CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Office of the City Auditor

Report to the City Council
City of San José

DEPARTMENT OF PUBLIC WORKS: ENHANCING MANAGEMENT OF CAPITAL PROJECTS

Report 18-03
July 2018

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Office of the City Auditor
Sharon W. Erickson, City Auditor

July 27, 2018

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

Department of Public Works: Enhancing Management of Capital Projects

Public Works is responsible for planning, designing, and building City facilities and infrastructure, including parks, municipal buildings, roads and bridges, sewers, and trails. Public Works' capital delivery teams develop designs, conduct site surveys and materials testing, provide construction management and inspection services of outside contractors who are used to build or renovate facilities, and conduct general project management for capital projects.

Capital project costs are composed of "hard" and "soft" costs. Hard costs include the contractor's materials, equipment, and labor costs. Hard costs, which are subject to a competitive procurement process and are driven by the construction market broadly, have increased in recent years. Soft costs are the City's costs to deliver projects. This includes the salaries and benefits for engineers, architects, inspectors, and other capital support staff. It also includes Citywide and Public Works overhead, and may include consultant costs.

The objective of our audit was to assess Public Works' cost of project delivery. Our focus was on soft costs, or City-driven project costs. The audit was conducted at the request of a City Councilmember. We are bringing this audit directly to the full City Council because it includes information that may potentially inform the current discussion of a possible ballot measure to change the dollar threshold that triggers the formal competitive bidding process for capital projects.

Finding 1: Public Works' Cost to Deliver Capital Projects Appears Similar to Other Large California Cities. Public Works' labor costs are generally charged to individual projects. This allows the City to capitalize these costs, know what it truly costs to deliver projects, and potentially relieve the General Fund of the burden of those costs. In contrast, other City departments do not generally charge staff time to projects. This can contribute to the perception that using Public Works is more costly than "doing it yourself". During our review, multiple clients expressed concern with Public Works' ability to deliver small projects for a reasonable cost. However, according to the most recent *California Multi-Agency Capital Improvement Program Benchmarking Study*, which reports the average cost of projects across a five-year period, San José project delivery costs (soft costs) are in line with other jurisdictions. To more evenly distribute those costs between projects, we recommend Public Works allocate

staff time spent on training and administrative work through its overhead plan rather than charging that time to individual projects. In addition, the proposal to increase the dollar threshold that triggers the formal competitive bidding process for capital projects could decrease the amount of staff time spent in the bid and award process through increased use of other less formal bidding processes that are already in place, and potentially reduce costs for smaller projects.

Finding 2: Better Use of Lessons Learned and Project Management Training Can Help Lessen the Impact of High Turnover. Public Works' capital delivery teams over the last several years have a lost a significant amount of City experience. In the first quarter of 2018 alone the Department lost over 300 years of City experience due to retirements. Public Works is using various knowledge-transfer strategies to train new staff and capture knowledge of departing staff such as job shadowing, mentoring, and lunch trainings. However, more can be done to ensure that experiential knowledge is retained and continues to benefit the department and its employees. Project management trainings and regularly sharing lessons learned across Public Works and with other departments can help to ensure that the capital delivery program continues to improve.

Finding 3: Existing Project Management Tools and Guidance Could Be Improved. Enhanced software reporting capabilities could help project managers track project budgets and schedules more efficiently and help division managers monitor the capital program more easily. In addition, establishing a consistent electronic file management system could lessen the impact of employee turnover, making it easier for new staff to take over a project, and help supervisors monitor projects. Public Works capital delivery teams have created several project management resources for implementation managers, however, these resources are not always used and some are outdated. These resources should be used to onboard new staff, set clear expectations for implementation managers, and ensure necessary steps are taken to guard against avoidable issues.

Finding 4: Better Defined Project Scopes Can Reduce Changes During Design and Construction. Public Works coordinates with other departments, known as client departments, to deliver capital projects. Client departments are responsible for securing project funding, developing initial project scopes, and providing programmatic oversight throughout the design and construction process to ensure alignment with service delivery goals. This division of responsibility between Public Works and other City departments is similar to other jurisdictions. Capital project delivery is complicated and can take significant effort. Because of this, centralizing this function can lead to more consistent and efficient project delivery. However, developing and agreeing to a project scope and plan is critical to successful project implementation. Although Public Works and client departments have started meeting more regularly to improve communications, better scope definition can reduce the number of problems that may occur later in the project during design or construction. To improve communications further, we recommend Public Works develop an intake form for clients to submit that identifies what information is needed prior to beginning design work. In addition, to clarify expectations about the project plan, we recommend that Public Works use a standard project planning document that includes the agreed upon scope, budget, and schedule, and identifies the services to be provided.

This report contains 10 recommendations. We plan to present this report at the August 7, 2018 meeting of the City Council. We would like to thank the Department of Public Works; the Department of Transportation; the Parks, Recreation, and Neighborhood Services Department;

the Airport; and the City Attorney's Office for their time and insight during the audit process. The Administration has reviewed this report and their response is shown on the yellow pages.

Respectfully submitted,

Sharon W. Erickson
City Auditor

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Introduction

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) 2017-18 Audit Work Plan, we have completed an audit of Public Works' cost of project delivery. The audit was conducted in response to a Councilmember request.

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. We limited our work to those areas specified in the "Audit Objective, Scope, and Methodology" section of this report.

The Office of the City Auditor thanks the management and staff from the Department of Public Works; the Department of Transportation; the Parks, Recreation, and Neighborhood Services Department; the Airport; and the City Attorney's Office for their time, information, insight, and cooperation during the audit process.

Background

The mission of the Department of Public Works is to "provide excellent service in building a smart and sustainable community, maintaining and managing City assets, and serving the animal care needs of the community." The Department has six core services:

- Animal care and services;
- Facilities management;
- Fleet and equipment services;
- Regulate/facilitate private development;

- Plan, design, and construct public facilities and infrastructure, [1] and
- Strategic support, which includes the Office of Equality Assurance, technology services and other support functions.[2]

This audit focuses on the core service: plan, design, and construct public facilities and infrastructure. The three Public Works divisions that plan, design, and construct public facilities and infrastructure are:

- **City Facilities Architectural Services (Architectural Division)** – Provides architectural design and project administration for the construction of City-owned buildings, site and landscaping improvements, and capital repair, rehabilitation, and/or improvements to existing City facilities. This includes facilities such as Police and Fire stations, libraries, community centers, parks and playgrounds, and recreational trails.
- **Transportation and Hydraulic Services** – Provides "design and construction of right-of-way capital infrastructure projects including, but not limited to: bridges, streets, sidewalks, sewers, pump stations, streetlights, and traffic signals", as well as projects at the Mineta San José International Airport and the Regional Wastewater Facility. In addition, this division provides "general engineering plan review for regional projects and electrical engineering review for projects constructed by private developers."
- **Engineering Services** – Provides construction inspection services for capital projects and development/utility permit projects, inspection oversight of other public agency projects built within the City right-of-way, and Underground Service Alert services. Construction inspectors assigned to a project will monitor day-to-day construction progress and perform inspections at key points throughout a project. The Engineering Services division also provides land survey, materials testing, structural engineering services, and code inspections.

In addition, some strategic support functions such as equality assurance and technology services support the capital program.

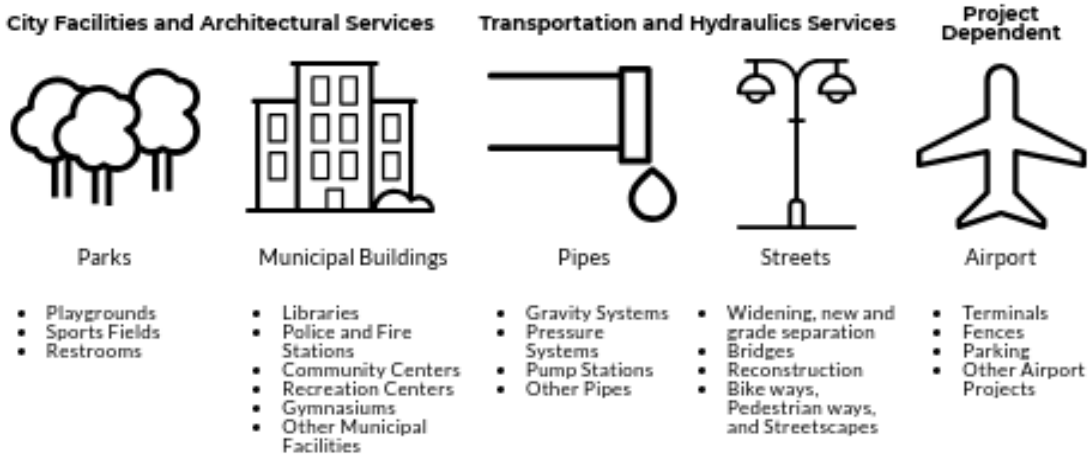
[1] According to Section 1217 (a) of the City Charter, "public works project shall mean a project for the construction, erection, improvement or demolition of any public building, street, bridge, drain, ditch, canal, dam, tunnel, sewer, water system, fire alarm system, electrical traffic-control system, street-lighting system, parking lot, park or playground. Public works project shall not mean or include maintenance of any public works project, or any repairs incidental to such maintenance, or the planting, care or maintenance of trees, shrubbery, or flowers."

[2] According to Public Works' Labor Compliance webpage, "the Office of Equality Assurance (OEA) implements, monitors, and administers the City of San José Wage Policies. OEA ensures that San José businesses along with City contractors and vendors pay their employees the correct wage and benefit rates." The cost of OEA, along with other strategic support services, are run through Public Works' overhead. Approximately $525,000 was budgeted for labor compliance in the FY 2016-17 Public Works Overhead Plan.

Public Works Manages a Wide Variety of Projects

Public Works manages a wide array of capital projects that can be largely categorized as parks, municipal buildings, pipe systems, streets, and the airport. The Architectural Division manage parks and municipal building projects. The Transportation and Hydraulics Division manage pipe and streets projects.[3] All three divisions mentioned above, including Engineering Services, provide support for Airport projects as needed. Exhibit 1 provides examples of capital projects managed by the Architectural and Transportation and Hydraulics divisions. Public Works staff are also integrated into other departments to manage projects for the Regional Wastewater Facility and the Airport, providing project management support for several projects and managing construction.

Exhibit 1: Public Works Projects by Type



Source: CIP Benchmarking Study and the City's Capital Project Management System (CPMS)

[3] Public Works has a specialized group under Transportation and Hydraulics that support the Wastewater Treatment Facility re-build that is also being worked on by the Environmental Services Department.

Exhibit 2: Sample of Photos of Public Works Projects Accepted in FY 2016-17

City Facilities Architectural Services

Martin Park Expansion

City Hall Employee Breakroom

Source: Public Works Project Completion Reports

Transportation Hydraulics Services

Five Wounds Brookwood Terrace Pedestrian Improvements: After Photo

Stevens Creek Blvd Pipe Installation

Capital vs. Maintenance Projects

Projects involving City infrastructure can either be considered maintenance or capital projects. Capital projects generally involve new construction, or the expansion, renovation, replacement, and/or other improvements of existing infrastructure. While capital projects are primarily implemented and managed by the Architectural Division, Transportation and Hydraulics Division, and Engineering Services, Public Works' Facilities Management Division is primarily responsible for maintenance work. Other departments including Parks, Recreation and Neighborhood Services and the Department of Transportation can also perform maintenance work. It can be difficult to distinguish between maintenance and capital projects. Capital projects can involve maintenance components and vice versa.

Projects are considered capital or maintenance based the type of work that is being performed. Maintenance, according to the municipal code,[4] involves "repairing or keeping in good condition" any existing public "property, improvement, or facility". Some factors that may be considered in determining whether something is maintenance or capital include whether new construction, permitting, design work, or extensive coordinating with stakeholders is required. The Architectural and Public Works Facilities Divisions meet to coordinate work efforts on upcoming and ongoing projects. In addition, Facilities may answer questions about ongoing maintenance implications for projects that are being designed and managed by the Architectural Division.

Roles and Responsibilities of Public Works and Other Departments

Public Works is generally considered to be the "implementing department" of capital program projects.[5] In that role, Public Works provides cost estimates and design services, solicits bids, and manages construction. In addition, the Department coordinates with key stakeholders, such as local utilities, the Santa Clara Valley Transportation Authority (VTA), other City departments, contractors, and County agencies.[6]

Other departments, including the Department of Transportation (DOT); Parks, Recreation and Neighborhood Services (PRNS); and others are considered "project owners" and are referred to by Public Works as "clients". As project owners, client departments are responsible for soliciting input and feedback from the public, securing project funding, developing initial project scopes, and in some cases, maintaining the assets.

Balancing Project Delivery with Programmatic Alignment: Public Works and Project Owners

The division of responsibility between Public Works and other City departments is similar to other jurisdictions. Capital project delivery is complicated and can take significant effort. Because of this, centralizing this function rather than having

[4] San José Municipal Code Section 14.04.080

[5] The San José Municipal Code identifies three directors of public works. Section 14.04.141 states that the title director of public works refers to the: Director of Transportation, who has authority over transportation projects and can only implement projects that cost under $100,000 (i.e., do not require City Council approval); the Director of Environmental Services, who only has authority over environmental services projects; and the Director of Public Works as to all other capital projects. The Department of Public Works has the broadest authority and ability to implement a wide range of capital program projects.

[6] Public Works generally leads the procurement process for all capital projects in the City. In addition, the Office of Equality Assurance in Public Works supports all capital projects including those led by DOT and ESD. Labor compliance is funded through the Public Works' overhead.

separate teams across departments can lead to more consistent and efficient project delivery.

Ideally, the public sees a seamless integration of work between these departments and their projects, but it requires an intricate web of collaboration, and funding to execute a new capital project. Public Works and client departments are responsible for different aspects of capital project delivery.[7] Centralizing project delivery functions in Public Works can enhance the efficiency and consistency across the City, but at the same time project owners maintain programmatic oversight and ownership to ensure alignment with service delivery goals. The objective is to create the right balance between programmatic needs and consistent and efficient project delivery.

Public Works Budget and Staffing

During the annual budget process, the City identifies capital improvement projects for the upcoming five-year period. Staffing and budget plans reflect the planned number of capital projects in the upcoming year. In total, the 2018-2022 Adopted Capital Budget contained approximately $391 million for capital projects for FY 2017-18.[8]

The FY 2017-18 plan, design, and construct function in Public Works was budgeted for 226 full time positions and had an operating budget of $45 million. The largest program within the function is the transportation and storm sewer capital program, with more than 100 positions and a budget over $20 million.

Team Structure

Capital projects are generally managed by teams of engineers or architects depending on the type of project. Senior engineers or architects oversee all projects in their section. For example, in the Transportation and Hydraulics Division each of the five primary areas of expertise: electrical, storm, roads and bridges, storm/sanitary master planning, and sanitary engineering are led by a senior engineer.

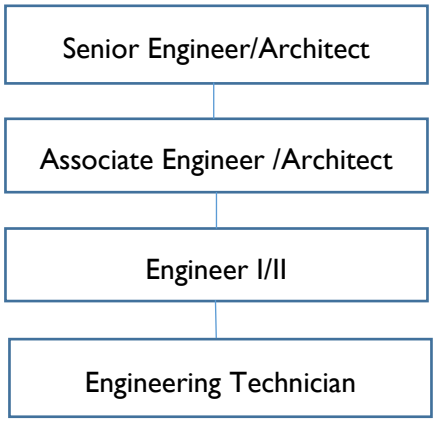
Senior engineers or architects tend not to be involved in the day-to-day management of a project, whereas the associate engineers and architects are more involved. The associate is generally considered to be the implementation (or project) manager, and typically manages several projects at once. Depending on the group there may be several associates under a senior and there may be additional staff (e.g., engineer I/IIs and engineering technicians) who support the associates. Engineer I/IIs may have some prior experience with the City. For

[7] There are numerous factors that go into deciding whether a project is worked on by City staff or the work is contracted out. Some factors for deciding include staff availability, expertise, and funding.

[8] This figure includes construction costs as well as Public Works project delivery costs. It excludes $194 million that was budgeted for construction projects at the San José-Santa Clara Regional Wastewater Facility.

example, some staff start as engineering technicians while others may come straight from getting a degree in engineering or architecture.

Exhibit 3: Public Works Team Structure



Source: Simplified summary of team structure from Public Works Organizational Chart

Five Main Phases in Capital Project Delivery

There are several methods to deliver a capital project. The traditional method of project delivery that is commonly used by public entities is referred to as design-bid-build.[9] The design-bid-build process generally involves five main phases -- feasibility, design, bid and award, construction, and closeout.[10] During each phase of the process, Public Works and/or the client may work with various stakeholders, including the community, business owners, utilities, and other interested or affected parties. The five phases are described below and in Exhibit 4.

1. **Feasibility**: This is the first step for many projects. It is when the project scope, preliminary schedule, and project funding are identified. Depending on the type of project, the City may get community input on the scope and schematic design. An initial environmental analysis may also be conducted to determine project feasibility.

[9] Public entities, including the City, are increasingly using alternative project delivery methods besides design-bid-build to deliver projects. One of the alternative methods used is referred to as "design-build." The design-build method can be used to deliver complex projects with performance risks, constrained schedules, and fixed budgets. In San José, design-build was used for projects such as the Airport Terminal Area Improvement Program and several projects at the Regional Wastewater Facility. In design-build projects, a single contract is awarded for the design and construction. San José voters in 2004 approved an amendment to City Charter Section 1217 allowing for a possible exemption from the competitive bidding process for design-build contracts exceeding $5 million. Design-build may be used when Council finds that "doing so would save money or result in faster project completion."

[10] In addition to these five main phases, Public Works' Capital Project Management System (CPMS) User Guide defines additional "phases" that may be charged to depending on individual project needs. These are: general administration; property acquisition; technology, furniture, and equipment; and public art.

2. **Design**: Public Works develops project plans and preliminary cost estimates to the client. A decision may be made to engage a design consulting firm, depending on the availability and expertise of staff and the project schedule. There are typically three levels of design review where the client and other stakeholders, such as utilities or granting agencies, are asked to provide feedback. Levels of review should occur at 35, 65, and 90 percent completion. With each level of review the design should get closer to the final version and cost estimates will be more precise. When the design package is complete, it is reviewed and initialed by the implementation manager, section senior, division manager, the Director of Public Works, and other departments or divisions as needed.
3. **Bid/Award**: Once the design is finished and approved, the project goes out to bid. There are various procedures and requirements for projects with estimates below/over $100,000. For projects with construction costs exceeding $100,000, the City Charter requires that the project go through a formal competitive bidding process and awarded to the lowest responsible bidder. There are certain time requirements to ensure that the process is fair and competitive. For example, when Request for Bids are posted, how long they remain open, and how long the protest period lasts.
4. **Construction**: Once the contract is awarded and executed with the appropriate insurance and bonds, project construction can begin. Construction may take several months or years and may be split into phases depending on project size and complexity. During construction, issues commonly arise that can impact the schedule and cost of the project. This might include unforeseen conditions at the site, such as underground conditions that were unknown during design, a change in weather conditions, delayed permitting from outside entities, client-initiated changes, or a change in the price of materials. A project is considered useable by the public when it reaches "beneficial use". However, it is not considered fully complete until necessary documentation is filed and posted at the Santa Clara County Recorder's Office. This is called "project acceptance".[11]
5. **Closeout**: After a project is completed, as-built drawings are filed for future reference and the Public Works implementation manager writes a *Project Completion Report* to present to the Public Works Director's office. A public opening ceremony may also be held to mark the opening of a new facility.

[11] Project acceptance signifies that a project has a Notice of Acceptance filed with the County Recorder's Office.

Exhibit 4: Five Phases of a Capital Project

FEASIBILITY	DESIGN	BID & AWARD	CONSTRUCTION	CLOSEOUT
• Develop project scope, preliminary schedule, funding plan and "initial cost estimates" • Obtain community/ stakeholder input on scope and design • Prepare schematic/ conceptual design/ preliminary engineering	• Prepare project plans, specifications, and "Preliminary" Cost Estimates • Materials testing and survey services to support design work • Obtain stakeholder input on project design	• Prepare "Final" (Engineer's Cost Estimate) • Develop bid documents and forms • Evaluate bids • Prepare recommendation award • Obtain approval from City Council or Department Director • Conduct pre-bid meetings	• Execute contract • Construction management • Regular updates to client/agencies • Construction inspection; daily/weekly documentation and meetings • Change orders as needed*	• Closeout activities like preparing as-built drawings, final report • Present project completion report to senior department staff/lessons learned meeting

Source: Department of Public Works Capital Project Costs by Phase Summary

* Change orders are defined in San José Municipal Code 14.04.010 as "any order made or issued, for and on behalf of the city for any alteration in, deviation from, addition to or omission from any specific public works project…for which a city contract shall have been awarded or entered into, including any increase or decrease in the quantity of any item or portion of the work or the omission of any item or portion of work…" In other words, a change order is required for any change in scope of work provided for and agreed to in an original contract.

Cost of Project Delivery

Project costs are composed of "hard" and "soft" costs.

- **Hard Costs (Construction Costs)** include materials, equipment, and labor costs in the construction contract (including change orders).
- **Soft Costs (Project Delivery Costs)** are the costs of delivering a project that are not construction costs. For example, the salaries and benefits of engineers, architects, inspectors, and other Public Works staff supporting capital project delivery. It also includes Citywide and Public Works overhead and may include consultant professional services.[12]

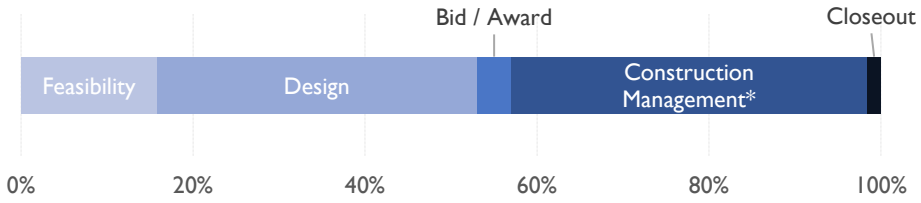
Similar to Other Jurisdictions, San José Charges Soft Costs to Projects

Soft costs are charged to projects so that the City and the public understand what capital projects truly cost. In addition, it can potentially relieve the General Fund of the burden of engineering and architectural staff costs. Exhibit 5 shows the

[12] Client department staff and other City staff time may also be included in project soft costs as is appropriate. Staff from other departments may provide review, permitting, code compliance, and other specialized inspection services.

percent of soft costs incurred during the five main phases of 10 Public Works design-bid-build capital projects. Different divisions and sections within Public Works are responsible for various services in each phase. For example, most of the soft costs in the design phase paid for engineering or architectural staff time (approximately 37 percent of soft costs in the sample). As noted previously, the design phase is when staff develops project plans and cost estimates. On the other hand, soft costs in the construction phase (approximately 41 percent of soft costs in the sample) were primarily inspection-related. Inspectors in Engineering Services generally provide day-to-day management during the construction phase.

Exhibit 5: Percent of Soft Costs by Project Phase

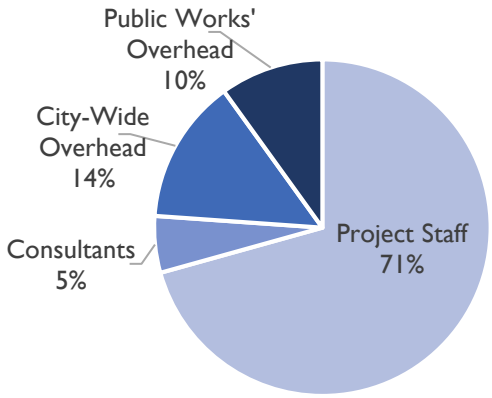


* Construction management soft costs do not include hard costs

Source: Auditor analysis of 10 Public Works capital projects

Although salaries and benefits comprise most of Public Works' soft costs, overhead charges also represent a considerable amount of soft costs. An analysis of 10 Public Works' Capital projects shows that nearly one out of every four dollars spent on soft costs pays for overhead. Public Works staff is subject to both the Citywide overhead as well as Public Works' overhead.[13] These costs represent approximately 14 percent and 10 percent of a project's soft cost, as noted in exhibit 6.

Exhibit 6: Sources of Soft Costs



Source: Auditor analysis of 10 Public Works capital projects

[13] Citywide overhead includes Citywide support functions in the departments of Finance, Human Resources, the City Manager's Office, and others. Public Works overhead includes the department's senior managers, staff in the labor compliance and procurement sections, and other services that support the capital delivery process.

The box below has additional information about the current construction market in Northern California and factors that affect the bidding environment for capital projects.

Hard Costs: Northern California Construction Market

Several trends are affecting bid prices in the region. These include a:

- Decrease in the number of bids submitted;
- Increase in the price of subcontractor trades; and
- An increase in the demand for construction labor in the private sector.[14]

Various other factors can impact cost:

- Fuel pricing
- Materials pricing
- Availability of labor

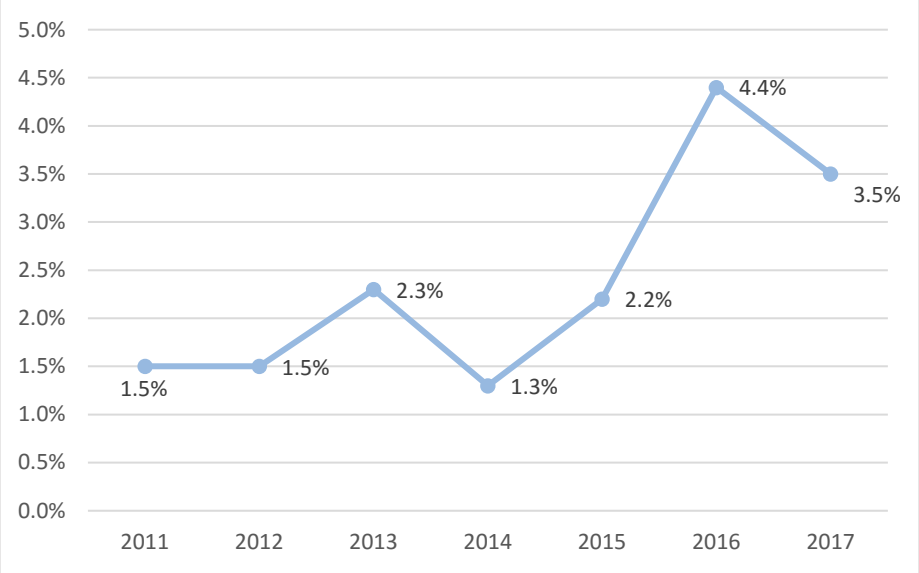
In the fall of 2017, San Francisco recommended using a 6 percent Annual Infrastructure Construction Cost Inflation Estimate (AICCIE) rate for cost estimating purposes. They indicated that the construction market was still strong even with the possibility of a slowdown sometime in the future, and that prices were still rising. A consultant noted that this is related to the overall health of the economy. The consultant explained that "the health of the local economy is driving record amounts of construction, resulting in more work [than] the labor market can easily perform. This is causing escalation in excess of labor and material increases."[15]

Exhibit 7 shows the annual change in the California Construction Cost Index from 2011 to 2017. The index can vary widely from year to year and remains relatively strong, as was indicated by San Francisco.

[14] "Construction Cost Trends in Northern California."2016. Presentation created by Carollo Engineers for American Public Works Association. http://northernca.apwa.net/Content/Chapters/northernca.apwa.net/Documents/2016 APWA Conference - Recent Construction Bid Cost Changes and Analysis from the CM and Agency Perspective.pdf

[15] City of San Francisco, Office of Resilience and Capital Planning. "OneSF Building Our Future." *OneSF Building Our Future*, OneSF, 2018. onesanfrancisco.org/sites/default/files/2017-10/Agenda Item 6 - 2018 AICCIE.pdf.

Exhibit 7: Change in the California Construction Cost Index



Source: California Department of General Services

Note: The Index is developed using the Building Cost Indices for San Francisco and Los Angeles produced by Engineering News Record (ENR). The annual percentage included here is calculated from December to December.

Public Works and other departments, such as the Department of Transportation, have described a difficult bid environment that supports the findings from San Francisco's analysis. Public Works also reports that they have seen a declining number of bids for projects, as well as an increasing number of bids coming in over the City's cost estimates.

In accordance with the California Labor Code Section 1782 and City policy, contractors and subcontractors awarded with City contracts are required to pay their workers prevailing wage rates. Prevailing wages vary by craft and are determined by the Department of Industrial Relations. Prevailing wage rates, as well as market demand for certain skills, can impact the cost of labor for capital projects.

In addition to an increase in labor costs and fewer firms interested in bidding on municipal projects, materials pricing can fluctuate. Prices can increase for a variety of reasons including the increasing amount of construction for recovery from natural disasters. In one project reviewed for this report, Public Works noted volatility in concrete prices which led to cost increases.

Audit Objective, Scope, and Methodology

The objective of our audit was to assess Public Works' cost of project delivery. The audit was conducted at the request of a City Councilmember and in accordance with the City Auditor's FY 2017-18 Audit Work Plan.

We performed the following to meet our objective:

- Identified the key components of project delivery costs and compared costs with other benchmark jurisdictions
- Reviewed the Department's project cost controls, focusing on Public Works' controls to contain project delivery costs
- Identified 49 projects with acceptance dates in FY 2016-17.
    - Reviewed costs and Project Completion Reports for all projects when available.
    - Sampled 17 projects to assess process consistency among staff, clarity of project delivery roles, extent of communication among project stakeholders, tracking of budget and schedules, and documentation and organization of electronic project files. Sample selected based on division, project types and dollar amount, project delivery costs, project completion reports, and Public Works' client department input. See Appendix A.
- Conducted interviews with management and staff from Public Works, the City Attorney's Office, the Budget Office, the Department of Transportation, the Airport, the Environmental Services Department, and the Department of Parks, Recreation and Neighborhood Services
- Reviewed policies and procedures and staffing documentation
- Reviewed applicable City Charter and Muni Code Chapters
- Analyzed data from the City's Financial Management System and Capital Project Management System (CPMS)
- Analyzed Public Works' data from Peoplesoft, the City's human resource management system
- Reviewed the Public Works Cost Allocation Plan and assessed the reasonableness of the cost bases and allocation methodology
- Interviewed Public Works participants in the *California Multi-Agency CIP Benchmarking Study* (2002-present) from the City of Sacramento, the City of San Francisco, the City of Long Beach, and the City of San Diego. Reviewed the methodology of the study and several years of study results.

- Reviewed manuals and available project management guidance for benchmark jurisdictions: Los Angeles, San Diego, San Francisco, and Sacramento
- Reviewed industry standards published by the American Society of Civil Engineers
- Reviewed the textbook *Project Management for Engineering and Construction* 2nd and 3rd Editions
- Interviewed a Stantec Consultant responsible for collecting, analyzing, and reporting on data collected annually for the Benchmarking Study
- Attended a CPMS training, and observed two project completion report debriefings

Finding I Public Works' Cost to Deliver Capital Projects Appears Similar to Other Large California Cities

Summary

Public Works' labor costs are generally charged to individual projects. In contrast, other City departments do not generally charge staff time to projects. This can contribute to the perception that using Public Works is costly. According to the most recent *California Multi-Agency Capital Improvement Program Benchmarking Study*, which reports the average cost of projects across a five-year period, San José project delivery costs (soft costs) are in line with other jurisdictions. Nonetheless, Public Works could better track costs by allocating staff time spent on training and administrative work through its overhead plan rather than charging that time to individual projects. In addition, the City is currently considering increasing the dollar threshold that triggers the formal competitive bidding process for capital projects, which could decrease the amount of time spent in the bid and award process.

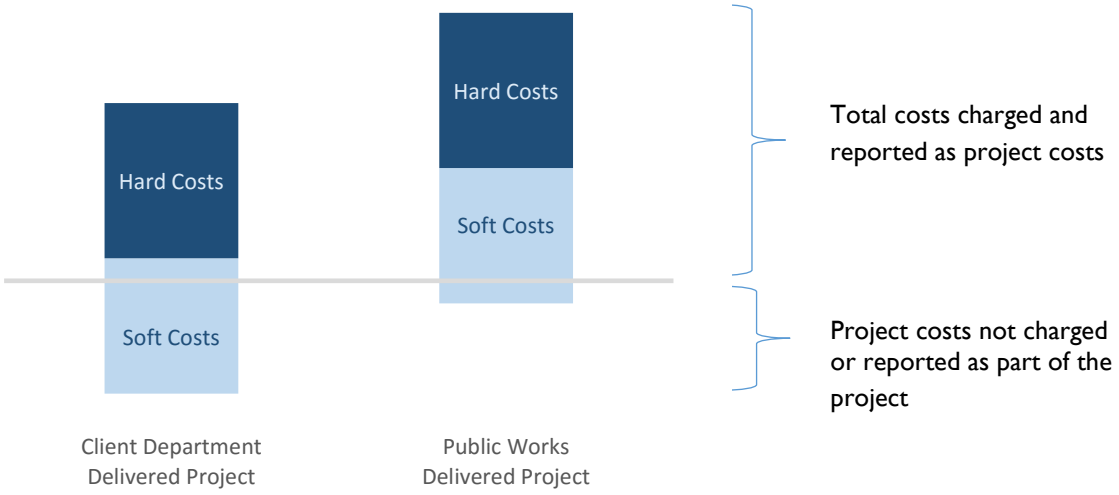
Unlike Other Departments, Public Works Engineering and Architectural Staff Time Is Charged to Individual Projects

Public Works Appears Costly Because Soft Costs Are Charged Directly to a Project

As work on capital projects proceeds during the year, Public Works staff charge time directly to capital projects on their timesheets. Staff costs in client departments, such as PRNS and DOT, are managed differently. PRNS or DOT staff who also work on capital projects, for example, generally do not charge their time directly to projects. Instead they generally charge to broad personal services or program administration appropriations. As a result, their costs are not captured in the overall "cost" of a project and do not impact the project budget in the same way as Public Works staff time.

Similarly, whereas a portion of the Director of Public Works' time is allocated to capital projects as Public Works overhead, a portion of the Director of PRNS' time is not. Because of this funding structure, it can appear that Public Works' project delivery costs are significantly higher than other City departments. Exhibit 8 shows a hypothetical representation of a project implemented by a client department and Public Works and the difference in the appearance of project cost.

Exhibit 8: Public Works' Projects Can Appear More Costly Than Other Departments Due to Funding Structure



Source: Auditor analysis

Note: Soft costs below the line represent client department costs. Those above the line are Public Works costs charged directly to the capital project.

Public Works Can Better Track Costs by Spreading Training or Other Administrative Costs Through Overhead

To capture the full cost of project delivery, the costs of a variety of Public Works administrative and support activities are allocated across capital projects as Public Works overhead.[16] Several of the jurisdictions in the benchmarking study also spread departmental or agency overhead in a similar manner.

One difference from other jurisdictions is that time spent in training or on administrative work by engineering or architectural staff in San José is charged to individual projects; whereas other jurisdictions capture a portion of that time in their overhead plans and spread it across capital projects. For example, in San Francisco, about 40 hours of each engineer's time is budgeted for training or feasibility work and allocated as overhead.

As a result of not allocating costs in a similar manner, in San José some projects may absorb the full cost of a Public Works' employee's training hours or time spent at department-wide events. This could make it difficult to assess how well Public Works performed across projects. To better track costs and account for costs that benefit

[16] Public Works overhead costs are budgeted through the Public Works Program Support Fund (Fund 150). Support services in Fund 150 include Public Works' senior management; departmental administrative services, such as budget, human resources, and payroll staff; the labor compliance group; and procurement staff. The Public Works Cost Allocation Plan (PWCAP) is prepared annually to determine rates to allocate the costs in the support fund to the various capital programs (e.g., Transportation, Airport, etc.). The FY 2017-18 rates range from about 7 percent to 40 percent across capital programs. The rates are determined based on the level of services provided to each program.

the capital program more broadly, Public Works should spread these costs through overhead.

Recommendation #1: To better allocate training and non-project costs to capital projects, Public Works and the City Manager's Budget Office should appropriate a portion of capital staff time for such charges in the Public Works Program Support Fund (150), and allocate such costs to projects through the Public Works Cost Allocation Plan.

According to the Most Recent *California Multi-Agency Capital Improvement Program Benchmarking Study*, San José's Project Delivery Costs Are in Line With Other Jurisdictions

Since 2002, the City of San José has participated in the *California Multi-Agency Capital Improvement Program Benchmarking Study* along with five other large cities in California.[17] The study reports project delivery performance, or the ratio of soft to hard costs, across benchmark cities.[18]

The study also contains a list of best management practices for project delivery and the implementation status for participants.[19] Best management practices were selected and voted on by study participants and can have a range of anticipated benefits including: improved cost, schedule, quality, communication, environment, and customer service.

Based on interviews with other benchmark jurisdictions and the consultant that prepares the study, we believe the study reasonably represents project delivery performance for comparison purposes. For example, participating agencies generally report similar projects and cost information, including indirect costs. An example of the form San José submits for every qualifying project is included in Appendix D. The study analyzes delivery costs by project size, type, and phase for four types of projects (municipal facilities, parks, pipes, and streets).

According to the consultant that puts the annual benchmarking study together, there are ongoing conversations among participants about how to improve the study and ensure that cities capture and share comparable data.

[17] The other study participants are: City of Long Beach/Port of Long Beach, City of Los Angeles, City of Oakland, City of Sacramento, City of San Diego, and the City of San Francisco. The study is prepared by Stantec and is titled *California Multi-Agency Capital Improvement Program Benchmarking Study.* The study only analyzes projects delivered using the design-bid-build method. Reports from 2002-2017 are available here: https://www.cityofsacramento.org/Public-Works/Resources/Publications

[18] The benchmarking study refers to soft and hard costs as project delivery costs and total construction costs, respectively.

[19] San José has fully or partly implemented many of these best management practices. The relative prioritization of best management practices is up to each individual City and is based on individual need and priorities both within and outside the Department. Recommendations in this audit address some of these practices.

The 2017 benchmarking study reported that San José Public Works' project delivery costs were similar to the other large California cities. The study reports costs as a rolling five-year average; the 2017 report covers performance from years 2012 through 2016. Public Works' average costs over this time period were 49 percent of hard costs or construction costs compared to 48 percent for all study participants. As discussed in Exhibit 9, this performance measure compares soft costs to hard costs rather than to total project cost.

Exhibit 9: Ratio of Project Delivery Costs to Construction Costs

The figures cited in this report from the benchmarking study are based on the ratio of soft costs to hard costs.

Hard costs are the sum of all construction costs, including the materials and labor of the construction contractor. It does not, for example, include construction management or environmental monitoring.

Soft costs, or project delivery costs, are the sum of all other project costs including staff time spent on design, construction management, inspections, materials testing, insurance, judgments and claims, overhead, consultant professional services, and fringe benefits.

Project delivery (or soft) costs are commonly reported as a ratio (or percentage) of construction (or hard) costs:

$$\textbf{Ratio of Project Delivery Costs to Construction Costs} = \frac{\text{Soft Costs}}{\text{Hard Costs}} = \frac{\text{Project Delivery Costs}}{\text{Construction Costs}}$$

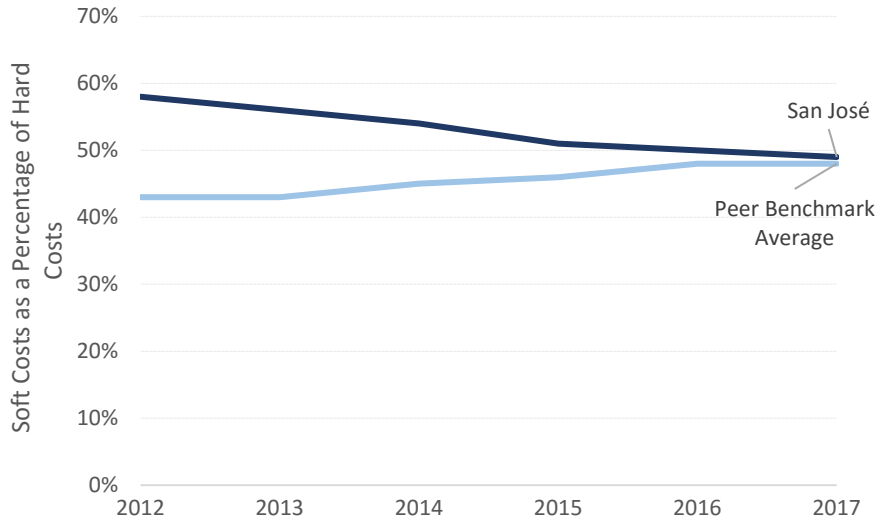
This is different from the ratio of soft costs to total project cost:

$$\textbf{Ratio of Soft Costs to Total Project Cost} = \frac{\text{Soft Costs}}{\text{Soft Costs+Hard Costs}} = \frac{\text{Project Delivery Costs}}{\text{Total Project Cost}}$$

For example, if a project's soft costs total $80,000 and its hard costs total $200,000, then the ratio of soft costs to hard costs would be 40 percent ($80,000 / $200,000). However, the soft costs on that project only represent 29 percent of the total cost of the project ($80,000 / ($80,000 + $200,000)).

According to the 2017 benchmarking study, San José's average ratio of soft costs to hard costs appear to be in line with other jurisdictions. Exhibit 10 shows that the rolling five-year average of the City's soft costs as a percent of hard costs decreased from 58 percent in the 2012 study to 49 percent in the 2017 study.

Exhibit 10: Ratio of Soft Costs to Hard Costs for Capital Projects (5-Year Rolling Average)



Source: Auditor analysis of annual CIP benchmarking studies (2012-2017); study results based on a rolling five-year average.

Public Works' performance noted in Exhibit 10 was impacted by the types of projects completed and decreased construction management costs relative to hard costs.[20] During the 2012 and 2013 studies, most of the City's projects were street type projects, which tend to have higher project delivery costs. Beginning in the 2014 study, most of the City's projects were pipe system projects, which generally have lower project delivery costs. Over the same period, construction management costs relative to hard costs decreased from 28 percent in the 2012 study to 23 percent in the 2017 study. These percentages represent the ratio of project delivery costs to construction costs. They do not represent the ratio of project delivery costs to the total cost of the project (see Exhibit 9 for a more detailed explanation).

There are several other factors that could impact the ratio of soft to hard costs. For example, during economic downturns construction costs generally decrease as price competition increases. Overall project costs decrease but also reduce the denominator in the equation. If project delivery costs (i.e., the numerator) remain relatively stable, the result would be a higher soft to hard cost ratio. This relationship generally reverses itself during an economic expansion. Because the study reports project delivery costs as a rolling five-year average, the impact of economic downturns and expansions will influence study results over a period of years.

[20] The benchmarking study classifies certain soft costs as construction management costs. These include onsite management; lab work, materials testing, and inspection; payment request processing; responding to requests for information; and others.

According to the consultant, other factors that can impact project delivery costs across cities include state and federal regulations or the amount of work individual public works departments are asked to do.

The City's Threshold for Formal Bidding Is Lower than Other Benchmark Jurisdictions

Multiple clients expressed concern with Public Works' ability to deliver small projects for a reasonable cost. Project delivery costs are reported as a ratio (or percentage) of construction costs. Because the overall dollar amount on smaller projects is lower but many costs associated with project delivery are independent of the size of a project (e.g., regulatory requirements, public outreach, bid, and award process), soft costs tend to be much higher as a percentage of construction costs. For example, for projects in our sample with construction costs less than $600,000, the median percentage of soft to hard costs was about 75 percent. This is considerably higher than other projects, which tend to have soft costs closer to 40-60 percent of hard costs.

In addition, the formal competitive bidding process, required for all projects with hard costs exceeding $100,000, whether it is for a smaller project or a larger one can be complicated and time consuming. The bid and award phase can take several months from design completion to start of construction. On average 12 projects with construction contracts that cost less than $600,000, from bid to construction start took four months.[21]

The City Council Is Considering a Ballot Measure to Update the City Charter's Language Surrounding Public Works Procurement

California State Public Contract Code section 20162 requires that public projects of $5,000 or more be "let to the lowest responsible bidder after notice." However, as a Charter City, San José can set the same or different monetary thresholds for public works contracts by a charter change/or ordinance. According to the San José City Charter, capital projects greater than $100,000[22] must be procured via formal, public bidding and awarded to the lowest responsible bidder. This was last updated in 2000 when the threshold was increased from $50,000 to the current amount.

[21] This analysis of schedules includes capital projects led by the Transportation and Hydraulics and Architectural divisions and excludes any "projects" listed as on-call, turnkey, or condition assessment. In total, 15 projects had hard costs less than $600,000. However, date information for three projects was incomplete in CPMS and were also excluded from the analysis.

[22] Procurement of public works contracts of $100,000 or less are subject to requirements of San José Municipal Code Section 14.04.500, which requires an informal bidding process. Section 140,04.500 states that, "before entering into or executing any minor public works project contract [costing $100,000 or less] or any miscellaneous public works contract, the director of public works shall solicit informal bids for the performance of the work to be done thereunder from at least three responsible contractors…" The informal bidding process requires the Director to encourage "full and open" competition and the contract is still to be awarded to the lowest responsible bidder. Some differences between the formal and informal processes could include the number of solicitations received and the time and effort involved to develop and publicize the solicitation.

The $100,000 threshold has not been adjusted for inflation and does not consider the current construction market in the region. For example, only two of the 38 projects completed during FY 2016-17 were under the $100,000 threshold.

Other jurisdictions participating in the benchmarking study have a higher threshold triggering the formal competitive procurement process. For example, in 2015, San Francisco updated their municipal code to increase the threshold amount to $600,000. The $600,000 amount applies until 2020 when it will be recalculated to reflect changes in the Urban Regional Consumer Price Index.

Fifteen of the 38 projects completed during FY 2016-17 had hard costs under $600,000. Increasing the threshold could have saved the City time on these projects.

The City Council is expected to consider draft ballot language for the November 2018 election to change the City Charter dollar threshold that triggers the formal competitive bidding process.

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Finding 2 Better Use of Lessons Learned and Project Management Training Can Help Lessen the Impact of High Turnover

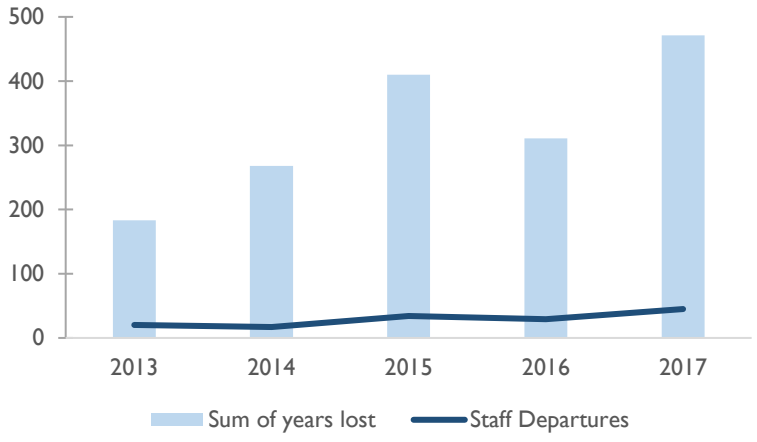
Summary

The Public Works capital delivery teams over the last several years have lost a significant amount of City experience. In the first quarter of 2018 alone, the Department lost over 300 years of City experience due to retirements. Public Works uses various knowledge-transfer strategies to train new staff and capture knowledge of departing staff, such as job shadowing, mentoring, and lunch trainings. However, more can be done to ensure that experiential knowledge is retained and continues to benefit the department and its employees. Project management trainings and regularly sharing lessons learned across Public Works and with client departments can help to ensure that the capital delivery program continues to improve.

Public Works Has Experienced a High Degree of Turnover and Loss of Experiential Knowledge

Public Works' capital project delivery divisions have lost over 1,600 years of City experience in the last five years. See Exhibit 11.

Exhibit 11: Public Works Capital Project Delivery Divisions Have Lost a Significant Amount of City Experience in the Last Five Years



Source: Peoplesoft data, auditor analysis

* Analysis includes staff that worked for Transportation and Hydraulics, Architectural, and Engineering Services Divisions at the time of their departure.

300

Years of City Experience Lost in the First Quarter of 2018

In addition, sixteen employees retired in the first quarter of 2018, resulting in an additional 300 years of lost City experience. Turnover can negatively impact projects because new staff often take over projects midstream. Depending on the size and complexity, it can take several years to complete a capital project and there can be significant project manager turnover on individual projects. This was the case for several projects reviewed for this audit.

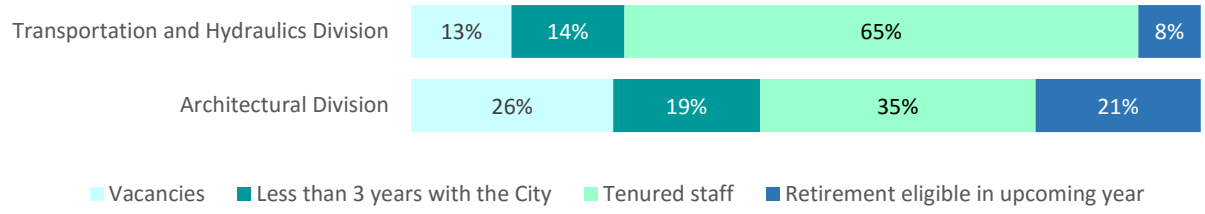
To aid in the transition from one implementing manager to another, staff rely heavily on one-on-one meetings and job shadowing during the hand off, meaning two implementation managers will be charging to a project rather than one. In addition, senior managers play a large role in ensuring continuity on projects. All of this can require additional staff time and adds costs to a project.

In addition, Public Works noted difficulties retaining new staff. A senior engineer commented that their team recently went through three engineers and had all relatively new people. They expressed frustration on spending time training the new staff only to see them leave the City after a short time.

Turnover Is Expected to Continue Because of Retirements, Leaving Less Tenured Staff to Deliver Capital Projects

As a result of staff turnover, there are a relatively large number of employees with less than three years of City experience involved in capital project delivery. For example, in 2018, 28 percent of Transportation and Hydraulics and 45 percent of Architectural staff positions were either vacant or filled with relatively new employees.

Exhibit 12: The Capital Team Continues to Face Staffing Challenges in 2018[23]



Source: Peoplesoft and Public Works Organization Charts; Auditor analysis

Note: Numbers may not add due to rounding

[23] This analysis excludes administrative staff positions. Tenured staff includes those with more than 3 years of experience with the City. Transportation and Hydraulics is budgeted for 128 full time staff positions. The Architectural Division is smaller, with 44 budgeted full time staff positions. Retirement eligibility is calculated based on if the staff member will be over the age of 55 and/or will have been with the City for 30 years or more in the upcoming year.

According to an interviewee, there is no substitute for experience. Steps that more tenured staff know to do intuitively, like knowing when to involve various stakeholders, is something that is learned and internalized over time. Because of the loss of tenured employees and greater responsibility given to new hires, staff report that there is a greater reliance on senior engineers or architects to ensure that projects are completed on-time and on-budget. The trend in turnover is expected to continue as more staff reach retirement eligibility within the next year.

Public Works Uses Several Knowledge-Transfer Strategies, But High Turnover Demands More Be Done

According to an article published by the American Society of Civil Engineers (ASCE), the capital projects industry has been experiencing a large number of people leaving the workforce. The ASCE article notes that a loss of experiential knowledge is a problem that requires a proactive approach to prevent negative operational and cost implications:

> *The operational effects of a knowledge gap within an organization include: reduced efficiency, an increase in the number of critical errors, reduced ability to innovate, and a reduced ability to pursue growth strategies. These issues arise due to a lack of expertise, which forces the remaining employees to reinvent the wheel when addressing common problems, contributing to loss of efficiency and more mistakes.*[24]

Public Works uses a variety of recommended knowledge-transfer strategies to try to capture knowledge and experience from potential retirees.[25] For example:

- **Mentoring/job Coaching:** The Transportation and Hydraulics and Architectural divisions offer some mentoring opportunities for new hires to be paired with more senior staff.
- **Lunchtime Seminars:** Between January 2016 and May 2018, the Transportation and Hydraulics and Architectural divisions offered more than 80 lunch and learn sessions. Topics included: California electrical code changes, consultant procurement training, cost estimating, Caltrans federal aid, solar roof systems, and effective waterproofing.
- **Keeping Retired Staff Connected:** The capital team has brought back some retirees with flexible hours or in a consulting capacity to

[24] Caldas, Carlos H., et al. "Development of a Method to Retain Experiential Knowledge in Capital Projects Organizations." *Journal of Management in Engineering*, vol. 31, no. 5, 2015, p. 04014083. *American Society of Civil Engineers*, doi:10.1061/(asce)me.1943-5479.0000322.

[25] ibid

allow the team to continue to benefit and learn from their accrued experience and knowledge.

- **Job Rotation:** Several divisions host an early career engineer for six months. The rotation program offers employees an opportunity to gain broader experience working on various aspects of capital project delivery including procurement, engineering, and inspections. The program was initiated in July of 2014 and the Department is on their eighth, six-month cycle.[26]

Lessons Learned Could Be Better Used to Improve Future Performance Across the Department

Another knowledge-transfer strategy that the Department uses is sharing lessons learned. After finishing a capital project, implementation managers prepare a project completion report. Completion reports include information such as the project summary/scope, positive aspects of the project, project challenges, schedule, expenditures by phase, photos, a customer survey, and lessons learned.[27]

Public Works staff who worked on the project then present the report to senior Department staff. See Exhibit 13 for a picture of the first page of the San Felipe Sanitary Pump Station project completion report and a photo of the installation of a new pipe to re-route sanitary sewer flow.

[26] As of June 2017, there were eight participants in the rotation program (expected to graduate in July 2018). Eleven more participants were expected to start in the second half of 2018. Unfortunately, nine of the 32 participants in the rotation program left the City. In addition to graduates leaving the City, which means the City does not benefit from the knowledge gained, it should also be noted that the rotation program can lead to higher soft costs for some projects. In at least one instance, an implementation manager stated that soft costs were high on a project in part due to training a rotating engineer.

[27] Post project reviews like what is described here is considered a best management practice in the benchmarking study. Post-project reviews according to the study can promote candid discussion and can make future project management and delivery more efficient and cost effective.

Exhibit 13: Example of a Project Completion Report

PROJECT COMPLETION REPORT
Date: Dec 1, 2016

Project Name: 6965 – San Felipe Sanitary Pump Station

Engineer Estimate: $670,000

1. Project Team:

Project Managers: [redacted] **Construction Manager:** [redacted]

Contractor: [redacted] **Project Inspector:** [redacted]

Other Team Members: [redacted]

2. Project Summary/Scope:

This project is located on San Felipe Road between Farnsworth Road and Yerba Buena Road, adjacent to Thompson Creek.

At San Felipe Road and Yerba Buena Road, the project abandoned twin 6-inch siphons and re-routed the sanitary sewer flow onto a new 12-inch gravity pipe along the south side of the Yerba Buena/Thompson Creek Bridge. The project abandoned 2 manholes and installed 3 new manholes in the same area.

The **6965 – San Felipe Sanitary Pump Station** project was awarded to JMB Construction, Inc. on May 6, 2015 for the amount of $630,085.

3. Positive Aspect of the Project:

- Abandoned a twin 6-inch siphon at San Felipe Rd and Yerba Buena Rd
- Installed approximately 150 feet of epoxy lined Ductile Iron pipe along the south side of the Yerba Buena /Thompson Creek Bridge.
- Installed three (3) new manholes
- Abandoned two (2) manholes
- Set up system to abandon pump station by June 2017.

4. Project Challenges:

- Re-scoped project, looked at several design options.
- The contractor encountered thrust blocks at the existing waterline bends. Staff had to re-design the pipe hangers and structural restraints on the side of the bridge in order to avoid the conflict and install the pipe under the concrete thrust blocks. Even with Potholing prior to start of construction the thrust blocks were not revealed.

Start of installation of pipe roller hangers to hold 12" epoxy lined DIP pipe.

Source: CPMS

Completing the report and sharing lessons learned appears to be beneficial for closeout, but more could be done to maximize its utility as a training tool. Although managers described discussing lessons learned in division meetings or informally with peers, there does not appear to be a process in place to ensure lessons are shared consistently across work groups or with client departments, or that lessons shared improve future capital project delivery.

Many of the lessons learned identified by staff appear to recur across projects, such as improving coordination with stakeholders, or improving planning and feasibility (e.g., ensuring the project scope is complete and identifying a funding source prior to starting design). Other lessons learned highlight issues that could affect many projects (e.g., scheduling more construction time because of winter weather). In several instances, project managers noted success in using available resources such as contractor pre-qualification for complex projects or software to manage contractor documentation.

Sharing lessons learned across work groups and ensuring that there is a process in place for updating guidance and protocols can better ensure that the knowledge-transfer strategy improves capital project delivery more broadly.

Public Works and Client Departments Should Share Capital Project Lessons Learned

In addition to ensuring lessons learned are shared across teams within Public Works, more could be done to get client insight and share project experiences to improve future performance. Currently, client departments fill out a customer satisfaction survey, which is included in the project completion report; however, they otherwise do not generally participate in the process. The one-page survey asks clients to rank satisfaction in five areas: project management and design, construction management, project function, quality, and aesthetics – with a space for comments.

In addition to monitoring client satisfaction through the survey, both parties may benefit from additional discussion and reflection about lessons learned. In one example, Public Works met with DOT staff after phase 1 of a project and co-wrote a lessons learned document to assist with the future project phases. According to DOT, they found the exercise to be useful and planned to use knowledge shared to update DOT procedures.

Public Works mentioned that they recently started inviting client departments to the project completion meetings.

Recommendation #2: Public Works can better ensure that lessons learned improve future performance by:

a) **Ensuring that project completion reports containing lessons learned are distributed to department and client staff.**

b) **Regularly meeting with client departments to share lessons learned from projects,**

c) **Including standard language in the project completion report, following the lessons learned section, that ensures department manuals and project guidance are updated if necessary.**

Project Management Training Could Help the Department Address Challenges Caused by Turnover

Knowledge-transfer strategies are useful for capturing and sharing experiential knowledge, but more can be done to train and strengthen implementation managers' project management skills. Project management training may help to lessen the reliance on senior and administrative staff involvement in project management.

Orientation is part of the onboarding process for all new Public Works employees. Topics covered include the department mission, department services, the organization structure, and intranet resources. Because the

orientation is required for new employees, it is high level and does not cover topics such as capital project management. Public Works also offers periodic trainings on its IT systems and provides materials to help with the procurement and bidding process.

Project managers join projects with varying degrees of experience and familiarity with project management. Ongoing project management training that includes Public Works procedures can better equip them to deliver capital projects. It can also improve project consistency across the Architecture and Transportation and Hydraulics divisions (see Finding 3 for more information on the consistency of project management).

In San Diego, all new project managers participate in a Project Management Academy. It includes modules on the principles of project management, as well as internal policies and procedures. The academy is provided twice a year but attendance is required only once. The trainers are other city employees.

Providing project management training can help to improve consistency by ensuring that all staff have a similar, foundational understanding of project management as it pertains to capital projects. Additional training will be helpful, especially for less tenured staff with less experience with City policies and procedures. Public Works noted that they had planned to add project management training in past years, but were unable to because of competing priorities.

Recommendation #3: Public Works should provide project management training for implementation managers that covers general principles of project management as well as Department/Division procedures for managing projects through the various phases of project delivery.

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Finding 3 Existing Project Management Tools and Guidance Could Be Improved

Summary

Existing project management tools and guidance documents could be improved to aid staff delivering capital projects. Enhancing reporting capabilities, for example, could help implementation managers (project managers) track project budgets and schedules more efficiently and enable division managers to monitor the capital program more easily. In addition, establishing a consistent electronic file management system could lessen the impact of turnover, making it easier for new staff to take over a project, and help supervisors monitor projects. Public Works capital delivery teams have developed various project management resources for implementation managers, however, these resources are not always used and are sometimes outdated. These resources could be used to onboard new staff, set clear expectations for implementation managers, and ensure necessary steps are taken to guard against avoidable issues.

Existing Software Tools Can Be Enhanced and Better Used to Support Public Works Staff

Implementation managers rely on multiple systems to manage their projects including Excel, Microsoft Project, Primavera P6, and Primavera Submittal Exchange. In general, the decision of what software program to use is left to the discretion of the implementation manager or senior engineer (or architect).

The Capital Project Management System Is a Reporting Tool, Not a Management Tool

One software tool used by the Public Works capital teams is the City's Capital Project Management System (CPMS). CPMS contains key information such as the schedule and budget for Public Works projects.[28] One of its primary uses is capturing cost estimate information for the City's capital budget. It is also capable of generating pre-formatted reports for quarterly Capital Improvement Program updates for Council. The platform has some built in project controls. For example, the schedule can be "locked" so it cannot be changed without notifying and seeking approval from the Division Manager.

While Public Works staff described CPMS primarily as a reporting tool, it does include some features that could be useful for implementation managers in the day-to-day management of projects. For example, implementation managers can

[28] CPMS is a legacy system that was built in-house by Public Works. It was built using an Adobe platform that will be supported through 2022.

use the alerts and notes tabs to flag issues to senior staff. In addition, CPMS can generate several standardized reports from the City's Financial Management System, including information about project expenditures and time charges that can be used to manage project budgets.

While some of these reports could be useful for managing projects, not all implementation managers use these reports.[29] In general, implementation managers reported that CPMS was difficult to use and several fields required duplicate entry.

Improving CPMS Reporting Capabilities Can Aid Project Management

Implementation managers often lead several projects at once – meaning that they are communicating with multiple stakeholders and working on various phases of different projects. However, there is no existing report that allows users to easily view key information about multiple project budgets and milestones in one place. Implementation managers must create their own way of tracking projects using programs such as Excel and Microsoft Project.

While there are limitations to CPMS, several staff explained that there are not any comparable off-the-shelf options that would fulfill the Department's reporting needs. As such, there are currently no plans to migrate information to a new platform; CPMS will continue to be maintained, and is being updated with more modern application development techniques.

The need for an overview report is amplified at higher levels in the organization. The Division managers have no way to quickly check on the progress of all the projects in their division. The CPMS administrator built and runs a custom report with basic information for one of the division managers every month and other staff are asking for similar kinds of reports.

According to Public Works, the first phase of updates to CPMS is ongoing. Department technical staff are testing a new custom report portal for CPMS that will allow users to access information more easily. Moreover, it may be possible to review information about multiple projects in one report. Customizable reports that are easy to generate could greatly benefit implementation managers all the way up to the Director's Office.

[29] An additional challenge to budget tracking is that FMS updates only occur every two weeks and overhead does not hit a project budget until the end of the month. This is due to how the City's financial management system accounts for overhead and payroll.

Recommendation #4: To ensure a more standardized and efficient capital project delivery process, Public Works should enhance CPMS reporting tools to aid implementation managers with tracking budget and schedule from feasibility through post-construction.

Consistency in Electronic File Management Could Lessen Impact of Turnover and Help Supervisors Better Monitor Projects

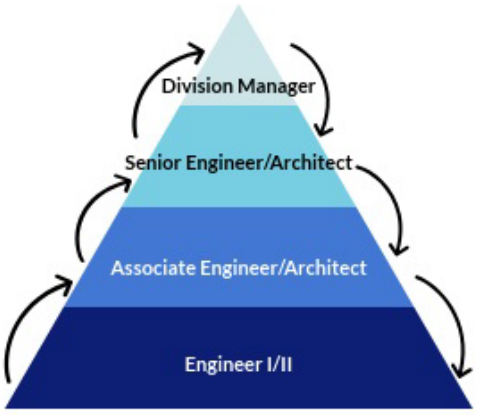
The organization of electronic project files and documentation practices vary among implementation managers. While the Transportation and Hydraulics Division uses a largely standardized electronic file structure, architectural staff does not. Also, there is little guidance about what electronic files to save and how. For example, while the standard design process requires reviews at 35, 65, and 90 percent completion of the design, there was little documentation of that process in the electronic files reviewed during this audit. Important information such as comments from the client department or other parties, and the resolution of those comments were often unavailable in the files.

As noted in Finding 2, turnover within Public Works has resulted in instances where implementation managers change in the middle of a project. Given how little is available in some electronic project files and the variability in project tracking, it could be difficult to take over a project or to take over while someone is out of the office. Improving electronic file structure and saving practices could help with transitioning new staff on to a project and save staff time.

Managers Rely on One-on-One Meetings to Learn About Project Progress

Division managers rely heavily on in-person meetings with staff to learn about project progress and issues as they arise. In the Architectural Division, for example, one-on-one meetings with senior architects occur once every week to go through their list of projects. Those seniors in turn meet with their associates once a week to go over their projects. A cascade of meetings is required to track projects. One division manager noted concern that not all the information makes it to senior staff as quickly as they would like. While CPMS allows implementation managers to input notes and to flag issues to notify supervisors, those features are used inconsistently by implementation managers.

Exhibit 14: Flow of Information Relies Heavily on In-Person Meetings



Source: Auditor analysis

In the Architectural Division alone, the division manager as of May 2018 had approximately 100 projects in process including 38 projects where staff were doing feasibility or cost estimate work. Division managers and senior staff are monitoring multiple projects at once and could benefit from consistency in how electronic files are maintained across working groups and implementation managers. Standardized file structures could allow supervisors to access information that would supplement in-person communication required to keep track of projects.

Recommendation #5: To support consistent project management delivery, knowledge transfer during staff turnover, and accessibility for future reference, Public Works should use a standard electronic file structure for capital projects and determine what files should be kept to ensure that key documents are maintained for each phase of the capital delivery process.

Project Management Can Be Improved by Updating Existing Project Management Tools

Client departments mentioned that project implementation and the experience of working with the Transportation and Hydraulics and Architectural Divisions can vary significantly depending on the implementation manager leading the project. Implementation managers use different software, track projects using different forms, and vary in how often they communicate with clients.

Staff from one client department noted that some implementation managers are much more responsive than others, and that they sometimes need to remind Public Works staff to schedule meetings to discuss designs. Another client noted inconsistencies in developing plans and specifications between implementation managers. An example cited was design formatting differences that could contribute to errors in understanding plans by client or survey staff, or difficulties with the contractor.

Inconsistency between implementation managers was also evident in the electronic project file review conducted for this report. Some implementation

managers tracked projects more consistently and saved communications with the client, while others saved very little information throughout the project. Similarly, the use of CPMS "alerts", a tool for documenting and notifying senior staff about project progress and issues, was used inconsistently—some managers used the feature regularly, while others chose not to use this feature at all.

Decreasing the amount of variability between implementation managers can help supervisors and allow Public Works and clients work more efficiently together.

Public Works' Project Management Manual Should Be Updated

Public Works staff noted that in the past they could rely on the experience of their implementation managers to lead capital projects without much additional guidance. This may not be sustainable with the level of turnover and loss of experiential knowledge noted in Finding 2 of this report.

According to the benchmarking study, a best management practice is to use a standardized project delivery manual, stating:

> *Standardized procedures streamline project design, bidding, and construction processes. Standardized design management procedures will reduce scope creep and delays in construction document preparation. During construction, standard procedures will reduce response times on RFIs [Requests for Information], and add overall clarity and efficiency to the construction management process. Having a standard manual will also reduce the time necessary for project documentation training.*

Public Works has a project management manual on its intranet site; however, it has not been kept up to date. The last updates occurred in 2006, and numerous sections are still labeled as draft. According to Public Works, there have been several attempts to update the manual but it was never completed because of competing priorities.

Adding to the Project Management Manual Can Increase Consistent Use of Tools and Communicate Expectations for Project Delivery

The *Project Management Manual* can be improved by including information about expectations, roles and responsibilities, and documentation during the various phases of capital projects. For example, the following areas of the manual could benefit from additional guidance to mitigate issues and ensure a more consistent, smooth project delivery experience for clients:

- **Feasibility:** The manual's section about feasibility or starting a new project is limited to a "New Project Form", a PDF that staff must print and scan to use. There is no accompanying guidance about its intended purpose and whether it is required. There is additional information

available in the CPMS Users Guide; but this is separate from the *Project Management Manual* and is available on a different web platform that is not linked to the Public Works intranet.[30]

In contrast, Sacramento's *Project Delivery Manual* covers the project initiation phase of a project in greater detail. Covering numerous pages, the section outlines the roles and responsibilities of stakeholders, the elements of a project report, project approval and authorization, and an example outline of a project report, as well as a sample project approval and authorization form.

- **Construction Management:** This section of the manual primarily focuses on processes related to material lab testing, inspection reports, and traffic control. However, based on project completion reports, 11 of the 29 project completion reports cited lessons learned related to construction management which a more comprehensive manual could help mitigate. The lessons learned ranged from managing contractor issues, including contractor default or attempting to overcharge the City, to coordinating construction activities. Los Angeles' manual has various sections related to construction, including schedule controls and avoiding and mitigating disputes.
- **Cost Tracking:** According to Public Works management, implementation managers should be tracking project expenditures in relation to the approved budget. They are also expected to notify the client if issues arise so that the client understands what is going on and is aware of possible budget implications. Reviewing the manual, it is unclear that either of these things should be done or when they should be done.

Updating the manual will help communicate Department expectations to staff and ensure that project delivery is consistent across implementation managers and working groups. In addition, it can be an effective tool for new hires as well as more experienced staff to stay current on changes to Public Works processes and procedures. Public Works is aware that the manual is outdated and several staff have been delegated to work on updating and adding to the manual.

Existing Project Management Tools Can Be Used to Update the Manual

Individual divisions or working groups have developed their own guidelines and resources that implementation managers can use to manage projects (see Appendix B). The tools vary in content and focus area. For example:

[30] As described in Finding 4, defining a project's scope, budget, or schedule before proceeding to the design phase was a recurring project management challenge.

- The Transportation and Hydraulics Division has a CIP Delivery Checklist available to the Roads and Bridges, Electrical, and Storm Sections that cover the various phases of a project.
- The Architectural Division has a "CIP Start-Up and Preliminary Engineering Form" that is focused on the feasibility phase.
- The Public Works procurement team recently released updated CIP procurement manuals, separate from the *Project Management Manual*. Guidelines like these are useful and when appropriate should be used to update the project management manual.

When used, these project management tools can be used for quality assurance, to ensure important project tasks are completed, to monitor project progress, and to prevent avoidable mistakes.

However, based on project file reviews and interviews, these forms and resources do not appear to always be used. Four street projects reviewed as part of this audit contained 14 lessons learned related to challenges related to agreeing with the client on a schedule and budget, communicating with project stakeholders, coordinating project activities, performing site surveys, or ensuring accurate specifications. These are areas covered in the "Transportation and Hydraulics CIP Delivery Checklist" which is applicable for street projects.

The City's Standard Details and Specifications Should Be Updated

The City's *Standard Details* and *Specifications* were last updated in the 1990's. Although there are addendums to the specifications on the City's intranet as well as other libraries of information, Public Works should update the standard specifications. Several lessons learned from the project completion reports reviewed for this audit related to the need to obtain or use appropriate specifications. In other words, several projects ran into issues having to do with inadequate specifications for aspects of the project. It should be noted, that updating the specifications would likely involve other departments, including the City Attorney's Office.

Public Works began updating the standard specifications about a decade ago, but never completed the project. Other jurisdictions or agencies, such as San Francisco and Caltrans, update their standard specifications more regularly, at least every five years. Public Works should similarly lead a review and update of the City's specifications on a regular basis.

Recommendation #6: To ensure consistent project delivery, Public Works should:

a) **Update its project management manual using existing project management guidelines and checklists as well as current practices,**

b) **Expand the manual to include guidance for each project phase and include duties of all divisions that are responsible for project delivery, and**

c) **Establish a process to regularly review and update the manual as needed.**

Recommendation #7: Public Works should review and update its Standard Details and Specifications, in coordination with the City Attorney's Office and other departments, to ensure it contains up-to-date specifications, and establish a process to regularly review and update the manual as needed.

Improving Performance Measurements Could Help Assess Projects and Communicate Public Works Value

Performance measurements can be useful to track and improve performance as well as communicate the value Public Works provides for the City.

Public Works uses standard "on-budget" and "on-schedule" measures to assess performance. However, these metrics generally only measure performance during construction.[31] Although on-budget and on-schedule appear to be commonly used across jurisdictions for public works projects,[32] they can take on slightly different meanings depending on when the budgets and schedules are formalized.

Clarifying that this measurement only assesses performance during construction will improve awareness about the construction phase; but, it also leaves open room for discussing what can be done to better track, assess, and improve performance during the phases leading up to construction.

[31] The budget and schedule are locked after bid and award. Until this phase the implementation manager may alter the dates to reflect changes to the project without having to seek supervisor approval or to justify changing the target dates.

[32] Ammons, D.N. (2001), *Municipal Benchmarks: Assessing local performance and establishing community standards* (2nd ed.). Sago Publications, Inc.

Additional Performance Measures Can Lead to a Better Understanding of the Reasons for Change Orders

The benchmarking study includes classifying types of change orders as a best practice. The study lists the following categories: changed conditions, unforeseen conditions, owner requests, or design changes for owner use as a best practice. In addition, other change orders could be a result of design errors and omissions. The study notes that categorization of change orders can improve understanding of projects, and lessons learned from the data may improve project delivery on similar projects.

Public Works appears to classify some change orders for the purposes of the benchmarking study; however, nearly all are considered "changed conditions" regardless of whether this was because of a request from the client or some other reason. The classifications are also not reviewed or reported in the aggregate to better understand the reasons behind change orders across projects, or to communicate with client departments about the implications of scope changes.

The benchmarking study includes one recommendation that an "internal dashboard provides a platform to measure, monitor, evaluate, and report performance to assist in establishing clear business rules and improve internal communication." The Public Works Information Technology Division currently has plans to develop dashboards for supervisors after more immediate reporting needs are answered.

Recommendation #8: To improve its metrics used to assess performance, Public Works should:

a) **Clarify that the performance metrics "on-budget" and "on-schedule" for capital projects refer to the construction phase of project delivery, and**

b) **Track the categories of change orders over time across all projects.**

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Finding 4 Better Defined Project Scopes Can Reduce Changes During Design and Construction

Summary

Public Works coordinates with other departments, known as client departments, to deliver capital projects. Client departments are responsible for securing project funding and developing initial project scopes among other things. Developing and agreeing to a project scope and plan is critical to successful project implementation. Although Public Works and client departments have started meeting more regularly to improve communications, better scope definition can reduce the number of problems that may occur later in the project during design or construction. To improve communications further, we recommend Public Works develop an intake form for clients to submit that identifies what information is needed prior to beginning design work. In addition, to clarify expectations about the project plan, we recommend that Public Works use a standard project planning document that includes the agreed upon scope, budget, and schedule, and identifies the services to be provided.

More Thorough Scopes Could Improve Schedule and Delivery Cost

Developing and agreeing to a scope and project plan in the initial phase of a project is critical to the quality and appropriateness of the design and construction phases. When problems occur in the early project phases it can have costly consequences going forward in the form of redesign work or change orders. Currently, Public Works relies on its clients to provide a written scope in CPMS.

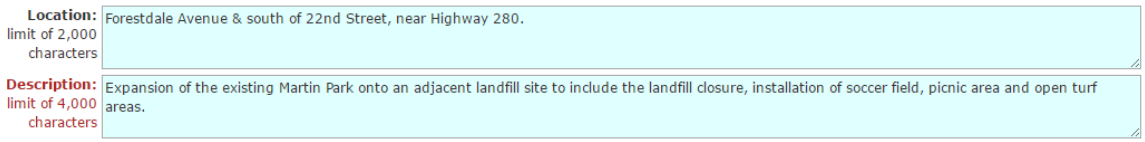
According to *Project Management for Engineering and Construction*:

> *The purpose of project scope definition is to provide sufficient information to identify the work to be performed, to allow the design to proceed without significant changes that may adversely affect the project budget and schedule…Before design is started, scope must adequately define deliverables, that is, what will be furnished. Examples of deliverables are design drawings, specifications, assistance during bidding, construction inspection, record drawings, and reimbursable expenses. All this information must be known before starting design because it affects the project budget and schedule.*[33]

[33] Oberlender, Garold D. *Project Management for Engineering and Construction*. 2nd ed., McGraw-Hill, 2000.

The CPMS user guide provides some guidance on what a scope should include, including items to consider depending on if the project involves buildings or landscaping. It also states, "*Do not assume that Public Works will automatically consider or recognize needs which might be obvious to you. It is better to be excessively detailed than to leave items out.*" While the scope in CPMS can contain up 4,000 characters, we found they are typically shorter and often lack detail required for design. See Exhibit 15 for an example.

Exhibit 15: Example Project Scope from CPMS



Source: CPMS

Project Feasibility is a Shared Responsibility Between Public Works and Client Departments

Defining a project's scope during the feasibility phase was a recurring project challenge noted both by clients and Public Works in interviews and project completion reports. According to Public Works and client departments, they have started meeting more regularly to improve communications across departments; however, more can be done to improve collaboration in developing scopes for capital projects.

Client department staff noted that they would like Public Works input or expertise earlier to help with planning and budgeting (e.g., they do not always know what Public Works wants in a scope or all the details required). If Public Works and the client discuss the scope further, outside of CPMS, that information is not always documented and saved in the project file. Documenting this information could be useful if implementation managers change, or to refer to if there is later confusion about the scope.

Unclear scopes can lead to confusion and costly project changes during design and construction phases of the project. The benchmarking study lists several best practices to improve scope development, noting that design professionals will work more efficiently if given a clear scope when contracted to provide design services.

Other jurisdictions have implemented processes to better define scopes in the feasibility phase of a project. For example, San Diego uses an intake form to prompt clients to provide useful information before Public Works will spend time working on a project. See Appendix C for an example of the intake form.

Recommendation #9: To improve the scope development process, Public Works should create, and require clients to submit, a comprehensive intake form that clearly identifies the project scope.

More Thorough Planning Documents Could Reduce Need for Redesigns or Other Costly Changes

Scope guidance and requirements are generally not standardized. An exception to this is for trails, where PRNS and Public Works have developed the *San José Trail Network Toolkit Planning & Design* with the help of an outside consultant.

Other jurisdictions (e.g., San Francisco and Sacramento) provide standardized forms/templates to guide project planning. In San Francisco, the client drafts the scope and then they meet with the public works agency to discuss the scope, identify services, and agree on deliverables. San Francisco Public Works drafts a Memorandum of Understanding (MOU) with the agreed upon information, which is then signed by the client and San Francisco Public Works. According to San Francisco Public Works, the MOU does not prevent scope creep or unforeseeable changes to the project; however, it can serve as a useful tool and a "professional and polite" reminder that can be referred to and used to justify amending budgets and schedules.

The standardized project planning document should be updated to reflect changes to the project as they occur. These changes and different iterations, agreed to by the client and Public Works, should be maintained in the electronic files as a record of communication and project history.

Recommendation #10: To improve coordination and understanding between Public Works and client departments, Public Works should create a standardized project planning document that includes: the scope, budget, and schedule, and identifies the services to be provided by Public Works as well as others. The project planning document should be signed by the client department and Public Works prior to beginning project design and saved in the project file.

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Conclusion

Public Works leads the design and construction for various types of capital projects including municipal buildings, streets, sewers, and parks. Capital projects can involve new construction, renovations, expansions, and/or improving City infrastructure. Capital projects consist of hard costs and soft costs. The focus of this report was on Public Works' soft costs, which are largely comprised of City labor, staff benefits, consultant costs (if any), and City and Department overhead.

According to the most recent *California Multi-Agency CIP Benchmarking Study* which calculates and compares project delivery costs over a five-year period, the City of San José is in line with other participating jurisdictions. Nonetheless, our review of 17 project files and interviews with Public Works and client departments found that processes and procedures could be strengthened to further increase staff efficiency and reduce dependence on experiential knowledge of more tenured employees. This is especially important as Public Works continues to struggle with staffing challenges such as turnover and retirement eligibility.

RECOMMENDATIONS

Finding 1: Public Works' Cost to Deliver Capital Projects Appears Similar to Other Large California Cities

Recommendation #1: To better allocate training and non-project costs to capital projects, Public Works and the City Manager's Budget Office should appropriate a portion of capital staff time for such charges in the Public Works Program Support Fund (150), and allocate such costs to projects through the Public Works Cost Allocation Plan.

Finding 2: Better Use of Lessons Learned and Project Management Training Can Help Lessen the Impact of High Turnover

Recommendation #2: Public Works can better ensure that lessons learned improve future performance by:

a) Ensuring that project completion reports containing lessons learned are distributed to department and client staff.

b) Regularly meeting with client departments to share lessons learned from projects,

c) Including standard language in the project completion report, following the lessons learned section, that ensures department manuals and project guidance are updated if necessary.

Recommendation #3: Public Works should provide project management training for implementation managers that covers general principles of project management as well as Department/Division procedures for managing projects through the various phases of project delivery.

Finding 3: Existing Project Management Tools and Guidance Could Be Improved

Recommendation #4: To ensure a more standardized and efficient capital project delivery process, Public Works should enhance CPMS reporting tools to aid implementation managers with tracking budget and schedule from feasibility through post-construction.

Recommendation #5: To support consistent project management delivery, knowledge transfer during staff turnover, and accessibility for future reference, Public Works should use a standard electronic file structure for capital projects and determine what files should be kept to ensure that key documents are maintained for each phase of the capital delivery process.

Recommendation #6: To ensure consistent project delivery, Public Works should:

a) Update its project management manual using existing project management guidelines and checklists as well as current practices,

b) Expand the manual to include guidance for each project phase and include duties of all divisions that are responsible for project delivery, and

c) Establish a process to regularly review and update the manual as needed.

Recommendation #7: Public Works should review and update its Standard Details and Specifications, in coordination with the City Attorney's Office and other departments, to ensure it contains up-to-date specifications, and establish a process to regularly review and update the manual as needed.

Recommendation #8: To improve its metrics used to assess performance, Public Works should:

a) Clarify that the performance metrics "on-budget" and "on-schedule" for capital projects refer to the construction phase of project delivery, and

b) Track the categories of change orders over time across all projects.

Finding 4: Better Defined Project Scopes Can Reduce Changes During Design and Construction

Recommendation #9: To improve the scope development process, Public Works should create, and require clients to submit, a comprehensive intake form that clearly identifies the project scope.

Recommendation #10: To improve coordination and understanding between Public Works and client departments, Public Works should create a standardized project planning document that includes: the scope, budget, and schedule, and identifies the services to be provided by Public Works as well as others. The project planning document should be signed by the client department and Public Works prior to beginning project design and saved in the project file.

APPENDIX A

Projects Sampled for Interviews and Project File Review for This Report

Project Name	Division	Project Type	Soft Costs	Hard Costs	Soft Costs / Hard Costs	Soft Costs / Total Costs	Total Costs
City Hall First Floor Employee Break Room and Restrooms	CFAS	Municipal	$ 201,077	$ 351,722	57%	36%	$ 552,799
Shirakawa Center Improvements	CFAS	Municipal	$ 282,262	$ 602,935	47%	32%	$ 885,197
Fire Station No. 21	CFAS	Municipal	$ 2,868,981	$ 5,506,652	52%	34%	$ 8,375,633
TiMC (Transportation Incident Management Center) Facility Improvements	CFAS	Municipal	$ 1,527,796	$ 2,627,814	58%	37%	$ 4,155,610
Penitencia Creek Park Playground Renovation	CFAS	Parks	$ 398,161	$ 686,255	58%	37%	$ 1,084,417
Martin Park Expansion	CFAS	Parks	$ 833,457	$ 2,985,492	28%	22%	$ 3,818,949
Branham Park Renovation	CFAS	Parks	$ 262,863	$ 256,134	103%	51%	$ 518,997
Happy Hollow Ride Design Build	CFAS	Parks	$ 245,503	$ 348,683	70%	41%	$ 594,186
TRAIL: Doerr Parkway	CFAS	Parks	$ 85,095	$ 265,244	32%	24%	$ 350,339
Mineta San Jose International Airport - Airfield Fence Improvements 2015*	THS	Airport - Design Only	$ 446,169	-	-	-	$ 446,169
San Felipe Sanitary Pump Station	THS	Pipe Systems	$ 753,723	$ 626,201	120%	55%	$ 1,379,924
The Villages Sanitary Sewer Rehabilitation Project	THS	Pipe Systems	$ 419,851	$ 715,985	59%	37%	$ 1,135,837
Brokaw III - Capitol Avenue Sanitary Sewer Improvement Project	THS	Pipe Systems	$ 587,382	$ 1,285,549	46%	31%	$ 1,872,932
Stevens Creek Boulevard Sanitary Sewer Improvement	THS	Pipe Systems	$ 614,341	$ 2,335,323	26%	21%	$ 2,949,663
Five Wounds/Brookwood Terrace CDBG Pedestrian Improvements	THS	Streets	$ 308,267	$ 410,620	75%	43%	$ 718,887
San Carlos Multimodal Streetscape Improvements:Phase 2	THS	Streets	$ 2,179,056	$ 1,208,865	180%	64%	$ 3,387,921
Arnold Avenue & Foss Avenue Streetlight Improvements	THS	Streets	$ 114,382	$ 60,140	190%	66%	$ 174,522
Downtown Dynamic Message Signs Replacement - Phase 1	THS	Streets	$ 355,068	$ 229,475	155%	61%	$ 584,543
Total Costs of Projects Reviewed							**$ 32,986,526**

Source: Public Works Capital Project Management System (CPMS)

*Hard cost data unavailable for project in CPMS. Costs shown are only Public Works and consultant design services.

APPENDIX B

Excerpt From the Architectural Division Submittal Checklist

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Department of Public Works

SUBMITTAL CHECKLIST
FOR MAJOR CFAS PUBLIC WORKS PROJECT

Note: This checklist is provided to assist with the submittals for a construction project

1. **015000 – Temporary Facilities and Controls**
   - ☐ Temporary Construction Sign
   - ☐ Traffic control plan (If applicable)

2. **015713 – Temporary Erosion and Sediment Control**
   - ☐ Storm Water Pollution Prevention Plan - SWPPP (if applicable)

3. **024100 - Demolition**
   - ☐ Schedule of proposed selective demolition work

4. **032000 - Concrete Reinforcing**
   - ☐ Mill certificates for reinforcing steel
   - ☐ Shop drawings for location, spacing and site of concrete reinforcement

5. **033800 – Cast-In-Place Concrete**
   - ☐ Mix designs for MTL
   - ☐ Concrete placement schedule
   - ☐ Product data / Certificates of compliance
   - ☐ Lab test reports
   - ☐ Weight and batch tags

6. **055000 – Metal Fabrications**
   - ☐ Shop drawings of miscellaneous metal work
   - ☐ Product data for anchor details and installation instructions

7. **061010 – Miscellaneous Carpentry**
   - ☐ Product data for fasteners
   - ☐ Wood treatment data

8. **099100 - Painting**
   - ☐ List of materials
   - ☐ Provide sample finishes

9. **101400 – Signage**
   - ☐ Shop drawings for all sign faces
   - ☐ Color samples
   - ☐ Submit sign design for review and approval

Submittal Checklist (1) Revised: 4/23/15

Source: Architectural Division electronic files

APPENDIX C

Sample Project Intake Form

Applicant Deputy Director Signature: _____

Date: _____

Public Works Department - Engineering & Capital Projects
External Clients'/Asset Owners' Intake Form
For initiating a new CIP Project with PW-ECP

INSTRUCTIONS

The following is an application for the Asset Owner's initiation of E&CP's Administration and Engineering services related to new (A) Design & Construction, (B) JOC Construction, (C) Technical Studies projects. Please ensure that all known project information is provided in the boxes below, and that all responses are clear and detailed. Projects will not be initiated if the application is found to be incomplete. A member of the Preliminary Engineering & Program Coordination Section staff will review the intake form for completeness and notify you whether additional information/clarification is required to initiate the project.

Once the form is signed and dated, please submit to [redacted]

- Electronic documents via Email [redacted], or
- Hard prints via Inter-office mail to [redacted]
- (for questions on Intake Form submittals, please contact [redacted]

PROJECT KICK-OFF MEETING

Once all needed project information is gathered and validated, a Project Kick-Off Meeting will be scheduled signifying the start of the project. This meeting will include the applicant, the Project Manager and other key E&CP project implementation staff.

1. APPLICANT INFORMATION

a. Name, Title

b. Division, Department

2. PROJECT INFORMATION

a. Asset type (S)

b. Project Need & Objective (why is this needed – safety, operational, claim, etc… provide DETAIL as to what the project will aim to correct or provide):

c. Project Scope (list of deliverables/what's to be built – please provide DETAIL of the expected finished product):

d. How has the Community been notified of this intended project? Does the Community support the project?

e. Has the Council District and/or the full Council been notified of this intended project?

f. Does this project require Property Acquisition and/or easements (yes/no):

g. Who requested the intended Project (e.g. council, claim, community – please provide DETAIL):

h. If the project is using an existing easement provide a copy of the letter notifying property owners of the intended project and requirements to remove any obstructions.

i. Identify any known or possible obstacles that need to be resolved in order to deliver the project scope. Note: If the obstacle is determined to be an impediment with no solution, the intended project will be returned to the client for further scope assessment.

j. Were there any studies performed for this project to support the scope (yes/no)? Provide copies and acknowledgement of your review and support of the study's conclusions.

k. Is this Project in Compliance with the Community Plan (yes/no)?

l. What's the anticipated annual O&M $ amount that may result from this proposed project?

m. Has the group responsible for the maintenance, been notified of this intended project?

n. If a Public Utility Project, is this a Metro or a Muni facility?

3. PROJECT LOCATION

a. Project Location Description (e.g. major cross streets, …). Please attach location map.

b. Council District(s):

c. Community Area(s):

4. PROPOSED TOTAL COST ESTIMATE & FUNDNG SOURCE (INCLUDE 30% DESIGN DELIVERY COST & 20% PROJECT CONTNGENCY)

a. Project Total Budget Amount:

b. Current FY Available Amount:

c. If not fully funded yet, identify source and timing of remaining funds:

6. FUNDING SOURCE

a. Annual Allocation number & title

b .If grant funded, what is the amount & type (e.g. state/fed & title)? Attach grant language.

c. What's the schedule constraint (milestone and date) on the grant?

d. What are the other Funding Source(s) & Amount(s)?

e. From what funding source and FY will any additional needed funds come from?

f. Will project funding require "Buy American"?

7. TARGET SCHEDUEL

1. **DESIRED FISCAL YEAR OF INITATION**
2. **DESIRED FISCAL YEAR OF CONSTRUCTION AWARD**

a. What's the desired target construction completion date? Provide justification for need (*).

(*)Schedule projections will be discussed @ the Kick-Off Meeting & established during the pre-design phase.

b. What are the schedule constraints (milestone and date)?

c. Provide more detail on the nature of the schedule constraint (consequence, etc…):

8. ENVIRONMENTAL

a. Have any Environmental Documents been obtained (or permits submitted)? Provide copies.

9. INITIAL PRIORITIZATION SCORE

a. Prioritization Score (Per Council Policy 800-14). Attach prioritization calculation details & justification.

10. RECOMMENDED (*) DELIVERY METHOD

a. If you have a preference for a Delivery Method, such as DBB, DB, MACC or JOC (*), PW-ECP will evaluate its feasibility and notify you of the findings and of the most appropriate delivery method to achieve project objectives. Please state your preference:

b. If the Recommended Delivery Method is for a JOC Task, then provide the reasons why this should and can proceed as a JOC task.

11. ENGINEERING ONLY SERVICES (e.g. cost estimate, condition assessment, or scoping)

a. If this request is not for Design & Construction, indicate whether this project is strictly for:

(1) Administration Only (explain below)
(2) Cost Estimate Only
(3) Condition Assessment (explain below)
(4) Other Engineering Services (explain below)

12. NOTES

Source: City of San Diego project intake form

APPENDIX D

Benchmarking Study Performance Questionnaire Form

California Multi-Agency CIP
Benchmarking Study
PERFORMANCE QUESTIONNAIRE

Agency: _____ Project Name: _____
Project Type: _____
New/Rehab Index: _____ Sustainability Goal: _____
Alternative Project Delivery[1]: _____ Project Grant Source: _____

(1) On-call engineering services does not use pre-negotiated, fixed-prices on units of material/labor.
Job order contracting (JOC) uses pre-negotiated, fixed-prices on units of material/labor.

☐ Project financial elements closed and complete

Description: _____
Comments: _____

	Planning		Design		Construction Management		Total	
	DOLLAR	% of TCC*	DOLLAR	% of TCC*	DOLLAR	% of TCC*	DOLLAR	% of TCC*
AGENCY LABOR								
AGENCY COSTS[2]								
SUB-TOTAL AGENCY								
CONSULTANT								
TOTALS								
PHASE DURATION		Months		Months		Months		

AMOUNT OF CONSTRUCTION CONTRACT					
ENGINEER'S ESTIMATE					
COST OF CHANGE ORDERS	Changed Conditions	Changed Bid Documents	Client-Initiated Changes	Total Change Orders	$-
UTILITY RELOCATION COST					
CITY FORCES CONSTRUCTION (HARD COSTS ONLY)					
TOTAL CONSTRUCTION COST (TCC)					
LAND ACQUISITION (ONLY COST OF LAND, NO ASSOCIATED LABOR COST)					
DATE STARTED TO INCUR CONSTRUCTION MANAGEMENT COSTS (IF AVAILABLE)					
BID OPENING DATE (IF AVAILABLE)					
CONSTRUCTION COMPLETION DATE					
TOTAL PROJECT COST					$ -
NUMBER OF BIDS RECEIVED					

(2) Agency costs include other direct costs and can be listed underneath. This value is locked and it is calculated from its items (Rows 15 - 19).

C:\P0102\Phase II\Database (Phase II)\B-2.1 PERFORMANCE QUESTIONNAIRE_2018 Save Date: 6/28/2018

Source: Public Works Intranet

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Memorandum

TO: SHARON W. ERICKSON **FROM:** Matt Cano

SUBJECT: **AUDIT RESPONSE – PUBLIC WORKS: ENHANCING MANAGEMENT OF CAPITAL PROJECTS.** **DATE:** July 24, 2018

Approved Angela F. Mague Date 7-25-18

BACKGROUND

This memorandum responds to the recently completed audit of the Public Works Capital Delivery program. We appreciate the professionalism of the City Auditor's Office and their taking the time to gain insight, understanding and appreciation for the complexity of this work. We commend their efforts to provide recommendations supporting improved processes and efficiencies and are pleased that the Auditor's Report found no major areas of concern. We look forward to implementing the Auditor's recommendations and improving our program.

In particular, we appreciate the report's finding that our Department project delivery costs are in line with those of other jurisdictions. In Public Works we operate similar to a private consulting firm, where every hour we spend working on a project is charged to that specific project, as opposed to being budgeted "off the top" into a separate account. This includes costs not only for our project manager, but also costs to ensure proper wage payments to construction workers, process payments to contractors, ensure quality of work and safety of the public through inspection of the final work products, and much more. The value of this industry standard methodology is that our stakeholders receive a true accounting of the actual costs to deliver a capital project in the City.

Public Works is responsible for planning, designing, and constructing the City's capital projects, including parks, municipal buildings, roads and bridges, sewers, and trails. Capital projects include construction of new public facilities or improvements or renovations to existing public facilities, and generally require extensive design work, or have special permitting requirements, all of which require input from Public Works capital project delivery teams. These teams develop engineering and architectural designs, conduct site surveys and materials testing, coordinate with project stakeholders, provide construction management and inspection services, and conduct general project management from project feasibility through close out. This centralization of the City's project delivery functions in Public Works enhances the efficiency and consistency across the city while the "client departments" maintain programmatic oversight and ownership to ensure

alignment with service delivery goals. The relationship between each client department and Public Works is different and unique and achieving the appropriate balance of responsibilities in each instance is important to successful project delivery.

Consistent with other priority-setting processes, the Council adopted a new framework for the Administration's response to Audit recommendations in May of 2015. As with other priority processes, the green, yellow and red light system is utilized to convey the Administration's operational readiness to undertake workload demands. Green items are either in the departments existing workplan or work already underway. Yellow items will take more than 40 hours of additional work including research and policy/ordinance development. In addition, yellow items are reviewed to determine alignment with department workplans, magnitude of effort, departmental capacity, and other relevant prioritized issues. Red indicates the item is not recommended or feasible (e.g., the item violates existing federal or state law, contradicts established Council policy or does not lie within the City's jurisdictional authority). The Administration's response to each of the Audit Report's ten recommendations is presented below employing the green, yellow and red light system.

In summary, the Administration concurs with the Auditor's recommendations. 9 recommendations are categorized as "green", and 1 is categorized as "yellow."

RECOMMENDATIONS AND RESPONSES

Recommendation #1: To better allocate training and non-project costs to capital projects, Public Works and the City Manager's Budget Office should appropriate a portion of capital staff time for such charges in the Public Works Program Support Fund (150), and allocate such costs to projects through the Public Works Cost Allocation Plan.

Administration Response: The Administration concurs with this recommendation. Allocating costs such as training and other non-project specific activities to the Public Works Program Support Fund, rather than charging directly to projects, will help isolate those costs. The cost allocation formulas are already in progress for 2018-2019. During this fiscal year Public Works will identify and track these types of charges with the intent of allocating these costs to the Fund during the budget development process for 2019-2020.

Green: The Administration will implement this recommendation

Target Date of Completion: July 2019

Recommendation #2: Public Works can better ensure that lessons learned improve future performance by:

a. **Ensuring that project completion reports containing lessons learned are distributed to department and client staff.**
b. **Regularly meeting with client departments to share lessons learned from projects,**

c. **Including standard language in the project completion report, following the lessons learned section, that ensures department manuals and project guidance are updated if necessary.**

Administration Response: The Administration concurs with this recommendation.

a. Public Works staff will integrate the distribution of lessons learned from project completion reports into the process and distribute the information to client departments. Project Manager training was initiated in June 2018 and the initial module of the training includes emphasis on lessons learned.

b. Public Works staff will include lessons learned as a standing agenda item with client departments at recurring monthly coordination meetings.

c. Public Works staff will create a checkbox in the project completion report to identify if the item will need to be included in the project management manual and training. September 2018 completion schedule. Public Works will also create a guideline to ensure the project completion report includes the "Solution" and "Impacts" for each lesson learned so that others can learn from past issues.

Green: The Administration will implement this recommendation

Target Date of Completion: January 2019

Recommendation #3: Public Works should provide project management training for implementation managers that covers general principles of project management as well as Department/Division procedures for managing projects through the various phases of project delivery.

Administration Response: The Administration concurs with this recommendation.

Project Manager training was initiated in June 2018 and contains various modules to address the general principals of project management as well as Department/Division procedures to manage projects through the various phases of project delivery. The initial round of Project Manager training is expected to be complete by September 2018, with annual training anticipated in July of each following year.

Green: The Administration will implement this recommendation

Target Date of Completion: December 2018

Recommendation #4: To ensure a more standardized and efficient capital project delivery process, Public Works should enhance CPMS reporting tools to aid implementation managers with tracking budget and schedule from feasibility through post-construction.

Administration Response: The Administration concurs with this recommendation. As noted in the audit report, staff is testing the first phase of a custom report portal that will be in production in the first quarter of Fiscal Year 2018-2019. This portal will provide implementation managers the ability to view their project performance in multiple ways in real time, removing the need for custom report generation by technical staff. The portal will allow users to extract the project information with the detail and breadth required by their role.

Green: The Administration will implement this recommendation

Target Date of Completion: December 2018

Recommendation #5: To support consistent project management delivery, knowledge transfer during staff turnover, and accessibility for future reference, Public Works should use a standard electronic file structure for capital projects and determine what files should be kept to ensure that key documents are maintained for each phase of the capital delivery process.

Administration Response: The Administration concurs with this recommendation. Public Works will develop an electronic file structure that can be used by capital project delivery teams that is compliant with City record retention policies and best practices to their relevant industries. Public Works will work with the Information Technology Department to include this file structure on the most appropriate platform to be useful and accessible to users and software that is both current and future ready. CPMS has some capability in this area already, however, each user group may have different software needs and reference file techniques that will require some effort to coordinate properly.

Green: The Administration will implement this recommendation

Target Date of Completion: July 2019

Recommendation #6: To ensure consistent project delivery, Public Works should:

a. **Update its project management manual using existing project management guidelines and checklists as well as current practices,**
b. **Expand the manual to include guidance for each project phase and include duties of all divisions that are responsible for project delivery, and**
c. **Establish a process to regularly review and update the manual as needed.**

Administration Response: The Administration concurs with this recommendation.

a. This effort is underway and will extend after the initial round of Project Manager training, as new information and issues may arise during the training. Access to the updated manual may benefit from computer server improvements for faster user access and possibly date/time stamping features to project checklists. December 2018 completion schedule.
b. This effort has already begun.

c. This effort has already begun.

Green: The Administration will implement this recommendation

Target Date of Completion: March 2019

Recommendation #7: Public Works should review and update its Standard Details and Specifications, in coordination with the City Attorney's Office and other departments, to ensure it contains up-to-date specifications, and establish a process to regularly review and update the manual as needed.

Administration Response: The Administration concurs with this recommendation. The Department has maintained an effort to review and update the Standard Details and Specifications for a number of years despite changing priorities and staff turnover. The difference between traditional "Public Works" projects and vertical building projects lends itself to two different written technical specification formats. Additionally, the 1992 Standards closely reflect those used by Caltrans. Staff will revisit the workload and provide a target schedule as the Audit response is completed.

Yellow: The Administration will implement this recommendation, however, due to the workload effort required, and a limited pool highly experienced staff needed to implement, an incremental process may be the most likely path to completion.

Target Date of Completion: December 2020

Recommendation #8: To improve its metrics used to assess performance, Public Works should:

a. Clarify that the performance metrics "on-budget" and "on-schedule" for capital projects refer to the construction phase of project delivery, and
b. Track the categories of change orders over time across all projects.

Administration Response: The Administration concurs with this recommendation.

a. Public Works will coordinate with client departments and include in future reports that the performance metrics of "on-budget" and "on-schedule" refer to the construction phase only of project delivery. Public Works will also coordinate with the City Manager's Budget Office to reflect this clarification in future Capital Budget documents.
b. Public Works will develop a list of typical change orders types and assign each change order to those categories for assessment and reporting across programs.

Green: The Administration will implement this recommendation

Target Date of Completion: March 2019

Recommendation #9: To improve the scope development process, Public Works should create, and require clients to submit, a comprehensive intake form that clearly identifies the project scope.

Administration Response: The Administration concurs with this recommendation. Public Works will collaborate with its client departments to develop a comprehensive intake form that gathers detailed information to develop the agreed upon project scope.

Green: The Administration will implement this recommendation

Target Date of Completion: July 2019

Recommendation #10: To improve coordination and understanding between Public Works and client departments, Public Works should create a standardized project planning document that includes: the scope, budget, and schedule, and identifies the services to be provided by Public Works as well as others. The project planning document should be signed by the client department and Public Works prior to beginning project design and saved in the project file.

Administration Response: The Administration concurs with this recommendation. Public Works will work with its client departments to develop a standard project planning document that gathers detailed information with a committed scope, budget, and schedule. The project planning document will be signed by the appropriate signatory of each department and saved in the project files developed from Audit Recommendation #5 and in coordination with Audit Recommendation #9.

Green: The Administration will implement this recommendation

Target Date of Completion: July 2019

This memo has been coordinated with the City Manager's Office and the City Attorney's Office.

Matt Cano
Director of Public Works

For questions, please contact Matt Cano, Public Works Director, at 408-535-8477.