SEATTLE OFFICE OF CITY AUDITOR

Date: April 10, 2017

To: City Councilmember Tim Burgess, Chair, Affordable Housing, Neighborhoods & Finance Committee
City Councilmember Lisa Herbold, Chair, Civil Rights, Utilities, Economic Development & Arts Committee
City Councilmember Kshama Sawant, Chair, Energy & Environment Committee
City Council President Bruce Harrell

From: David G. Jones, City Auditor

RE: Audit of New Customer Information System (NCIS) Implementation

This memo responds to questions posed by City Councilmember Tim Burgess about the implementation of the New Customer Information System (NCIS). In April 2016, the City Council received a briefing on the status of the NCIS project, a new billing system for Seattle City Light (SCL) and Seattle Public Utilities (SPU). The Council learned that the project was a year late and approximately $34 million[1] over budget. Some Councilmembers expressed concern about whether the Council was receiving timely and accurate information about the project's status.

Councilmember Tim Burgess asked our office to audit the implementation of NCIS to answer four questions: (1) Why did the project take longer than expected and go over budget? (2) Why wasn't project status communicated to the City Council on a timely basis, and what communication process improvements could be made? (3) How effectively did the project use the input of its Quality Assurance expert? (4) What were the key decision points for this project, including the dates of the original proposal, and Council approvals?

In this memo, we answer these questions, offer recommendations for future large City of Seattle (City) information technology implementation projects, and provide a brief update on the status of NCIS.

Summary of Findings

We found that the NCIS project took longer and cost more than originally estimated because of an unrealistic initial schedule, additions to the scope, project staff who were challenged by the project's size and complexity, and project leaders' decisions to prioritize quality over timeliness. The additional time these factors added to the project schedule – an increase of 11 months – resulted in increased labor costs for both City staff and the primary consultant on the project, Price Waterhouse Cooper

[1] This $34 million represents the difference between the January 2014 baseline budget of $66M and the anticipated $100M+ budget used when the Council was briefed in April 2016. The current NCIS budget is $109M, or $43M over the January 2014 budget.

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(PwC). As of December 31, 2016, these two budget categories accounted for most of the increase in project costs.

We identified three main reasons why the project's status wasn't communicated to the City Council on a timely basis: 1) there was no effective mechanism for regularly reporting the status of information technology (IT) development projects to the City Council, 2) the high degree of uncertainty underlying cost estimates at various stages of this large, complex IT development project was not transparent nor was it communicated effectively, and 3) the project's financial reporting was conducted for project management purposes, not to facilitate effective project oversight by elected officials and other stakeholders.

We found that the NCIS project team complied with City rules and protocols on the use of Quality Assurance (QA) experts, and that the NCIS QA expert was engaged in the project, was respected by project managers and team members, and worked collaboratively with project managers. However, the project's Executive Steering Committee could have acted more quickly to resolve or lower the assessed probability and impact of some of the 10 high risks identified by the QA expert during project implementation.

We provide a timeline showing key project decisions and formal communication by project officials with the City Council in Appendix A of this report. Below, we provide additional information on each of our findings, as well as recommendations to address some of them.

Question 1: Why did the project take longer than expected and go over budget?

Significant work was added to the project's original business case that increased its scope
Significant work was added to the project's original business case and this affected the project's schedule and cost. In May 2012, when SCL submitted the 2013-14 Budget Issue Paper that outlined the business case for the Consolidated Customer Service System (CCSS) Replacement project (i.e., what became NCIS), the preferred option was to implement a new application, Oracle's Customer Care & Billing (CCB) product. Total development and acquisition costs to implement this system, including a contingency, were estimated to be $43 million. However, by the time the utilities (i.e., SCL and SPU) advertised in April 2013 for the project's System Integrator[2], four other Oracle-based applications had been added to the project's scope: Customer Self-Service (CSS), Business Intelligence (BI), Meter Data Management (MDM), and Smart Grid Gateway (SGG).

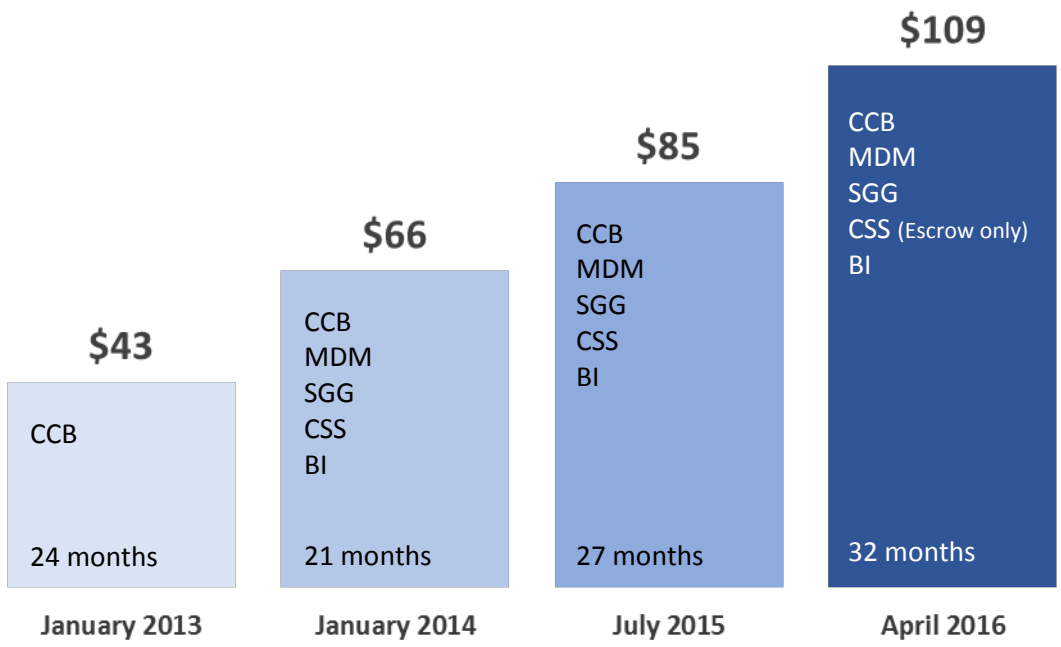
Further, project complexity increased after PwC signed a contract to serve as the System Integrator. For example, the Executive Steering Committee (ESC)[3] decided early in the design process to retain separate customer bills for each utility. This meant the project team had to build two structures within CCB to handle two different sets of customer accounts. Other key decisions that occurred early in the project and affected scope included the replacement of the system used to print utility bills, the

[2] A systems integrator is a person or company that specializes in bringing together component subsystems into a whole and ensuring that those subsystems function together, a practice known as system integration.
[3] The ESC was established by the Project Charter in March 2014. Its duties are to set priorities, approve scope, and help resolve any major issues that cannot be resolved at lower levels. Gartner's 2017 report on *Emerging and Best Practices in Public Sector IT Management* (Gartner Report) points out that ESC effectiveness is a key driver for project success, and states that to successfully execute their duties, ESC members should receive training or have experience in key areas, for example: financial management, change management, and risk management.

implementation of an Identity Management application throughout SCL, and the implementation of Service Oriented Architecture (SOA) at SCL and SPU.

Exhibit I compares four NCIS project budgets over time, with their corresponding scopes and schedules: 1) the January 2013 budget based on the original business case for CCB only, 2) the January 2014 revised budget at project initiation, which includes four additional applications, 3) the July 2015 re-baselined budget, revised at the end of the project's design phase, and 4) the April 2016 re-baselined budget, revised at the end of the project's construction phase after first execution of test scripts was completed.

Exhibit I. Increase in NCIS project scope and cost (in millions)



Source: Office of City Auditor analysis of NCIS project documents.

The following definitions explain the acronyms used in Exhibit I.

CCB – Customer Care and Billing, the customer information system the utilities implemented
MDM – Meter Data Management, a software program where all meter data is stored and validated for billing
SGG – SmartGrid Gateway, serves as an interface between the automated meters and MDM
CSS – Customer Self Service, the customer-facing website portal
BI – Business Intelligence, provides analytic tools for utility billing data

The project's initial schedule was aggressive and overly optimistic
In the original business case, the schedule for implementing just the CCB application was 24 months, plus six months' post implementation support. The schedule was then reduced to 21 months based on proposals received from System Integrator applicants, even though at this point the project had expanded to include four additional applications. One PwC spokesperson told us the project schedule was discussed in depth during contract negotiations, at which time both parties (the City and PwC) agreed to go with an "aggressive" timeline to save costs. Many of the NCIS managers we interviewed

told us they later realized this schedule was unrealistic given the size and complexity of the project and the City IT personnel available to staff it.

Further, industry experts told us that it is difficult to accurately estimate schedule and cost for large Customer Information System (CIS) projects that involve more than one organization and application, such as NCIS, especially in a project's early phases. This is true for several reasons: 1) large scale CIS applications involve significant design work, making it difficult to predict the resources and time needed for future project phases; 2) CIS applications are built to incorporate a wide range of options, practices, and processes, and project managers may not know early on which of these options they will need for their business purposes; and 3) system needs vary widely among utilities, making it challenging to benchmark against similar projects.

Although we gathered high level information from other utilities that have implemented CCB, we found that no two implementations were alike in terms of scope, schedule, and budget. This difficulty in benchmarking against similar projects is another factor that hampered NCIS project managers' ability to estimate costs accurately.

Gartner, an information technology research and advisory company, said in their 2017 report on *Emerging and Best Practices in Public Sector IT Management* (Gartner Report) that "setting realistic investment expectations" is one of the five essential factors for successfully implementing and planning large scale IT projects in the public sector. They explain that, in their experience, many government organizations try to reduce project costs by negotiating lower software license fees and cutting the budget for project implementation and management, change management, and training. However, rather than view these areas as expensive overhead, Gartner recommends organizations consider them "vital components of success."

Managers and staff were challenged by the size and complexity of the project

The NCIS project was a large and complex IT implementation project. Below, we describe some of the factors that made it complex and summarize them in Exhibit II.

1. NCIS had to assist in managing core business operations and customer service functions, and provide billing services for two utilities—Seattle City Light and Seattle Public Utilities—that are separate departments. These two departments provide different services, address different customer needs, and have different business cultures and management structures.
   One of NCIS' guiding principles[4] was to minimize customization (i.e., avoid modifying the original software). To accomplish this goal, the two departments invested additional time aligning their business practices to the extent possible. Additionally, representatives from both utilities had to review and approve each step of the project, and PwC had two sets of customers to satisfy. All these factors contributed to decision-making processes that often took longer than anticipated.

2. NCIS' final statement of work included five applications: Customer Care and Billing, Meter Data Management, SmartGrid Gateway, Customer Self-Service, and Business Intelligence. Project managers told us that it was challenging to manage the implementation of all these applications simultaneously.

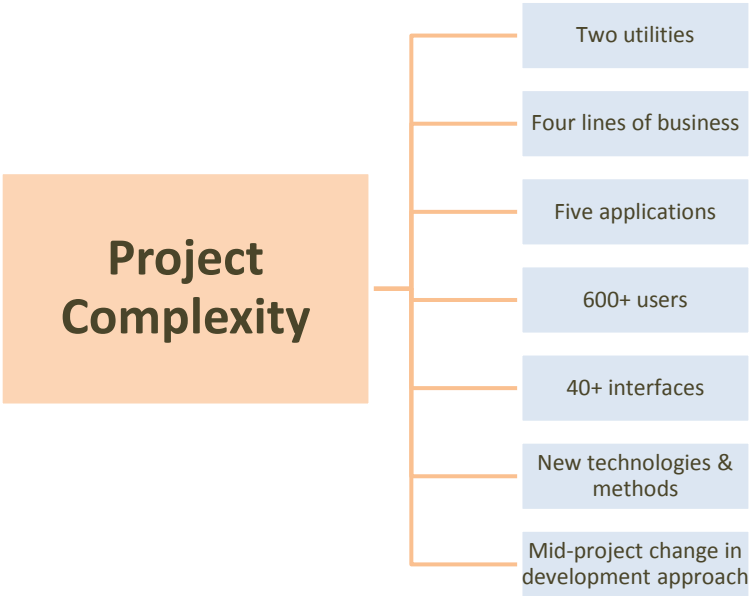
[4] The five guiding principles of the NCIS project were to: 1) improve customer satisfaction, 2) improve employee experience, 3) standardize and align operations, 4) embrace industry leading practices, and 5) leverage base applications and minimize customizations.

3. NCIS had to address four different lines-of-business (electric, water, waste water, and solid waste), while keeping revenues streams separate.

4. City staff were using new technologies and methods and realized that the project's scope was beyond anything the utilities had done before. Additionally, some City team leads had little or no project management experience or experience with implementing a new IT system, let alone one of this scale. While City IT staff were provided with some training, it focused primarily on an overview of new software applications. Their only opportunity to gain more in-depth experience with these applications was through on-the-job training. One City IT project manager told us that particularly challenging areas included using new technologies, such as the Service Oriented Architecture (SOA) for the interfaces and the updated version of the Oracle platform used by some of the applications.

5. A mid-project change in development approach, done to reduce slippage in the project schedule, strained resources by increasing the workload for some staff. The project began by using a sequential or waterfall development approach, which required exit and entry criteria to be satisfied before the team could move on to the next project phase. During testing, project leaders authorized the use of an iterative approach to allow work to begin before all tasks in the previous phase were complete. This created workload challenges for some project teams. For example, at one point in the project, the functional team was simultaneously doing design work, testing procedures development, and reviewing training material. Similarly, the IT team was working simultaneously on functional designs, construction, and testing.

Exhibit II. Factors affecting NCIS project complexity



Source: Office of City Auditor analysis of NCIS project documents.

Project leaders intentionally prioritized quality
At key points, project leaders intentionally chose quality—i.e., ensuring that the system would produce timely and accurate bills, and not have a negative impact on customers or City revenues—over meeting project deadlines. While project staff dealt with scope complexities (see Exhibit II), project leaders authorized two major schedule adjustments to allow sufficient time to work through issues. Specifically, in June 2015 the Go-Live date was changed from October 2015 to April 2016, and in April 2016, the Go-Live date was extended a second time to September 2016. Project leaders approved these extensions to allow the project team time to perform the testing needed to give them confidence in the system's performance. Project sponsors and managers told us that their decisions related to prioritizing quality over timeliness were influenced by other jurisdictions' negative experiences implementing the same customer information system (CCB). Specifically, they did not want to repeat what happened at the Los Angeles Department of Water and Power, whose premature launch of its CIS system was blamed for a revenue shortfall of $681 million due to customer confusion over late and estimated bills.

Changes in project schedule and scope impacted project cost
Each extension of the Go-Live date meant that both City staff and consultants worked additional time on the project, which resulted in greater labor costs. As of December 31, 2016, these two budget categories accounted for most of the increase in project costs.

Exhibit III shows a breakdown of NCIS project costs as of December 31, 2016, by major cost category. After covering some expenses with $11 million set aside as "management reserve" and $4 million for an item removed from scope (Release Migration[5]), the project was $24 million over the original budget developed in January 2014 at project initiation. Specifically:

- The utilities spent almost three times more on City labor than originally budgeted.
- The utilities spent a third more on PwC than originally budgeted.
- The utilities decided to capitalize Oracle license maintenance costs during project implementation, which contributed to software expenditures being about two thirds over budget.
- The total amount the City expects to pay PwC by the end of the project is $49 million, an increase of $16 million over the original contract amount.

It is important to note that Exhibit III below does not represent final project costs. NCIS costs will increase as the project team continues to accrue capital expenses through the end of project stabilization (March 2017). Further, although these figures are very close to actual expenditures, they may not be entirely accurate as it was challenging to gather expenditure data summarized by the budget categories used by the utilities. This was primarily due to the complex and at times inconsistent processes used to account for project reimbursements between the utilities as part of a cost sharing agreement. We were informed that utility accountants plan to do an end of project reconciliation exercise at the end of the project. This complication in comparing actual expenses to the budget strengthens our finding that NCIS would have benefited from a dedicated finance analyst (see Recommendation 3).

For this analysis, we considered the January 2014 budget of $66 million in place at project initiation as the original budget, and used it to compare to actual expenditures. Project managers officially re-

[5] According to an NCIS project manager, Release Migration was a placeholder in early project estimates in anticipation of a future software upgrade. It was removed when the budget was revised in July 2015.

baselined the budget twice when new Go Live dates were formally approved by the ESC. See Appendix B for a chart showing these increases.

Exhibit III. NCIS capital project budget and costs as of December 31, 2016 ($)

	QA	PwC	Consultant Services	Misc	Labor	Software	Release Migration	Infra-structure	Mgt Reserve	Total
Budget *Jan 2014*	598,650	32,800,000	Not Budgeted	Not Budgeted	12,000,000	5,417,747	4,000,000	500,000	11,063,279	66,379,676
Actual Costs *Dec 2016*	757,380	43,652,807	3,486,335	740,588	32,682,603	9,176,760	N/A	536,643	N/A	91,033,116
Budget-Actual Costs	(158,730)	(10,852,807)	(3,486,335)	(740,588)	(20,682,603)	(3,759,013)	4,000,000	(36,643)	11,063,279	(24,653,440)
% of Budget	127%	133%	N/A	N/A	272%	169%	N/A	107%	N/A	**137%** ***Dec 2016***

Source: Office of City Auditor analysis of financial data and NCIS project documents.

Question 2: Why wasn't project status communicated to the City Council on a timely basis, and what communication process improvements could be made?

There was no effective mechanism for reporting the status of IT development projects to the City Council

The utilities relied on the City's budget approval process to communicate Capital Improvement Program (CIP) budget updates to the City Council, and this did not adequately highlight the budget changes or communicate project status and risk.

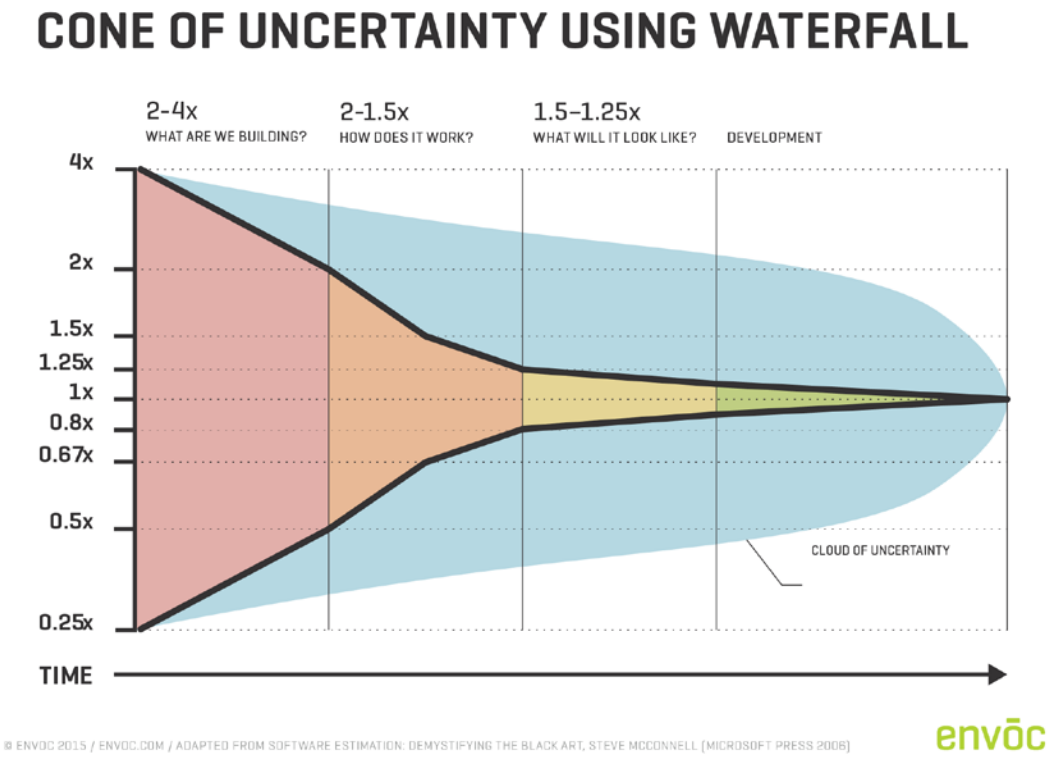
Although increases in the NCIS budget were included in CIP reports given to Council, they were difficult to track because they were divided between the two utilities' budgets, were not called the same thing by each utility, and for SPU, included more than just the NCIS project. Given the magnitude of the utilities' overall CIP budgets, individual capital improvement projects can get "lost" or seem insignificant. For example, in the 2012-17 CIP budget, SCL's "CIS" project was $20 million out of a $1.51 billion six-year department budget (1 percent), and SPU's "CCB" project was $38 million[6] out of a $1.12 billion budget (3 percent).

The high degree of uncertainty underlying cost estimates at various stages of large, complex IT development projects is not transparent nor communicated effectively to elected officials

Another factor that hampered effective communication about the NCIS project costs was that cost estimates for large CIP projects are often very uncertain at early stages of a project. This is sometimes referred to as the "cone of uncertainty" – the tendency for project cost estimates to be widely variable at the beginning of a project and generally become more certain over time. Exhibit IV is one example of a cone of uncertainty for an IT development project using a sequential, or waterfall, approach (like the one used by NCIS). As can be seen in this chart, costs can be very uncertain during the first stages and gradually become more certain over time.

[6] In SPU's 2012-2017 Adopted CIP, this figure represents what is reported under Customer Contact & Billing. Although this budget category includes multiple information technology projects, the budget is not broken down by individual project, so there is no way to tell what should be attributed to CCB.

Exhibit IV. Cone of uncertainty for IT development projects



Source: http://envoc.com/think/the-envoc-agile-glossary

The concept of cost uncertainty during early stages of a project is particularly relevant for IT projects due to the amount of design work that occurs after the project has begun. However, this lack of confidence in early stage budget estimates is not always pointed out to elected officials when CIP budgets are submitted. Based on our review of official, public communications with the City Council, this was true for the NCIS project.

In the case of NCIS, the inaccuracy of project cost estimates was exacerbated by three factors:

1. The original $43 million budget was based on an initial set of business requirements and a smaller scope of work.
2. The initial business requirements were two years old before the project officially began (i.e., the initial requirements didn't account for changes in business processes or IT applications that occurred during that period).
3. The January 2014 re-baselined budget was developed before the utilities decided on the final business requirements; these requirements were needed to determine the final design of the application.

To improve communication and transparency about project budgets, some entities communicate budget requirements to their stakeholders using a Stage Gate review approach,[7] which divides the budget review process into different stages based on budgeting confidence levels.

The project's financial reporting was conducted for project management, not oversight by elected officials and stakeholders

Another barrier to transparent communication about real-time project costs was that the project's financial reporting was conducted for project management purposes, not for external oversight. In other words, project managers tracked costs to determine current cash flow needs, forecast expenditures, and ensure that they did not exceed the project's approved budget authority. Project managers and staff told us they were primarily concerned about what was charged against PwC's fixed price contract and whether the CIP funding in the utilities' approved budgets was going to be enough to cover forecasted project costs. Project managers also told us that they managed the reimbursement activities to satisfy cost sharing between the two utilities. However, this cost sharing added a layer of complexity to the project's financial reporting, and as discussed earlier, we had difficulty independently verifying project costs and comparing them to the original budget because expenditure data was not categorized consistently.

While the NCIS financial reporting may have been sufficient to satisfy the needs of the Executive Sponsors and for project managers to monitor each department's CIP budget authority, this reporting was not designed with external oversight in mind. For large multi-department projects, financial reporting that compares the project initiation budget to actual expenditures is essential to provide transparency to elected officials and stakeholders. Departments should anticipate and plan for budget reporting expectations, ensure accounting processes align, and allow for simple expenditure summaries at any given point in time. Large IT projects, especially when more than one department is involved, would benefit from having a dedicated finance analyst on the project team responsible for consistent budget monitoring and reporting and ensuring ease of accurate verification of costs.

Further, there was a time lapse between when cost increases were recognized by the project team and when they were formally communicated. When it became apparent that to deliver a quality system, additional testing and time was necessary, the ESC authorized a comprehensive re-planning effort. According to NCIS project managers, understanding impacts to scope, schedule, and budget took several months. Only when these re-planning efforts were approved by the ESC were the results formally communicated.

Recommendation 1:

Given the recent consolidation of most of the City's information technology units into one centralized department, the responsibility for reporting to the Seattle City Council on the status of IT projects should be assigned formally to the City's Chief Technology Officer. This can be specifically defined in SMC 3.23.030 to include regular reporting periods.

[7] For example, possible stages could be: 1) conceptualization, 2) business case, 3) detailed planning, and 4) execution. For more information on what occurs in each of these stages, see page 32 of the Gartner report.

Recommendation 2:
To increase transparency in the Capital Improvement Program budget process, we recommend that the Chief Technology Officer develop a method for communicating the uncertainty of budget estimates in the early phases of large information technology projects when the budgets for these projects are discussed with the City Council.

Recommendation 3:
To ensure that cost data is sufficiently and consistently tracked and documented to allow for improved oversight and comparison to budget, Executive sponsors of large (e.g., over $50 million) City information technology development projects should assign a dedicated finance analyst as part of their project management team. As noted above, this is particularly important for IT projects that span multiple departments.

Question 3: How effectively did the project use the input of its Quality Assurance (QA) expert?

We found that the NCIS project team complied with City rules and protocols on the use of QA experts. However, the ESC and Project Management Office (PMO)[8] could have acted more quickly to resolve or lower the assessed probability and impact of some of the high risks the QA expert identified or they could have formally accepted the risk.

The NCIS project team complied with City rules and protocols in that they completed the Municipal Information Technology Investment Evaluation (MITIE) form and review, hired a quality assurance consultant, received monthly written reports and briefings from the QA consultant, and submitted monthly status reports and the QA reports to the Information Technology Department's MITIE lead, as required. We also found that the QA expert was engaged in the project, was respected by project managers and team members, and worked collaboratively with project managers.

As of December 31, 2016, the QA consultant had identified 55 risks to the project, including 10 considered to be high risks. Some of these high risks could be resolved only at the department level and were not within project leaders' control. For example, the impact of two risks—competing/dependent projects (open for 36 months), and SCL technical resource constraints (open for 28 months)—were related to the utilities' management of its portfolio of IT projects and were not within the ESC or project managers' control.[9]

[8] The Project Management Office (PMO) consisted of two City project managers (one from SCL and one from SPU), and the consultant's (PwC's) project manager.

[9] The competing/dependent projects risk refers to the number of City and utility IT projects that were taking place at the same time as NCIS. These projects posed challenges to NCIS for two reasons: 1) they included components that needed to be considered, integrated, and/or coordinated with NCIS; and 2) they used IT resources that were needed by NCIS. The SCL technical resource risk refers to the lack of specific skills and abilities among SCL technical staff—for example, knowledge of or experience with the SOA application--and to the sufficiency of the IT resources assigned to the project (i.e., not enough IT staff assigned to NCIS or those assigned were not dedicated to the project full-time). Because the NCIS team was not responsible for scheduling utility or Citywide IT projects, nor for assigning IT resources among them, addressing these risks was not within their control.

However, the ESC and PMO could have acted more quickly to resolve or lower the assessed probability and impact of six of the other eight high risks identified by the QA expert.[10] While it was clear from our review of ESC meeting minutes that ESC members and project managers were aware of these risks, the actions taken to address them did not result in a timely reduction of risk to the project. For example, in August 2014, the QA expert noted that the project's construction schedule would be delayed or the quality of the work would suffer due to workload that was too high for the project's existing resources. Although the QA expert reported on the status of this risk in all 13 of his subsequent monthly reports, including recommending mitigation or treatment plans, the risk remained open--i.e., not reduced--for 14 months. The QA reports document that although City and PwC project leaders were aware of this risk and trying to address it, their actions were not sufficient to reduce the impact of the risk on the project's schedule. In fact, in May 2015, the QA expert noted in his report that "this issue has been the root cause for slippage in many other areas of the project and is the primary driver for the decision to re-plan the Go-Live date."

NCIS project managers could have facilitated ESC decision making by prioritizing and emphasizing high risks identified by the QA expert and offering options for addressing them. According to the Gartner Report, one of the key responsibilities of the project leadership team is to "report on the status and escalation of critical risks to Executive leadership." The report also notes that "typically, when issues are raised to the ESC, a recommendation from the project team endorsed and presented by the project manager should accompany it." We determined that the NCIS project managers could improve the methods used to prioritize QA risks and document the actions taken to address them.

Recommendation 4: Information Technology project managers, both City managers and consultants, if applicable, should be responsible for monitoring and tracking quality assurance risks, and presenting the Executive Steering Committee with options to address them.

Recommendation 5: The Executive Steering Committee should be held accountable on information technology projects for resolving or lowering high risks identified by the quality assurance expert in a timely manner.

Question 4: What were the key decision points for this project, including the dates of the original proposal, and the City Council approvals?

See Appendix A for a timeline of key project decisions and formal communications to the City Council. As the timeline demonstrates, the normal CIP budget approval process did not coincide with budget changes in the NCIS project; therefore, schedule changes and cost overruns were not always communicated to Council in a timely manner.

Current Project Status

The NCIS project has completed its sixth month of the project stabilization period. Capital costs are still being charged to the project as some final invoices are pending. Project managers told us that they do not expect the final cost to exceed the current project budget of $109 million.

[10] One high risk was closed timely (within 28 days) and another was only considered high risk for one month, after which it was lowered to medium and low risk.

Additionally, NCIS project managers told us that in 2017 SPU's and SCL's General Managers and the City's CTO decided to expand the scope of the Customer Self Service application (i.e., Customer Portal) to include compliance with the Americans with Disabilities Act (ADA) and Single Sign-On with KUBRA, the utilities' eBilling and ePayment vendor. Planning for this scope change, including its schedule and budget impacts, is underway. This effort will be managed as a separate project under the NCIS program.

Department Response

Seattle City Light, Seattle Public Utilities and the Information Technology Department reviewed a draft copy of this report, and concurred with our findings and recommendations. Copies of the written comments provided to us by SCL, SPU and the Information Technology Department are included as Appendix C to this report.

Scope and Methodology

To gather information about the NCIS project, we reviewed project documentation, including: the original business case, options analysis, and risk assessment, the request for proposal for the project's System Integrator, the contract with PwC, the Project Charter, the independent QA reports, and all Change Requests.

To gather different perspectives on the project, we interviewed: ESC members, the Executive Sponsors, all three project managers, some project team leads, and the QA expert. We observed two ESC meetings, a Stakeholder's meeting, and a defect management meeting.

To verify the project's reported costs, we independently downloaded all NCIS capital expenditure data from Summit, the City's financial system, and worked with both utilities to review and categorize the data. We then compared the expenditure data to the project's January 2014 project initiation budget, provided to us by the utilities.

To verify that the project complied with City rules and protocols related to Information Technology (IT) project oversight, we reviewed the City of Seattle's IT policy related to Project Portfolio and Quality Assurance (December 10, 2013) and assessed whether the project met Municipal Information Technology Investment Evaluation (MITIE) requirements. To analyze the risks identified by the independent QA expert consulting on the project, we reviewed each QA report in detail and calculated the difference between the date each risk was opened and the date it was closed. We then calculated the average and median number of days the risks were open for all risks and high risks.

To verify what Seattle City Councilmembers were told about the NCIS project during formal briefings, we worked with the City Clerk's office to identify when briefings that could have discussed the project had occurred. We then listened to audio tapes or viewed video tapes of these sessions and documented whether the project was discussed and if so, what was reported about it. We also reviewed all related briefing documents and relevant CIP budgets.

To gather information on large public sector IT project management best practices, we contracted with an IT consulting firm, Gartner, Inc., to provide industry expertise and perspective throughout the audit. We also interviewed the City of Seattle's current and former Chief Technology Officers and an IT project manager with experience managing successful projects for the City. Finally, to obtain basic

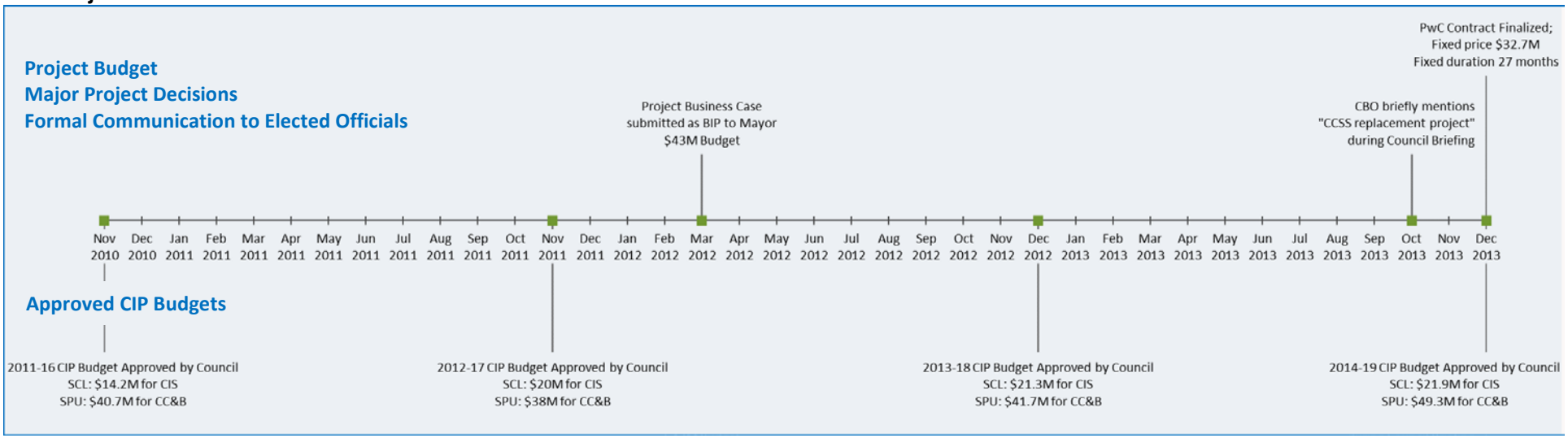
benchmarking data, we contacted six jurisdictions that recently implemented the same Oracle customer information system.

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.

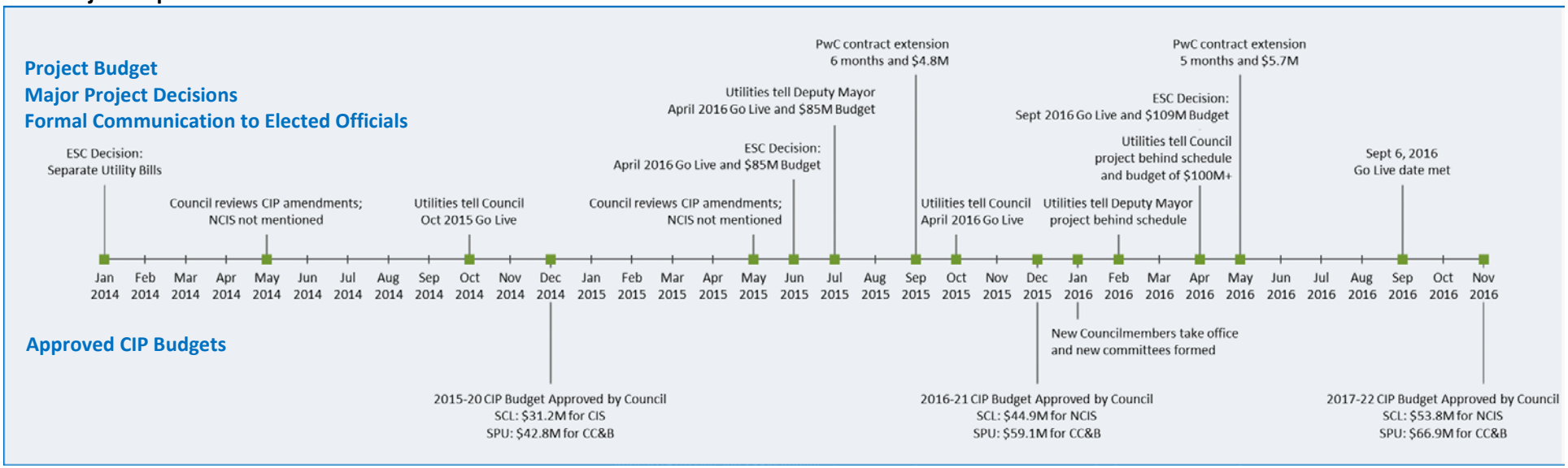
Appendix A

Note: The *NCIS Approved CIP Budgets* do not match the *NCIS Project Budgets* because: 1) SPU's CC&B budget category includes several projects in addition to NCIS, and 2) the NCIS project budget was updated outside the City's CIP process as the project became more fully developed and costs more certain.

NCIS Project Initiation Timeline 2010 – 2013



NCIS Project Implementation Timeline 2014 – 2016



Source: Office of City Auditor analysis of CIP documents and NCIS project documents. The CIP Budget figures shown in these timelines are what was reported by year in the utility's approved CIP budget. These amounts reflect the current year and a five-year forward projection. Actual expenditures from prior years are not considered in each year's request for new budget authority.

Appendix B

NCIS Rebaselined Budgets

January 2013 Draft Budget Based Upon Langham Business Case CCB Only	2013	2014	2015	Total
SCL Share of Draft Budget	6,000,000	9,054,500	6,476,500	**21,531,000**
SPU Share of Draft Budget	6,000,000	9,054,500	6,476,500	**21,531,000**
Total Draft Budget	**12,002,013**	**18,111,014**	**12,955,015**	**43,062,000**

January 2014 Budget at Project Initiation CCB, MDM, SGG, OUA, OUCSS	Mgt Res	QA	PwC	Labor	Software	Release Migration	Infra-structure	Total	Increase
SCL Share of Initiation Budget	6,195,913	299,325	18,550,000	6,400,000	3,480,242	2,000,000	250,000	**37,175,480**	15,644,480
SPU Share of Initiation Budget	4,867,366	299,325	14,250,000	5,600,000	1,937,506	2,000,000	250,000	**29,204,197**	7,673,197
Total Budget at Project Initiation	**11,063,279**	**598,650**	**32,800,000**	**12,000,000**	**5,417,747**	**4,000,000**	**500,000**	**66,379,677**	23,317,677

July 2015 Rebaselined Budget End of Design	Mgt Res	QA	PwC	Labor	Software	Infra-structure	Misc	Total	Increase
SCL Share of Rebaselined Budget	2,000,000	400,000	20,700,000	15,000,000	4,800,000	500,000	1,500,000	**44,900,000**	7,724,520
SPU Share of Rebaselined Budget	2,000,000	400,000	18,100,000	14,000,000	3,600,000	500,000	1,500,000	**40,100,000**	10,895,803
Total Rebaselined Budget	**4,000,000**	**800,000**	**38,800,000**	**29,000,000**	**8,400,000**	**1,000,000**	**3,000,000**	**85,000,000**	18,620,323

April 2016 Rebaselined Budget End of Construction and First Execution of All Test Scripts	Labor	PwC *	Services	Infra-structure	Software	Misc	Int/Rent	Mgt Reserve	Total	Increase
SCL Share of Rebaselined Budget	17,850,000	26,050,000	3,750,000	350,000	5,400,000	200,000	1,500,000	2,000,000	**57,100,000**	12,200,000
SPU Share of Rebaselined Budget	17,850,000	21,250,000	3,750,000	350,000	5,400,000	200,000	1,500,000	2,000,000	**52,300,000**	12,200,000
Total Rebaselined Budget	35,700,000	47,300,000	7,500,000	700,000	10,800,000	400,000	3,000,000	4,000,000	**109,400,000**	24,400,000

Source: Seattle Public Utilities

*Reflects $4.8M higher cost sharing for SCL due to MDM cost sharing agreement

Appendix C

Department Response

City of Seattle

March 3, 2017

David G. Jones
Office of City Auditor
City of Seattle
700 5th Avenue, Suite 2410
Seattle, WA 98124

Dear Mr. Jones,

Thank you for allowing Seattle City Light (SCL), Seattle Public Utilities (SPU), and Seattle Information Technology Department (ITD) the opportunity to respond to the City Auditor's Audit of the New Customer Information System (NCIS) Implementation.

The NCIS implementation program was a generational opportunity to replace one of the City's most critical systems. Despite replacing this system only once every ten to fifteen years, the team delivered a system with fewer implementation issues than other similar utilities. Today, customers are receiving timely and accurate bills. The Executive Steering Committee acted on information and lessons learned from other utilities throughout the project to ensure quality.

SCL, SPU, and ITD took seriously our respective responsibilities for the implementation of NCIS.

We recognized the need to work closely together, and to maintain clear lines of communication with the Mayor and City Council. We have carefully reviewed the audit report and concur with the findings and recommendations. While we believe the existing city procedures and mechanisms for regular reporting and communication were followed, there is an opportunity for improvement.

Our comments as they pertain to the recommendations from the audit are as follows:

- With the consolidation of IT in April 2016, ITD has visibility into IT projects across the City. Shortly after consolidation took place, the City's Chief Technology Officer began submitting a monthly report to Council with the status of IT projects, including key risks and issues. ITD is in the midst of its "Critical IT Processes" project, which will further refine this reporting process and the City's IT project portfolio by June 2017. (Recommendation 1)

- ITD is implementing a project stage gating process that refines budget estimated from initial project conceptualization to execution, as suggested by the audit. Seeking budget approval in phases is also being initiated for some technology projects. The budget for a design phase can be set, and then later inform the budget for a subsequent execution phase. While these changes will increase transparency and confidence in planning efforts, ITD recognizes additional effort will be required to standardize and enhance the project management methodologies inherited from the 15 IT teams through IT consolidation and anticipates beginning this work in 2018. (Recommendation 2)

- For large City IT development projects the Executive Sponsor will assign a dedicated finance analyst as a part of their project management team. (Recommendation 3)

- As new projects emerge within the three departments the findings of the audit will be considered in the planning and execution of these efforts. Additional consideration will be given for improving the tracking of QA risks, accountability, and mitigation plans with an emphasis on timely decision making. (Recommendations 4,5)

Thank you for affording SCL, SPU, and ITD the opportunity to comment on this report. Please do not hesitate to contact us with any questions regarding this response.

Sincerely,

Larry Weis	Mami Hara	Michael Mattmiller
SCL General Manager	SPU General Manager	Chief Technology Officer

Appendix D

Office of City Auditor Mission Statement

Our Mission
To help the City of Seattle achieve honest, efficient management and full accountability throughout City government. We serve the public interest by providing the City Council, Mayor and City department heads with accurate information, unbiased analysis, and objective recommendations on how best to use public resources in support of the well-being of Seattle residents.

Background
Seattle voters established our office by a 1991 amendment to the City Charter. The office is an independent department within the legislative branch of City government. The City Auditor reports to the City Council, and has a four-year term to ensure her/his independence in deciding what work the office should perform and reporting the results of this work. The Office of City Auditor conducts performance audits and non-audit projects covering City of Seattle programs, departments, grantees, and contracts. The City Auditor's goal is to ensure that the City of Seattle is run as effectively, efficiently, and equitably as possible in compliance with applicable laws and regulations.

How We Ensure Quality
The Office's work is performed under the Government Auditing Standards issued by the Comptroller General of the United States. These standards provide guidelines for audit planning, fieldwork, quality control systems, staff training, and reporting of results. In addition, the standards require that external auditors periodically review our office's policies, procedures, and activities to ensure that we adhere to these professional standards.