off list as appropriate.

3. Adjust or Delete Watermark as appropriate.

4. Delete this page.

Template Revision History

Version	Date	Name	Description

D-2

REVISION HISTORY

Revision	Date	Author	Description of change
			Draft

D-3

Project Description:

Proposed Project Name:			
Dates:	Proposed Start and Finish Dates	Initiated/Declined	Designated Start
Sponsor:	Section	Sponsor Name, Email, and Telephone Number	
Description of Project:			

Smart Cities Alignment: ☐ Safe City ☐ Inclusive City ☐ User-Friendly City ☐ Sustainable City ☐ Demonstration City ☐ Core IT

D-4

Reason Project is Required:			
Impact on Application and Server Systems:		Requires Upgrade	Requires Replacement
Impact on Network Systems:		Requires Upgrade	Requires Replacement
Project Budget:			

	Account String	Amount	Special Conditions
Funding:			

	Purchasing Representative	RFP / DEMO / Sole Source, etc.....	Special Conditions
Procurement Approach:			

Planned Life and Replacement:	• [Projected Lifecycle] • [Year Due for Replacement]

Scope and Requirements:

Project Scope:	
Excluded from Project Scope:	•
Major Deliverables, Milestones, and Dates:	• [Preliminary WBS] • [Competing Commitments and Critical Path Issues] • [Critical Deadlines]
Stakeholders:	• [Internal] • [External]
Back-Out/Recovery Plan	• [Application] • [Database(s)] • [File System(s)] • [Network] • [Server(s)] • [Clients]
Private or Confidential Data Requirement and Handling:	
Risks and Assumptions:	
Specialized Security Required:	

D-6

Roles & Responsibilities:	Role	Responsibilities
	• Sponsors (Department + IT)	• Approve charter; Assign resources; Ensure effort fits City goals and priorities; Represent importance of effort in organization; Clear hurdles; Prioritize
	• Project/Scrum Master	• Manage project requirements and prioritization; Coordinate charter and resources for sprints; Monitor and communicate status to Project Team; Support sprints to ensure delivery within requirements.
	• Technical Lead	• Author underlying code, database, interfaces, et al for a system; Technical resources for fit with the program architecture; Set development standards.
	• Functional Leads	• Provide business expertise; Own process work will support; Assert requirements and prioritize; Work with team to create working functions/deliverables; Review/test work and provide timely feedback.
	• Reviewer	• Provides review and project comment to project stakeholders.
	• Tester	• Execute system acceptance test for specific domain of operation.
	• Purchase Agent	• Manages the procurement process to ensure compliance with City municipal code requirements, policies, and procedures.

Assigned Staff Resources:	Staff Member(s) and Role	Time Required + Proposed Dates
	Project Management	
	• [Name, Project/Scrum Master]	• [Hours] in [Date Period]
	• [Name, Sponsor]	• [Hours] in [Date Period]
	Functional	
	• [Name, Functional Lead]	• [Hours] in [Date Period]
	• [Name, Functional Lead]	• [Hours] in [Date Period]
	IT	
	• [Name, Technical Lead]	• [Hours] in [Date Period]
	• [Name, IT Architecture Review]	• [Hours] in [Date Period]
	Total Number of Employees:	**Total Estimated Project Hours:**

Project: [Project Name]

Start—Project Commitments:

	Name, Signature, and Date	Department and Job Title	Date	Telephone	E-mail
Sponsoring Director					
CIO					
Project/Scrum Master					
Functional Lead					
Functional Lead					
Technical Lead					
Technical Lead					

Proposed Start Date	Adjustment(s) and Reason(s)	Completion Date

D-8

End—Project Acceptance:

	Name, Signature, and Date	Department and Job Title	Date	Telephone	E-mail
Sponsoring Director					
CIO					
Project/Scrum Master					
Functional Lead					
Functional Lead					
Technical Lead					
Technical Lead					

Example WBS Framework (Agile)

No.	Item	Staff	Start Date	Due Date
1	Initiation—Charter accepted and approved by sponsor [Department Name] and Information Technology Department. Staff time and resources dedicated per charter for project work.			
2	Planning and Analysis—Business process defined by sponsor [Department Name] and the project team. Pilot testing and demonstrations as required.			
3	Design—New process and requirements of business system(s) defined and accepted by project team. Requirements list and functional testing script.			
4	Development—System, database, network, and programming work to meet requirements. Define by "sprint" to develop each function.			
4.1	Sprint 1—			
4.1.1	Function/Deliverable 1—			
4.1.2	F/D 1 Testing—			
4.1.3	Function/Deliverable 2—			
4.1.4	F/D 2 Testing—			
4.2	Sprint 2—			
4.2.1	Function/Deliverable 3—			
4.2.2	F/D 3 Testing—			
4.2.3	Function/Deliverable 4—			
4.2.4	F/D 4 Testing—			
4.3	Sprint 3—			
5	Backlog Check—Review features and functions not complete. Re/Prioritize.			
6	Communications and Training—Communicate changes before and during transitions. Education outreach for user and stakeholder transitions.			
7	Deployment—Distribute system for use. Implement heightened support model for transition period. Document, communicate, and resolve issues that arise.			
8	Transition to Support—Educate IT Help Desk staff and power users to handle Tier 1 issues and escalate. Publish clean knowledgebase and documentation to central repositories for access.			
9	Lessons Learned—Debrief on project successes and needed improvements. Archive project documents and materials.			

D-10

Memorandum

TO: JOE ROIS
CITY AUDITOR

FROM: Rob Lloyd
Dolan Beckel
Julia H. Cooper

SUBJECT: SEE BELOW

DATE: November 22, 2019

Approved   /s/ Kip Harkness   Date 11/22/2019

SUBJECT: RESPONSE TO AUDIT OF "TECHNOLOGY DEPLOYMENTS: PROCESSES CAN BE IMPROVED TO ENSURE LONG-TERM SUCCESS OF THE CITY'S TECHNOLOGY VISION"

The Administration has reviewed the City Auditor's Office report "Technology Deployments: Processes Can be Improved to Ensure Long-term Success of the City's Technology Vision" and agrees with the 10 recommendations identified in the report. This memorandum details the Administration's response to each recommendation under the City Auditor's three findings, along with a discussion of the work planned to fully implement the recommendations and the expected timeframes for completion.

The Finance Department; Information Technology Department; Planning, Building, and Code Enforcement Department; Department of Transportation; Communications Office; and Office of Civic Innovation and Digital Strategy, greatly appreciate the work of the City Auditor and his team for this report. The Administration looks forward to improving the City's effectiveness with its technology and innovation efforts through implementing the recommendations.

BACKGROUND

The City's investments in technology and innovation represent organizational efforts to augment the capabilities of departments and staffs. When done effectively, software and hardware tools improve resident and business access, accelerate tasks, reduce errors, and provide essential data that enhances decision-making. Coupled with re-engineering work processes, those investments can dramatically improve the responsiveness and efficiencies of municipal services. Across City departments, customer expectations continue to rise, while the resources to support services remain unchanged. Thus, technology serves as a strategic tool to balance a difficult demand-to-resources equation.

As noted by the City Auditor's Office, this 2019 report on Technology Deployments follows a March 2016 audit that focused on shortening the timelines of technology deployments. The Information Technology Department has closed eight of nine recommendations from that report with the support of the City Manager's Office. This audit focuses on advancing the City's ability

to execute technology initiatives to deliver service improvements and the City's long-term business goals.

The report details the difficulty that comes with planning, acquiring, implementing, and then operationalizing the large and cross-department technology initiatives that have become the new standard in modern organizations. From its review of a sample of five major efforts, the City Auditor's Office noted the high occurrence of challenges in project delivery when the City does not invest in necessary professional project management rigor. As the report cites from research, the City is not alone in discovering the importance of strong product and project management practices to successful outcomes. Thus, the City Auditor's Office correctly calls on the City to bolster how the organization plans and initiates technology efforts (Finding 1), effectively governs and staffs those efforts (Finding 2), and communicates statuses of projects, correcting course early if and when needed (Finding 3).

RECOMMENDATIONS AND RESPONSE

Finding 1: Improved Planning Can Increase the Likelihood of Project Success

> **Recommendation #1: To address Citywide technology deployments and project management, the Administration should update the Procurement of Information Technology Policy (CPM 5.1.9) or develop a new Technology Deployment Policy to:**
> a. **Require project charters for technology projects (potentially reviewed and approved by ITD or CMO) prior to the procurement process.**
> b. **Clearly define the essential and secondary features that address business need within this project charter.**

Administration Response: The Administration agrees with this recommendation.

Yellow: The Administration agrees that the Procurement of Information Technology Policy should be updated, and a Technology Deployment Policy be created to require Citywide standard methodologies, project charters, and other deliverables in order to maximize success of technology and innovation efforts. All major projects across the City should be reviewed by professional product and project managers in the Information Technology Department (ITD) prior to any procurement process, to clearly define the business value, scope, approach, and features of the solution sought.

As noted in the audit, the Administration has already implemented a Portfolio-Products-Projects Management Division and the Procurement Prioritization Board. ITD received additional budget and positions to strengthen the City's professional project management capacities in the FY2019-2020 budget. However, these resources cannot span all major projects within ITD and the Departments. As such, the City will need to build additional product and project management capacities.

The Finance Department and ITD will work to incorporate language into CPM 5.1.9 and require review by the Procurement Prioritization Board, as well as any improvements from the current procurement innovation effort.

ITD will also develop a new policy to require professional project management rigor and project charters for major technology projects in the City. Related, ITD will develop Citywide project management standards and knowledge capital, accompanied by training for departments on how to successfully initiate, plan, execute, monitor/control, close, and operationalize projects; set a process for approval of project plans; and set protocol for assigning Product-Project Managers to initiatives. While in the medium term new City-wide technology deployment policies and standards will improve both the efficiency and effectiveness of technology deployments for all Departments, there will likely be additional people, process, and technology costs in the short term and/or medium for departments to comply with these policies and standards. The impact to each Department will depend upon technology deployment maturity within each Department and the degree of repeatability each Department has achieved with complex technology deployments – hence the Yellow designation.

Target Date for Completion: December 2020

Recommendation #2: In the Administration's policy update for technology deployments (see Recommendation #1), require departments to identify and engage all relevant levels of product users and stakeholders in the project chartering process.

Administration Response: The Administration agrees with this recommendation.

Yellow: The Administration agrees that a new Technology Deployments Policy should include language requiring departments to identify and engage all relevant levels of product users and stakeholders in the project imitation process to produce a through and clear charter that City departments can evaluate. Department cannot properly commit to projects without this initial clarity.

Finance, Civic Innovation, and ITD will incorporate this recommendation into city processes where appropriate—e.g., budget requests, Procurement Prioritization Board review, ITD purchase approval process, and project initiation processes to be included in the new Technology Deployments Policy.

While in the medium term new City-wide technology deployment policies and standards will improve both the efficiency and effectiveness of technology deployments for all Departments, there will likely be additional people, process, and technology costs in the short term and/or medium for departments to comply with these policies and standards. The impact to each Department will depend upon technology deployment maturity within each Department and the degree of repeatability each Department has achieved with complex technology deployments – hence the Yellow designation.

Target Date for Completion: December 2020

> **Recommendation #3:** In the Administration's policy update for technology deployments (see Recommendation #1), require departments to identify the appropriate project approach (e.g., Agile or Waterfall) in the project chartering process. These approaches should be incorporated into both the procurement process and in vendor agreements.

Administration Response: The Administration agrees with this recommendation.

Green: The Administration agrees that the Procurement of Technology Policy should be updated by Finance and ITD to require departments to identify the appropriate project approach (e.g., Agile or Waterfall) in the project chartering process. The new Technology Deployments Policy will incorporate this requirement into the project initiation processes. It is currently an attribute of the Portfolio-Products-Projects Office template.

Target Date for Completion: December 2020

Finding 2: A Formalized Governance Structure and Appropriate Staffing Is Critical for Complex, Interdepartmental Projects

> **Recommendation #4:** To ensure appropriate staffing with the right decision-making authority is designated to a technology project, the Administration's policy update for technology deployments (see Recommendation #1) should require:
> a. Clear governance structures for complex and interdepartmental technology projects, which include well-defined roles, responsibilities, decision-making authority, and the role of the City Manager's Office.
> b. Allocation of appropriate staffing resources based on project timelines, complexity, and approach.

Administration Response: The Administration agrees with this recommendation.

Yellow: The Administration agrees that the City must ensure appropriate business, technical, and support staffing with the proper decision-making authority are designated in technology project charters as part of a new Technology Deployments Policy. Further, a strong governance structure, method to budget necessary staffing resources, protocols for charter approvals and changes, and training resources must be included to support the successful deliver of major initiatives. These elements will be included Technology Deployments Policy.

While in the medium term new City-wide technology deployment policies and standards will improve both the efficiency and effectiveness of technology deployments for all Departments, there will likely be additional people, process, and technology costs in the short term and/or medium for departments to comply with these policies and standards. The impact to each Department will depend upon technology deployment maturity within each Department and the degree of repeatability each Department has achieved with complex technology deployments – hence the Yellow designation.

Target Date for Completion: December 2020

Recommendation #5: The Administration's policy update for technology deployments (see Recommendation #1) should:
a. **Formalize the role of the Information Technology Department (ITD) in technology deployments in initial project planning.**
b. **Identify an ITD liaison for the entirety of the project, as appropriate.**
c. **Formalize the role of the Procurement Planning Board in prioritizing technology procurements.**

Administration Response: The Administration agrees with this recommendation.

Yellow: The Administration agrees that Finance, Civic Innovation, and ITD will update the Procurement of Technology Policy to remove the discontinued IT Planning Board and formalize Procurement Prioritization Board, ITD approval, and procurement innovation processes.

The new Technology Deployments Policy will include a review process and protocol for assigning IT Products-Projects Managers and/or other liaisons.

The Procurement Prioritization Board (PPB) is currently reviewing all Citywide projects greater than $120,000, including all large IT projects. Finance, Civic Innovation, and ITD will formalize the role of the PPB in prioritization technology procurements in the Procurement of Technology Policy.

While in the medium term new City-wide technology deployment policies and standards will improve both the efficiency and effectiveness of technology deployments for all Departments, there will likely be additional people, process, and technology costs in the short term and/or medium for departments to comply with these policies and standards. The impact to each Department will depend upon technology deployment maturity within each Department and the degree of repeatability each Department has achieved with complex technology deployments – hence the Yellow designation.

Target Date for Completion: December 2020

Recommendation #6: In order to ensure that complex technology projects are adequately managed:
a. **Departments should work with the City's Portfolio-Product-Projects Office (C3PO) to evaluate internal project management capacity within the project chartering process.**
b. **If internal capacity is lacking and the project needs to use a consultant project manager, departments should identify staff at the beginning of the process to monitor and assess consultant performance and tie expenditures to overall project progress.**
c. **Require consultant project managers to report project progress on a regular basis to an appropriate governing body (e.g., the executive steering committee).**

Administration Response: The Administration agrees with this recommendation.

Yellow: The Administration agrees and will implement this recommendation through formalizing the role of the City Portfolio-Products-Projects Office (C3PO) in ITD. As part of a new Technology Deployments Policy, the C3PO will be required to provide planning and initiating, review/approval, monitoring and reporting, and project closure services at a Citywide level for all major projects. Thresholds will be determined by a mix of cost, criticality, and duration. ITD will be required to examine projects to rationalize and leverage the use of existing technology investments where possible, as well as set controls for the use and monitoring of contract project managers.

Civic Innovation and ITD will set coordinated project reporting standards and processes to communicate the progress of initiatives and to capture project deviations early.

The City Attorney's Office, Finance, and ITD will review and refresh contract standards for project planning, managing consultant staff changes, progress reporting, and acceptance of work.

While in the medium term new City-wide technology deployment policies and standards will improve both the efficiency and effectiveness of technology deployments for all Departments, there will likely be additional people, process, and technology costs in the short term and/or medium for departments to comply with these policies and standards. The impact to each Department will depend upon technology deployment maturity within each Department and the degree of repeatability each Department has achieved with complex technology deployments – hence the Yellow designation.

Target Date for Completion: December 2020

Recommendation #7: To limit loss of knowledge when key project staff leave the City, the Administration should develop procedures to require project staff Citywide to document (potentially using a shared platform) key technology deployment decision points, which include:
- **Approval of specifications**
- **Product customizations and their approvals**
- **Progress against project plans**
- **Changes to agreed-upon features**
- **Key communications with the vendor**

Administration Response: The Administration agrees with this recommendation.

Yellow: The Administration agrees that documentation is critical to ensuring successful product-project delivery. Documentation is also necessary for legal, audit, cybersecurity, and disaster recovery purposes.

ITD received staffing in the FY2019-2020 budget to hire a Division Manager for the City Portfolio-Products-Projects Office (C3PO) to set, train, and support the processes detailed in this recommendation. The City currently lacks a standardized and shared product and/or project management platform, and no funding exists for its acquisition. The Administration requires time

for ITD to assess effective platform options; budget for and then procure the solution; and implement and train City staffs in effectively using a selected platform. ITD will work with the City Manager's Office to set direction in the budget process for FY2020-2021.

Target Date for Completion: February 2020 for direction; Platform procurement and implementation target date of March 2021 is contingent on the appropriation of funds and Procurement Prioritization Board approval

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Recommendation #8: To ensure key vendor staff have adequate knowledge, skills, and expertise as turnover occurs, the Administration should work with the City Attorney's Office to include a clause in future vendor agreements for technology projects to ensure the City has input on the selection and replacement of key vendor staff.

Administration Response: The Administration agrees with this recommendation.

Green: The City Attorney's Office, Finance, and ITD will review and refresh contract standards for project planning, managing consultant staff changes, progress reporting, and acceptance of work.

Target Date for Completion: June2020

Finding 3: Reporting on Project Status Can Be Improved

Recommendation #9: For transparency on the status of technology projects above a certain threshold of complexity, dollar value, or public impact, the Administration should develop guidelines to:
a. Require regular and detailed reporting to the appropriate Council Committee(s).
b. Include budget and time metrics, as well as deviations from original estimates in reporting.
c. Create a dashboard, or other online tool, to track and publicly display the progress of key technology projects, incorporating metrics that are critical to the success of the deployment.

Administration Response: The Administration agrees with this recommendation.

Yellow: The Office of Civic Innovation and ITD will set monitoring and reporting processes for major technology initiatives in the City, with defined thresholds based on complexity/risk, dollar value, public impact, and/or duration. As part of a new Technology Deployments Policy, the City Portfolio-Products-Projects Office (C3PO) will be required to report on projects that have any significant deviation in cost, schedule, and/or scope.

As processes are set, Civic Innovation and ITD will determine best options for a dashboard and tool to actively report the statuses of major City technology and innovation projects. The

Administration requires time to assess effective options; budget for and then procure the solution; and implement and train City staffs in effectively using the selected tool.

Target Date for Completion: February 2020 for direction; Platform procurement and implementation target date of March 2021 is contingent on the appropriation of funds and Procurement Prioritization Board approval

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Recommendation #10: The Information Technology Department should work with City departments to compile and continuously update a comprehensive inventory of technology assets/systems Citywide and establish criteria for monitoring key events in the technology's lifecycle (e.g., contract expiration, vendor end support dates).

Administration Response: The Administration agrees with this recommendation

Yellow: A significant amount of work is already underway through ITD's Cybersecurity, asset scanning, computer refresh, FirstNet, and Emergency Management planning efforts. However, producing a comprehensive inventory of City technology hardware and software assets remains a challenge due to lack of active reporting across departments in a decentralize technology environment. Rationalizing and proactively planning technology investments and projects is not practical without that data.

The Administration, through Finance, the Budget Office, and ITD, will add language to the new Technology Deployments Policy tying budget and purchasing requests to tracking in a Citywide Technology Assets inventory, including key contract and support dates, costs, and license agreements.

Target Date for Completion: December 2020

CONCLUSION

The Administration sees the timing of this report as opportune. City departments continue to lean on technology and innovation to meet increasing demands for City services. Those services and needs will clearly be more multi-departmental and complex in nature, requiring the ability to expertly perform major business re-engineering and technology projects with higher frequency.

With those understandings and the close partnerships departments developed as they worked together to recover the projects identified in this audit, the City has a compelling foundation from which they can implement the audit recommendations enumerated in the audit report. To sustain the "Most Innovative City in North America" goal, the Administration aims to make technology product and project management a defining *strength* for the City of San José. The City Auditor's findings help the City toward that outcome.

Again, the Administration thanks the City Auditor's Office for this important report and looks forward to implementing the recommendations.

/s/   /s/
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/s/   /s/
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