



Streetcar cost review

Initial Summary

City of Seattle

Center City Connector project

August 2018

Streetcar Cost Review

Project Background

In 2012, SDOT began the C3 project with \$900,000 of funding from the Federal Transit Administration (FTA) to perform a transit alternative analysis. In late 2015, the Project team developed a full Project cost estimate totaling \$143.2 million that included adopted Capital Improvement Program (CIP) budgets for Seattle Public Utilities' (SPU) water, drainage, and wastewater work as well as Seattle City Light's (SCL) work, increasing to \$166.5 million in August 2016.

In fall 2016, this budget was submitted to the FTA for the Small Starts Grant Agreement (SSGA) process, which increased the budget to \$177 million primarily for FTA required contingency. At this time, the full project cost estimate totaled \$197.7 million in the Capital Improvement Program (CIP) budget which included additional utility work by Seattle Public Utilities' (SPU) and Seattle City Light (SCL). In March, an initial analysis by Seattle Department of Transportation (SDOT) and the City Budget Office (CBO) showed higher estimates for the project. At that time, the independent review of the costs began.

Also, in March 2018, the local press identified that SDOT and King County Metro (KCM), the City's streetcar operator, had a significant difference in the estimated annual cost to operate and maintain the expanded streetcar system. SDOT had estimated O&M costs of approximately \$16 million per year, while KCM's estimated annual operating costs at approximately \$24 million. The differences between the two operating cost estimates are being reconciled by SDOT and KCM.

As a result of the identification of the additional unfunded costs and the difference in the operating costs, a stop work order was issued for the Project on March 30, 2018 and the City began a study of the Project costs and risks. As of April 2018, the Project had committed over \$90 million and spent over \$31 million across multiple contracts for design, construction, vehicle purchase, and Project support.

Streetcar Cost Review

Project background (continued)

Existing system overview

The Seattle Streetcar System currently operates two separate Streetcar lines, designated as the South Lake Union Streetcar (SLU) and the First Hill Streetcar (FHS). These two, separate lines, have been in operation since 2007 and 2016, respectively. The two lines serve a population along 3.8 miles of combined operation, utilizing a vehicle fleet of 10 Inekon rail cars.

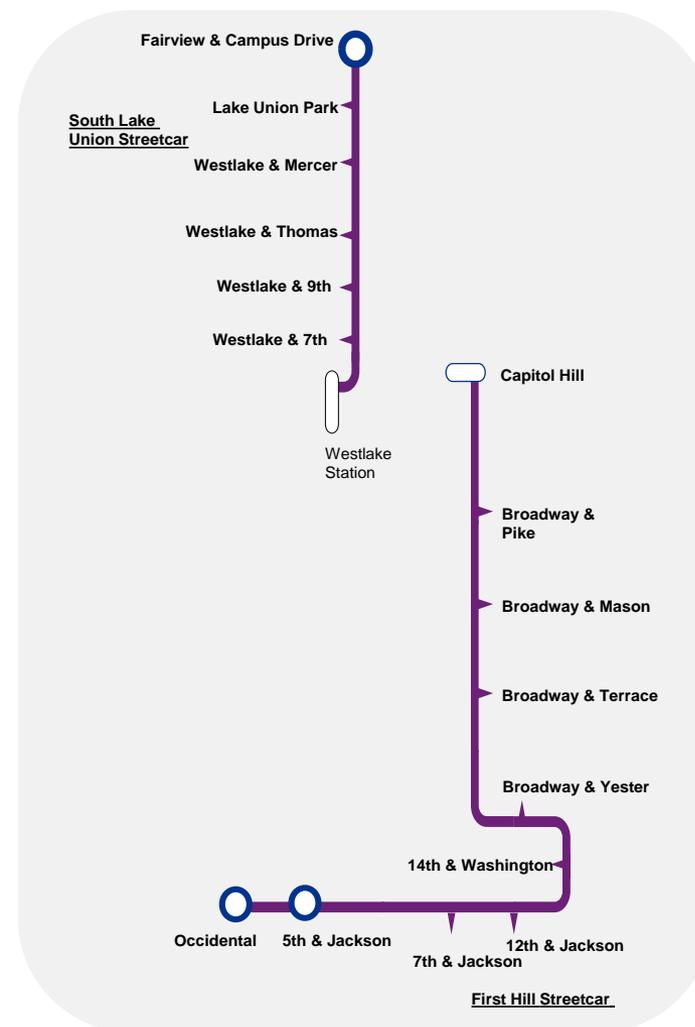
The two existing Streetcar lines were constructed in attempts to develop and expand growing business and residential hubs, while also providing an alternate transportation option to local commuters and business employees. These two lines were independently sponsored and funded through various fund sources, including local property owner contributions, Interlocal agreements, and state/federal contributions.

The SLU and FHS lines are both owned by the City and operated by KCM. This relationship has been detailed in the 2014 *Amended and Restated Interlocal Agreement between the City of Seattle and King County regarding the Seattle Streetcar (ILA)*. This document details the respective roles and responsibilities of the partnership. The ILA also serves as an estimate for anticipated Streetcar revenue and costs. The document identifies a schedule of values and payment structure for the partnership, based on these estimates and actual KCM costs, through the expiration of the ILA in December 2019.

Actual costs submitted by KCM as part of a reconciliation process in 2015-2017 have substantially exceeded the costs projected in the ILA in 2014. Likewise, actual ORCA fare revenue reported by King County have come in below the ILA estimates.

To address the differences, KCM is submitting reconciliation requests, per the ILA agreement, for additional funding. These supplemental funding payments will be addressed later in this report. In addition, coordination will be required between SDOT and KCM for any future operating plan and system expansion decisions.

Based on the Seattle Streetcar system characteristics reviewed for this report, and benchmarked data from other streetcar systems around the country, the SDOT operating costs appear to be reasonable. The forecast operating costs reflected throughout this report represent a reasonable starting position for continued operating plan discussions between KCM and SDOT.



Streetcar Cost Review

Project background (continued)

Historic data 2013-2017¹

Line	Year of annual operation (\$ millions)																			
	2013				2014				2015				2016				2017			
	Revenues ¹	Operation cost	Net operating deficit	Cumulative operating deficit	Revenues ¹	Operation cost	Net operating deficit	Cumulative operating deficit	Revenues ¹	Operation cost	Net operating deficit	Cumulative operating deficit	Revenues ¹	Operation cost	Net operating deficit	Cumulative operating deficit	Revenues ¹	Operation cost	Net operating deficit	Cumulative operating deficit
SLU	\$1.4	\$2.9	(\$1.5)	(\$1.5)	\$1.6	\$3.1	(\$1.5)	(\$3.0)	\$3.0	\$3.1	(\$0.1)	(\$3.1)	\$2.8	\$3.0	(\$0.2)	(\$3.3)	\$3.1	\$3.4	(\$0.3)	(\$3.6)
FHS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	\$5.9	\$7.1	(\$1.2)	(\$1.2)	\$5.9	\$7.7	(\$1.8)	(\$3.0)
Total	\$1.4	\$2.9	(\$1.5)	(\$1.5)	\$1.6	\$3.1	(\$1.5)	(\$3.0)	\$3.0	\$3.1	(\$0.1)	(\$3.1)	\$8.7	\$10.1	(\$1.4)	(\$4.5)	\$9.0	\$11.1	(\$2.1)	(\$6.6)

¹ Note that the SLU streetcar began operations in 2007. Cumulative operating deficit not shown is approximately \$550K.

² Revenues include KCM contributions, farebox revenue, FTA funding, sponsorships and contributions.

Summary of payback plan for existing debt

The streetcar lines, SLU and FHS, have existing past debts totaling \$17.9 million. The SLU line has an operating loan with an outstanding balance of \$3.6 million, and has operating reconciliation costs with KCM of \$0.6 million. The FHS line has unfunded operating costs of \$0.2 million, and operating reconciliation costs with KCM of \$2.8M. The SLU line also has a capital loan with \$4.4 million in remaining balance, with a payment plan underway using Commercial Parking Tax resources. The FHS line has unfunded capital costs of \$6.4 million. The City has considered liquidating the debts using property proceeds purchased with transportation fund sources.

Summary of existing debt (\$ Millions)

Existing Operating Liabilities		Existing Capital Liabilities	
SLU Cumulative Operating Deficit	(\$3.6)	SLU Capital Costs ³	(\$4.4)
SLU King County Metro Reconciliation (2016/17)	(\$0.6)	FHS Capital Costs	(\$6.4)
FHS Cumulative Operating Deficit	(\$0.2)	Total Capital Liabilities	(\$10.8)
FHS KCM Reconciliation Amount (2016/17)	(\$2.8)		
Total Operating Liabilities	(\$7.1)	Total Existing Liabilities	(\$17.9)

³ Ordinance 122603 approved the Interfund Loan with payback plan of \$300,000 per year through 2035

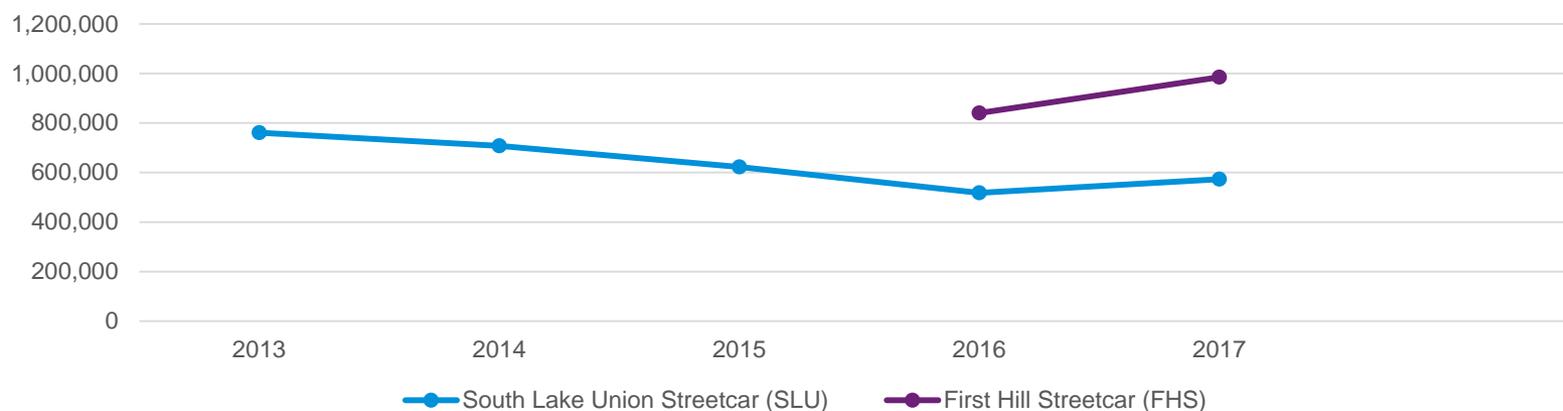
Streetcar Cost Review

Project background (continued)

Historical ridership summary

Line	Year of annual operation				
	2013	2014	2015	2016	2017
	Ridership ¹	Ridership ¹	Ridership ¹	Ridership ¹	Ridership ¹
South Lake Union Streetcar (SLU)	760,933	707,712	622,219	518,248	572,819
First Hill Streetcar (FHS)	NA	NA	NA	840,049	984,947

¹ Ridership numbers for 2013-2015 are totals for Unlinked Passenger Trips (UPT) as reported by KCM to the National Transit Database (NTD). 2016-2017 ridership is the SLU component of the UPT total reported to the NTD.



It is important to note that while the ridership statistics on these two separate streetcar lines have been lower than estimated, the overall transit data suggests an increase in ridership across the various other modes of transportation through these corridors. Streetcar ridership may have been impacted by increased congestion resulting from heavy construction zones through the corridors. In addition, some ridership appears to have been diverted to the KCM bus routes that currently share transit platforms with the SLU streetcar line. SDOT has developed a number of operation performance improvement initiatives for these Streetcar lines that may help to improve service levels and reliability. Future costs of improvements to the existing lines could add additional costs to the overall budget.

Streetcar Cost Review

Project scope

Introduction

KPMG LLP (KPMG) was engaged by the City of Seattle (the City) to evaluate the Seattle Department of Transportation's (SDOT) operating plan for the Seattle Streetcar System as well as the capital delivery costs and risks for the Center City Connector (C3) Streetcar Project (the Project). To perform this work, KPMG engaged a subcontractor, Deutsche Bahn Engineering & Consulting (DB), to assist with ridership, farebox revenue, and operating cost elements of this review. Our report summarizes KPMG's analysis through May 31, 2018 and information received through August 29, 2018.

Our work was performed in accordance with AICPA Consulting Standards. We developed our work plan based on discussions with the City Budget Office and our understanding of the objectives and scope of work. Our observations and recommendations are those we could reasonably derive from the procedures or scope of services performed.

Our report covers two objectives outlined in our scope of work:

- A. Evaluate the SDOT operating plan for the Seattle Streetcar System
- B. Evaluate the capital delivery costs and risks for the Project

Based on these evaluations, we developed projections to account for risk and variance in potential outcomes for revenue and operating costs. We also developed projections of the capital cost to continue and to terminate the Project. Our projections for revenue and operating, maintenance and capital costs, included moving forward with SDOT's current service based model and a demand based model for continuing the project, as well as considerations for terminating the Project. Termination forecasts have been developed based on 2016 FTA SSGA statistics, provided by SDOT, and benchmarked industry operating costs. These costs do not include SDOT operating expenses or recent reconciliation activities. This estimated cost represents a reasonable forecast of true operating costs on a system with existing characteristics similar to that of the SLU and FHS lines.

In presenting the termination/delay cases, we have used conservative assumptions based largely on estimates and information provided by contractors that has not been audited or otherwise tested for accuracy. The information is primarily illustrative and should not be relied upon for precision or completeness. Nor have we attempted to evaluate any potential legal liabilities or claims for contribution or indemnity in connection with these Options. Further, this report should not be relied on for any legal analysis related to potential claims or litigation that may arise with respect to any aspect of the Project.

In providing this review, KPMG has undertaken no role and expresses no view that should be considered as public policy advocacy.

Streetcar Cost Review

Project scope (continued)

Task A – SDOT operating plan evaluation

Objective

Evaluate the SDOT operating plan for the Seattle Streetcar System

1. Reviewed SDOT's ridership and farebox revenue "STOPS" model and confirmed underlying inputs and assumptions
2. Reviewed proposed operating plans for the consolidated system
3. Assessed reasonableness of SDOT planned service via rail planning, optimization, and scheduling analysis
4. Reviewed SDOT's O&M cost model and assumptions for the consolidated system
5. Benchmarked operating cost metrics with comparable U.S. and global streetcar systems
6. Reviewed available operations & maintenance funding sources, and discussed ancillary revenue opportunities with SDOT staff
7. Reviewed sponsorship contract rates and conducted inventory analysis of opportunities.

Task B – C3 capital costs and risks evaluation

Objective

Evaluate the capital delivery costs and risks for the Center City Streetcar Project

1. Summarized the existing contracts, purchase orders, and committed project costs
2. Summarized project costs incurred to date including invoiced to date and unbilled work
3. Assessed the City's estimate of cost to terminate the project
4. Assessed the City's estimate of costs of delays to the project
5. Reviewed the costs for operating and maintaining the current phase of the project including existing contracts and estimates prepared by the City
6. Reviewed estimates developed to date and the variances between the estimates
7. Assessed possible scope omissions in the current project plan and the estimate

The following stakeholders were interviewed to further understand the project basis, current status, and plan:

- City Budget Office and Budget Director
- SDOT Deputy Director & Director's Office staff
- SDOT streetcar project teams in Finance & Administration, Transit & Mobility, and Capital Projects & Roadway Structures
- Seattle Public Utilities, Seattle City Light
- Consultants: Nelson Nygaard Consulting Associates, Parsons Transportation Group, Inc., LTK Engineering Services, Shiels Obletz Johnsen
- Contractors: Gary Merlino Construction Company, CAF USA Inc.
- King County Metro
- Puget Sound Energy

The following PTV VISUM software solution was utilized in the review and assessment of the SDOT operating plan:

PTV VISUM is a leading software solution for traffic and ridership analyses, forecasts and GIS-based data management, recognized as a standard in transport and rail network planning. The tool is frequently used in ridership analyses and macro-simulations in order to assess regional travel markets, trip demand, and passenger interactions with various transportation and transit modes/options.

VISUM considers four broad areas of transport demand modeling. These areas are trip generation, trip distribution, mode choice and assignment. VISUM was used to:

- Review of the reasonableness, robustness, and achievability of ridership market and demand assumptions
- Prepare updated estimates of ridership and travel demand
- Consideration of more recent ridership performance

Forecasts were calibrated with more recent actual ridership data since forecasts were prepared for submission to FTA through input changes to trip generation and distribution. Please see pages 86 and 87 of this report for additional details regarding the use of VISUM in our analysis.

Summary of findings

Primary options for the Project are summarized below.

Four primary options available to the City are summarized below and further detailed throughout the report. Each option has varying costs, benefits, and risks that have been analyzed and highlighted throughout the report. The decision to move forward with a specific option is a City management decision and will ultimately depend on balancing several factors including budgetary constraints, funding requirements, legal analysis, as well as constituent needs and concerns regarding the demand for downtown transit alternatives.

We have presented several operating plan options for the City in order to show the range of potential streetcar operations concepts. Further detailed analysis (outside the scope of this report) may be needed prior to the City's selection of a final operations plan for the eventual service concept.

The key differences between the build options, Option 1 (the City's current service plan) and Option 2 (demand-driven service plan), are primarily a result of the change in service model. Option 2 explores a demand-driven model that requires a smaller vehicle fleet size and operates on a shorter service period. Option 2 also varies vehicle headways throughout the day to match the demand patterns of prospective commuters. This variance leads to a reduction in vehicles, operators, and maintenance costs.

For the purposes of this report, the following slides will focus on continuing with (Option 1) or terminating (Option 3) the Project, based on the City's current plan. All alternative options will be made available in a final report to the City.

Option		Description
Continue	<i>Option 1</i> Build with current operating plan	<ul style="list-style-type: none"> Continue with the current plan using CAF vehicles assuming decision to restart in August 2018, with revenue operations by 2022 SDOT service-driven operating plan following the existing service approach and longer operating hours than the demand-driven service plan above
	<i>Option 2</i> Build with demand-driven operating plan	<ul style="list-style-type: none"> Continue with the current plan using CAF USA Inc. (CAF) vehicles assuming decision to restart August 2018, with revenue operations by 2022 Proposed demand-driven operating plan with reduced train frequency and shorter operating hours, resulting in lower operating and maintenance costs, with slightly lower revenue than the current plan
Terminate	<i>Option 3</i> No build under current operating plan	<ul style="list-style-type: none"> Terminate and close out the Project to minimize cost exposure to the City SDOT service-driven operating plan with no new vehicles acquired, continuation of existing service approach, and continuation of current longer operating hours
	<i>Option 4</i> No build under demand-driven operating plan	<ul style="list-style-type: none"> Terminate and close out the Project to minimize cost exposure to the City Propose demand-driven operating plan for the existing streetcar lines, with no new vehicles acquired, reducing train frequency and shorter operating hours, resulting in lower O&M costs and slightly lower revenue

Streetcar Cost Review

Summary of findings (continued)

Option		Description
Continue	Option 1 Build with current operating plan	<ul style="list-style-type: none"> ▪ SDOT service-driven operating plan following the existing service approach, which provides consistent service levels throughout the daily operating period (peak and non-peak). ▪ Longer operating hours than the proposed alternative demand-driven service plan ▪ 17 Vehicle fleet size ▪ Ridership ¹: 5.8M (Low) to 6.9M (High) ▪ Net annual operating expenses (with external contributions) ¹: (\$2.6M) deficit to \$1.9M surplus ▪ Net annual operating expenses (without external contributions) ¹: (\$9.9M) to (\$5.4M) deficit ▪ Total capital expenses ²: \$252.4M (includes \$31M spent as of May 2018)
	Option 2 Build with alternative demand-driven operating plan	<ul style="list-style-type: none"> ▪ Proposed demand-driven operating plan, which varies service levels throughout the day depending on peak versus non-peak demand. ▪ Reduced train frequency and shorter operating hours, resulting in lower operating and maintenance costs, with slightly lower revenue than the current plan ▪ 14 Vehicle fleet size ▪ Ridership ¹: 5.4M (Low) to 6.3M (High) ▪ Net annual operating expenses (with external contributions) ¹: \$2.7M to \$6.1M surplus ▪ Net annual operating expenses (without external contributions) ¹: (\$4.7M) deficit to (\$1.2M) deficit ▪ Total capital expenses ²: \$241.9M (includes \$31M spent as of May 2018)

¹ Operating and ridership figures taken at the fifth year of operations. Assuming an average fare of \$1.49. ² Assuming an average fare of \$1.49, any change in ridership will result in an adjustment to total revenue (i.e. 100,000 riders equals \$149,000 revenue). Additional KCM reconciliation is not included in any of these options. Operating costs could be higher depending on an updated ILA, expected in 2019.

² Capital expenses include necessary public utility work.

The capital costs displayed in these options are representative of the actual project and design costs to-date, as well as anticipated project and design costs to complete each option. There are risks and costs associated with contract negotiations, integration, and potential cost litigation that are not captured in the dollar figures shown. Additional coordination between SDOT, the City, and each respective contract owner will need to occur before final risk, integration, and litigation costs can be identified.

Streetcar Cost Review

Summary of findings (continued)

Option		Description
Terminate	<p><i>Option 3</i></p> <p>No build under current operation plan</p>	<ul style="list-style-type: none"> ▪ Terminate and closeout the Project to minimize cost exposure to the City ▪ SDOT service-driven operating plan following the existing service approach, which provides consistent service levels throughout the daily operating period (peak and non-peak). ▪ No new vehicles acquired. Continue with existing 10 vehicle fleet. ▪ Continuation of existing service approach, and continuation of current longer operating hours ▪ Ridership ¹: 1.5M (Low) to 1.8M (High) ▪ Net annual operating expenses (with external contributions) ¹: (\$0.1M) deficit to \$1.9M surplus ▪ Net annual operating expenses (without external contributions) ¹: (\$7.4M) to (\$5.4M) deficit ▪ Total capital expenses ²: \$55.4M (includes \$31M spent as of May 2018)

¹ Operating and ridership figures taken at the fifth year of operations. Assuming an average fare of \$1.49. ² Assuming an average fare of \$1.49, any change in ridership will result in an adjustment to total revenue (i.e. 100,000 riders equals \$149,000 revenue). Additional KCM reconciliation is not included in any of these options. Operating costs could be higher depending on an updated ILA, expected in 2019.

² Capital expenses include necessary public utility work. This does not include the Advanced Utility Package 2 (AUP 2) work, which has been estimated at approximately \$25 million.

The capital costs displayed in these options are representative of the actual project and design costs to-date, as well as anticipated project and design costs to complete each option. There are risks and costs associated with contract negotiations and potential cost litigation that are not captured in the dollar figures shown. Additional coordination between SDOT, the City, and each respective contract owner will need to occur before final risk and litigation costs can be identified.

Streetcar Cost Review

Summary of findings (continued)

Capital cost and fifth year operations (2026) performance metrics are summarized below

All dollar figures are in millions of USD

Option		Total Capital Expenditure		Fifth year of annual operation									
		Low	High	Farebox Revenue	Sponsorship	External Ops Contributions	Operation Cost	Net Opex (w/ External Contribution)	Net Opex (No External Contribution)	Riders	Fleet Size	Peak Headway	Off-Peak Headway
Continue	Option 1 Build with current plan	\$236.1	\$252.4	\$8.7 (Low) \$10.2 (High)	\$1.0	\$7.3	\$16.6 (Low) \$19.6 (High)	(\$2.6) to \$1.9	(\$9.9) to (\$5.4)	5.8M (Low) 6.9M (High)	17	10 min	15 min
Terminate	Option 3 No build under current operating plan	\$51.5	\$55.4	\$2.3 (Low) \$2.7 (High)	\$1.0	\$7.3	\$9.1 (Low) \$10.7 (High)	(\$0.1) to \$1.9	(\$7.4) to (\$5.4)	1.5M (Low) 1.8M (High)	10	10 min	15 min

Notes: External contribution refers to contributions or grants for operations or maintenance from KCM, Sound Transit, and FTA. Numbers may not foot due to rounding

- **Option 1 and 3**
 - Operating costs increase faster than revenue and non-farebox funding sources, resulting in a potential net operating deficit that may require further contributions from the City.
- **Option 1 and 3**
 - Operations forecasts have been developed based on 2016 FTA SSGA statistics, provided by SDOT, and benchmarked industry operating costs. These costs do not include SDOT operating expenses or recent reconciliation activities. This estimated cost represents a reasonable forecast of true operating costs on a system with existing characteristics similar to that of the SLU and FHS lines. Additional KCM reconciliation is not included in any of these options. Operating costs could be higher depending on an updated ILA, expected in 2019.
- **Contingency**
 - Additional risk contingency has been added to the capital cost forecast to adjust for estimate uncertainty and risk.
- **Other assumptions**
 - Assuming an average fare of \$1.49, any change in ridership will result in an adjustment to total revenue. (i.e. 100,000 riders equals \$149,000 revenue)
 - The total capital expenditure is not adjusted for currently identified project funding sources such as FTA grants, local bonds, and vehicle sales.
 - The total capital expenditure includes all City department project construction costs, including FTA Small Starts submittal scope and Non-FTA SSGA scope. Non-FTA SSGA scope includes additional SPU utility costs, delay impact costs, and additional risk contingency.
 - High and low scenarios are presented for fare revenues, operations cost, and ridership. This range (-15 percent) was applied to base case numbers utilizing FTA guidance.
 - Net OpEx (farebox revenues and sponsorship less operating costs) are presented with and without external Ops contributions (e.g. KCM, Sound Transit, and FTA contributions for operations or maintenance)
 - Sponsorship assumptions do not vary significantly between options, as it is SDOT's assumption in the Small Starts Grant application that C3 sponsorships account for a small percentage of overall system sponsorships during the early service ramp-up years (see detail in the "Funding and Revenue Assumptions" section). Assumes full ramp-up of First Hill sponsorship sales by 2021 consistent with trends seen with South Lake Union sponsorship sales.
 - Operations funding include external contributions and grants from KCM, Sound Transit, and FTA. According to SDOT, the KCM and Sound Transit operating contributions are assumed to extend past current sunset years (2019 and 2023, respectively) at current terms due to the status of renegotiations. However, there is the risk these agreements might not be extended.
 - Forecast headways are not adjusted for street traffic and congestion impacts. Values shown are for optimal system performance in consideration of City congestion relief measures currently planned and underway.

Capital costs and risks evaluation

C3 capital costs and risks evaluation

Objective

Evaluate the capital delivery costs and risks for the Center City Streetcar Project

Observations

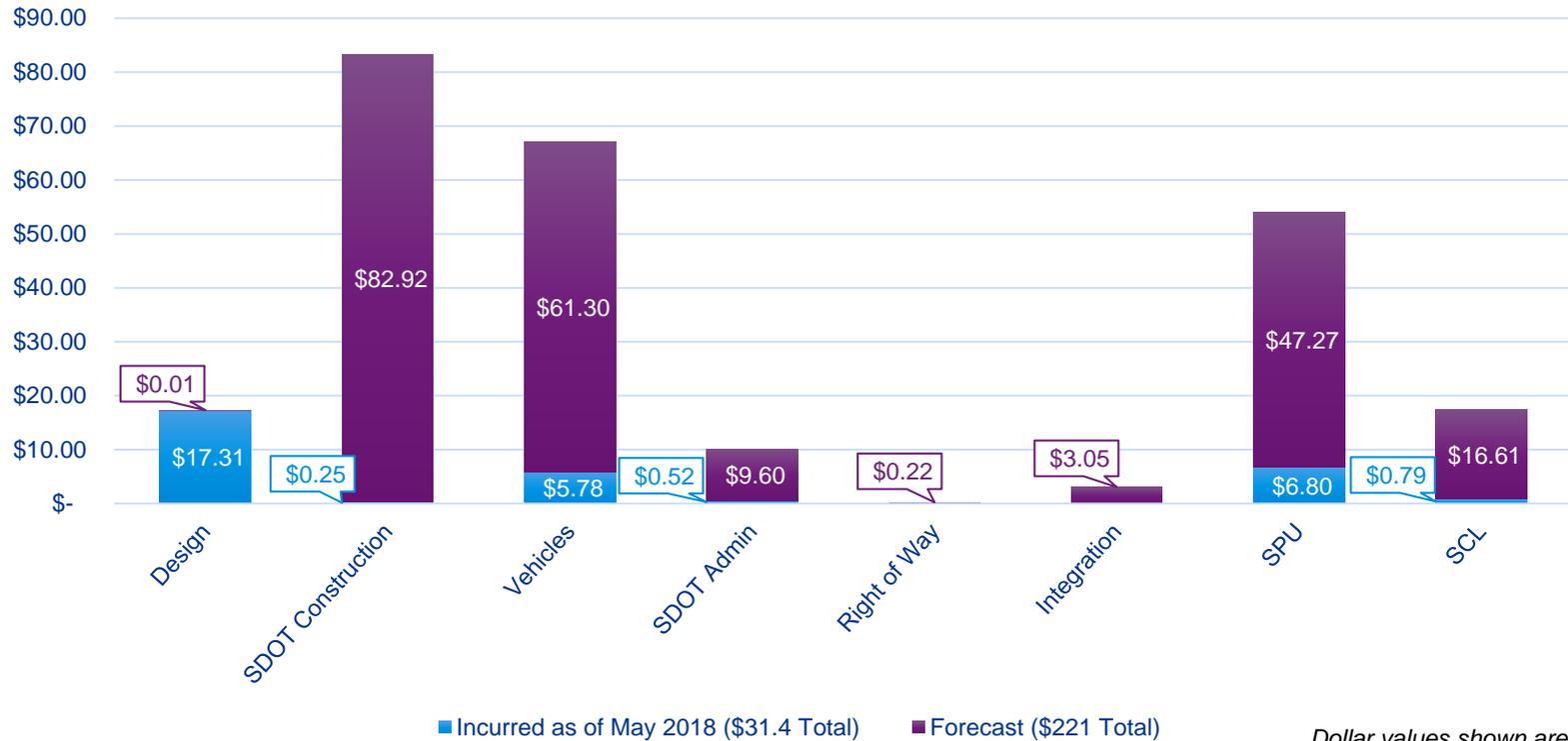
1. Cost analysis shows that based on the City's current service driven model, total cost is \$252.5 million, which includes incurred costs as of May 2018.
2. The project was previously expected to cost \$197.7 million. This cost increase has been driven by the following:
 - Approximately \$7.2 million in new startup costs and approximately \$130,000 in items that were not captured in the latest project estimate.
 - Approximately \$9 million dollars was added to the primary continuation options to account for the risk of estimate uncertainties.
 - Approximately \$8 million dollars in escalation costs will be incurred if the Project timeline is extended into 2022. This amount will continue to increase with project delays.
 - Approximately \$19 million in additional design, vehicles, start-up, administrative and construction costs were added to the original estimate after scope reviews in March 2018.
 - Approximately \$11 million in adjusted utility scope and management costs.
3. At the time of this report, the key capital cost drivers for continuation are:
 - Material and labor escalation
 - Additional administrative and management staff
 - Adjustments to the utility scope and management estimates
 - Additional project contingency to account for risks such as SDOT civil and facility costs to accommodate new CAF vehicles
4. Termination of the project could result in total capital costs in excess of \$55 million dollars. This total includes approximately \$26 million in already completed design and utility work. Additional analysis may be required related to unknown litigation and unquantified costs.
5. At the time of this report, the primary drivers of termination costs are:
 - Utility improvement and replacement
 - Construction contract completion
 - Construction management and administration

Streetcar Cost Review

Capital costs

Summary of the anticipated capital cost sources for the “Build (Option 1)” option

Build (\$252.5) - Option 1



Dollar values shown are in millions

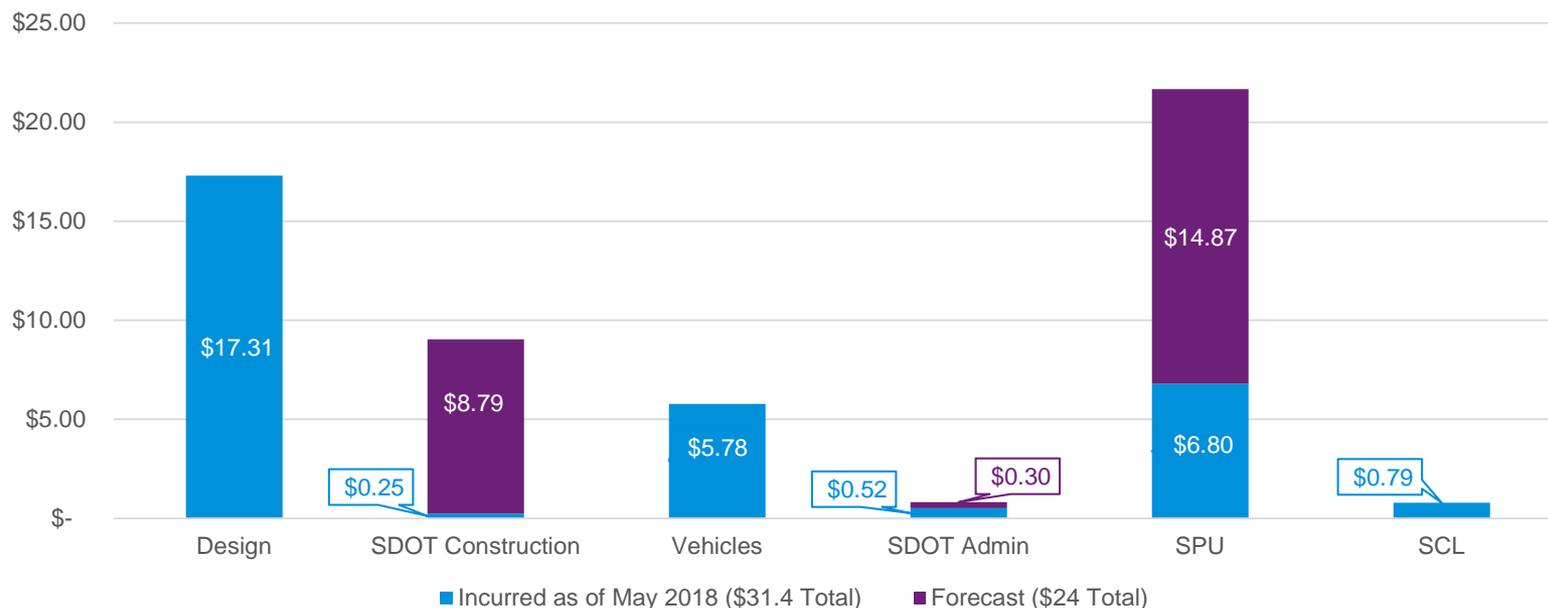
Note: The capital costs displayed in these options are representative of the actual project and design costs to-date, as well as anticipated project and design costs to complete each option. There are risks and costs associated with contract negotiations, integration, and potential cost litigation that are not captured in the dollar figures shown. Additional coordination between SDOT, the City, and each respective contract owner will need to occur before final risk, integration, and litigation costs can be identified.

Streetcar Cost Review

Capital costs (continued)

Summary of the anticipated capital cost sources for the “No-Build (Option 3)” option

No-build (\$55.4)- Option 3



Dollar values shown are in millions

The primary forecast costs for the no-build option are:

- **SDOT Street restoration and utility work**
 - SDOT intends to restore the street along the current construction route to a new permanent condition. In addition, completion of the current utility improvements requires administrative and construction management oversight from SDOT.
- **SPU utility costs**
 - SPU is currently working on numerous utility improvements along the planned Streetcar route. This utility work is being completed in the no-build option.
- **Note**
 - The capital costs displayed in these options are representative of the actual project and design costs to-date, as well as anticipated project and design costs to complete each option. There are risks and costs associated with contract negotiations and potential cost litigation that are not captured in the dollar figures shown. Additional coordination between SDOT, the City, and each respective contract owner will need to occur before final risk and litigation costs can be identified.

Operating plan evaluation

SDOT operating plan evaluation

Objective

Evaluate the SDOT operating plan for the Seattle Streetcar System

Observations

1. SDOT's base case assumptions were confirmed utilizing benchmarks from other streetcars in operations globally and subject matter knowledge from professionals with direct experience with streetcar operations management.
 - A more detailed analysis involving bottom-up FTE scheduling and detailed ridership modeling will be needed to confirm range of potential efficiencies.
2. SDOT planned operations and maintenance staffing models can meet proposed service patterns
3. Seattle Streetcar cost per passenger trip is competitive in comparison to U.S. systems.
4. Recovery ratio compared to the U.S. market is in the medium to high range, potentially for the following reasons:
 - Ridership performance through a dense, urbanized corridor
 - U.S. benchmarks presented are typically for service-driven systems, as opposed to demand-based models (Option 1)
 - Source data for work breakdown structure assumptions
5. This report acknowledges that SDOT had estimated O&M costs of approximately \$16 million per year, while KCM's estimated annual operating costs are approximately \$24 million. Meetings have been held to align with KCM on operating assumptions and review the key inputs for KPMG's review. Further coordination will be necessary between SDOT and KCM to identify the preferred operating characteristics and costs for an integrated C3 system and additional costs could be incurred by the City.
6. Based on the Seattle Streetcar system characteristics reviewed for this report, and benchmarked data from other streetcar systems around the country, the SDOT operating costs appear to be reasonable. The forecast operating costs reflected throughout this report represent a reasonable starting position for continued operating plan discussions between KCM and SDOT.

Streetcar Cost Review

Forecast ridership summary

Line	Year of annual operation (Trips per year in millions)				
	2022	2023	2024	2025	2026
	Ridership	Ridership	Ridership	Ridership	Ridership
Option 1 <i>Continue with current plan</i>	6.08 (High) 5.17 (Low)	6.26 (High) 5.32 (Low)	6.45 (High) 5.48 (Low)	6.65 (High) 5.65 (Low)	6.86 (High) 5.83 (Low)
Option 3 <i>Terminate with current plan</i>	1.58 (High) 1.34 (Low)	1.63 (High) 1.39 (Low)	1.67 (High) 1.42 (Low)	1.73 (High) 1.47 (Low)	1.78 (High) 1.51 (Low)

Assumes 3.0 percent annual increase in ridership.

Key observations

- At the time of this analysis, it was assumed that the first year of operation would be 2022. There is a risk that additional delays will result in the first year of operation pushing beyond 2022.
- Option 1 is more than 3.5 times that of Option 3 in Year 5 of operations.
- Analysis utilizes assumptions from STOPS model as reviewed in Deutsche Bahn PTV Visum software and proprietary systems.
- Analysis for the Terminate option takes into account recent actual ridership data provided by SDOT.
- Analysis for the Continue options reflects a future-state system and reflects confirmed assumptions on future travel market growth and trip generation.
- Analysis utilizes existing industry tools and benchmarks, in particular operations plans for other lines in service globally. No new ridership demand model was built for this report.
- Train travel times were reviewed and match SDOT assumptions. These were assessed in light of congestion relief measures currently planned and underway. Any new modifications to improve system performance will result in additional costs.
- A range of -15 percent was applied to base case numbers utilizing FTA guidance provided for estimates on past transit projects to reflect potential variances.

Streetcar Cost Review

Forecast revenue and operating costs

Summary of forecast revenue and operating costs with continuing contributions

Line	Year of annual operation (\$ millions)									
	2022		2023		2024		2025		2026	
	Revenues ¹	Operation Cost ²	Revenues ¹	Operation Cost ²	Revenues ¹	Operation Cost ²	Revenues ¹	Operation Cost ²	Revenues ¹	Operation Cost ²
Option 1 <i>Continue with current plan</i>	\$16.99 (High) \$15.63 (Low)	\$16.73 (High) \$14.22 (Low)	\$17.35 (High) \$15.95 (Low)	\$17.4 (High) \$14.79 (Low)	\$17.72 (High) \$16.28 (Low)	\$18.1 (High) \$15.39 (Low)	\$18.09 (High) \$16.61 (Low)	\$18.82 (High) \$16.00 (Low)	\$18.49 (High) \$16.95 (Low)	\$19.57 (High) \$16.63 (Low)
Option 3 <i>Terminate with current plan</i>	\$10.29 (High) \$9.94 (Low)	\$9.16 (High) \$7.79 (Low)	\$10.44 (High) \$10.08 (Low)	\$9.52 (High) \$8.09 (Low)	\$10.58 (High) \$10.21 (Low)	\$9.91 (High) \$8.42 (Low)	\$10.75 (High) \$10.37 (Low)	\$10.3 (High) \$8.76 (Low)	\$10.91 (High) \$10.51 (Low)	\$10.71 (High) \$9.10 (Low)

¹ Revenues include KCM contributions, farebox revenue, FTA funding, sponsorships and contributions.

² Assuming an average fare of \$1.49, any change in ridership will result in an adjustment to total revenue (i.e. 100,000 riders equals \$149,000 revenue). Additional KCM reconciliation is not included in any of these options. Operating costs could be higher depending on an updated ILA, expected in 2019.

Note: A range of -15 percent was applied to base case numbers utilizing FTA guidance provided for estimates on past transit projects to reflect potential variances.

Summary of non-farebox revenue sources

Based on information provided by SDOT, funding for streetcar operations comes from these primary sources, in addition to farebox revenue:

- **Sound Transit contribution (approximately \$5 million):** Annual contribution per interlocal agreement to support First Hill line operating expenses. This agreement expires in 2023.
- **KCM contribution (approximately \$1.9 million):** Annual contribution per interlocal agreement to support South Lake Union line operating expenses. This agreement expires in 2019.
- **FTA Urbanized Area Formula Grant 5307 (approximately \$430,000 annually):** Federal program that makes funds available to urbanized areas for transit operating maintenance costs on the basis of a formula calculation that takes into account metrics such as population density, network operating metrics, and system length. Continuation of this funding is subject to continued SDOT participation in the Puget Sound Regional Council (PSRC) grant allocation process.
- **Sponsorship, advertising, and other (approximately \$980,000 annually):** Revenues from advertising, sponsorship, branding, and other agreements. Sponsorship revenue does not vary significantly between options due to SDOT's assumption that during the early years of C3 service, incremental C3-only sponsorship revenues reflect a small percentage of overall system sponsorship levels due to ramp-up.

Streetcar Cost Review

Forecast revenue and operating costs (continued)

Summary of forecast revenue and operating costs without continuing contributions

Line	Year of annual operation (\$ millions)									
	2022		2023		2024		2025		2026	
	Revenues ³	Operation Cost ²	Revenues ³	Operation Cost ²	Revenues ¹	Operation Cost ²	Revenues ¹	Operation Cost ²	Revenues ¹	Operation Cost ²
Option 1 Continue with current plan	\$14.91 (High) \$13.55 (Low)	\$16.73 (High) \$14.22 (Low)	\$15.22 (High) \$13.82 (Low)	\$17.4 (High) \$14.79 (Low)	\$10.54 (High) \$9.1 (Low)	\$18.1 (High) \$15.39 (Low)	\$10.86 (High) \$9.38 (Low)	\$18.82 (High) \$16.00 (Low)	\$11.21 (High) \$9.67 (Low)	\$19.57 (High) \$16.63 (Low)
Option 3 Terminate with current plan	\$8.21 (High) \$7.86 (Low)	\$9.16 (High) \$7.79 (Low)	\$8.31 (High) \$7.95 (Low)	\$9.52 (High) \$8.09 (Low)	\$3.41 (High) \$3.03 (Low)	\$9.91 (High) \$8.42 (Low)	\$3.52 (High) \$3.14 (Low)	\$10.3 (High) \$8.76 (Low)	\$3.63 (High) \$3.23 (Low)	\$10.71 (High) \$9.10 (Low)

¹ Revenues do not include KCM contributions, FTA funding, and Sound Transit contributions.

² Assuming an average fare of \$1.49, any change in ridership will result in an adjustment to total revenue (i.e. 100,000 riders equals \$149,000 revenue). ² Assuming an average fare of \$1.49, any change in ridership will result in an adjustment to total revenue (i.e. 100,000 riders equals \$149,000 revenue). Additional KCM reconciliation is not included in any of these options. Operating costs could be higher depending on an updated ILA, expected in 2019.

³ Revenues for years 2022 and 2023 include the Sound Transit contribution, which expires in late 2023. Revenues for these years do not include KCM contributions and FTA funding.

Note: A range of -15 percent was applied to base case numbers utilizing FTA guidance provided for estimates on past transit projects to reflect potential variances.

Summary of non-farebox revenue sources

Based on information provided by SDOT, funding for streetcar operations comes from these primary sources, in addition to farebox revenue:

- **Sound Transit contribution (approximately \$5 million):** Annual contribution per interlocal agreement to support First Hill line operating expenses. This agreement expires in 2023.
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- **Sponsorship, advertising, and other (approximately \$980,000 annually):** Revenues from advertising, sponsorship, branding, and other agreements. Sponsorship revenue does not vary significantly between options due to SDOT's assumption that during the early years of C3 service, incremental C3-only sponsorship revenues reflect a small percentage of overall system sponsorship levels due to ramp-up.



Streetcar Cost Review

Select financial metrics

Key Metrics

Utilizing validated inputs, the following metrics were assessed for each options described in this report:

- **Net Operating Expenditures (Net Opex):** Estimates of the annual subsidy required from the City of Seattle (through the City's Transportation Operating Fund) for streetcar operations. This statistic considers farebox revenue, sponsorships, and external operating contributions from KCM, Sound Transit, and FTA. Net Opex is presented below with and without external operating contributions, as those agreements may be subject to further extension negotiations in the future.

Projected metrics	Current ² 2016 (Existing lines)	Year 1		Year 5	
	SDOT 2018 Semi-annual report ³	Continue Option 1	Terminate Option 3	Continue Option 1	Terminate Option 3
Total Farebox Revenue, Sponsorships, and External Ops Contributions¹ (YOE \$ Millions)	\$8.7	\$16.99 (High) \$15.63 (Low)	\$10.29 (High) \$9.94 (Low)	\$18.49 (High) \$16.95 (Low)	\$10.91 (High) \$10.51 (Low)
Total Operating Costs¹ (YOE \$ Millions)	(\$10.2)	(\$16.73) (High) (\$14.22) (Low)	(\$9.16) (High) (\$7.79) (Low)	(\$19.57) (High) (\$16.63) (Low)	(\$10.71) (High) (\$9.10) (Low)
Net Opex (w/ External Contributions) (YOE \$ Millions)	(\$1.5)	(\$1.1) to \$2.7	\$0.8 to \$2.5	(\$2.6) to \$1.9	(\$0.1) to \$1.9
Net Opex (No External Contributions) (YOE \$ Millions)	(\$7.9)	(\$3.18) to \$0.69	(\$1.3) to \$0.42	(\$9.9) to (\$5.4)	(\$7.4) to (\$5.4)

Note: External contribution refers to contributions or grants for operations or maintenance from KCM, Sound Transit, and FTA.

Note: A range of -15 percent was applied to base case numbers utilizing FTA guidance provided for estimates on past transit projects to reflect potential variances.

¹ Estimates utilize confirmed farebox revenue, non-farebox funding, ridership, and cost assumptions. Net OpEx is the City's position after farebox revenue, sponsorships, and external contributions from KCM, Sound Transit, and FTA are taken into account. Net Opex is presented for scenarios with and without contributions, as there is the potential that current contribution agreements may not be extended.

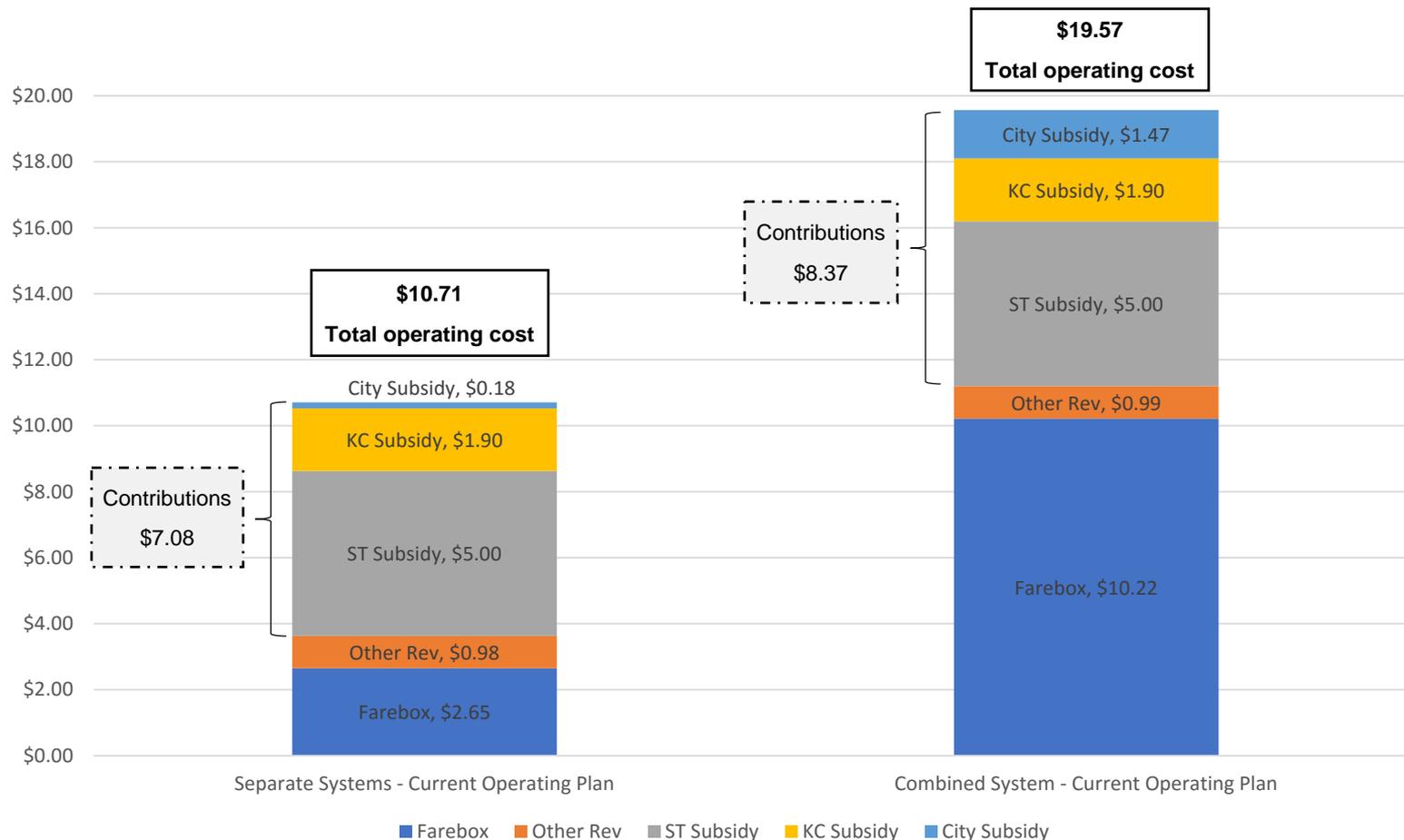
² Current operations values reflect actual 2016 SDOT data from its 2018 Semi annual Report (inclusive of data for both the South Lake Union and First Hill lines)

³ According to SDOT, year 2016 operating costs reported in SDOT 2018 Semi annual Report are in draft form and reflect additional reconciliation of SDOT and KCM figures since 2017 Semi annual Report. These numbers differ from numbers the City previously reported to the FTA National Transit Database (NTD).

Streetcar Cost Review

Operations funding

Comparative summary of the necessary funding and revenue sources for the “Build (Option 1)” and “No-Build (Option 3)” options in year 5 of operation



Dollar values shown are in millions

Schedule forecast assumptions

Summarized below is an assessment of original schedule and forecast of schedule if Project is continued.

Assessment of a conservative schedule to continue the Project, as of the date of this report, assumed an in service date of May 2022.

- Based on recent discussions, the City has been notified that the FTA will conduct an additional review of the assumptions to continue the project once a decision is made to continue or terminate the project. The City indicated that this review may take eight months based on their discussions with FTA. Recent discussions with the FTA indicate that the duration of the review may now take between twelve to eighteen months to complete.
- The conservative schedule assumption in June 2018 was that the City would decide by August 6, 2018, to continue the Streetcar Project, which would start the FTA SSGA review/approval period and allow planning and procurement to restart immediately thereafter. It is now assumed that the decision to continue will be determined based on the outcomes of numerous internal project reviews that are currently underway.
- Based on discussions with various project stakeholders, it is assumed that the Advanced Utility Package 2 (AUP 2) work scope and track infrastructure work will be consolidated into a single procurement package, which should allow for better coordination between utility and track work, encourage more competition in bidding, and reduce the City's administrative cost.
- Additionally, for cost certainty at the time of bids, we assume the City will want to study the existing conditions (platforms, maintenance facilities, storage yards, etc.) at the SLU and FHS lines and incorporate changes into the contract documents as required to accommodate the larger CAF vehicles. This review is underway and will likely impact the decision date of the Project.
- As of June 2018, it was assumed advertisement for bids on the combined utilities and track infrastructure contract could occur in June 2019, which should have allowed the City to issue the NTP to the successful bidder in late October 2019. Based on numerous internal project reviews and expected FTA timelines, this assumption will likely need to be extended.
- In June 2018, using the more conservative schedules developed by the project manager for both the utility and track infrastructure work, and adding reasonable schedule contingencies, a more conservative streetcar in-service date was expected to be May 2022. Based on information that has become available since this initial review in June 2018, it is reasonable to assume that the Project in service date will extend further.

Streetcar Cost Review

Key risks

Continuation:

- \$75 million FTA Small Starts Grant is still under review.
- Sound Transit, KCM, and FTA operating contributions or grants may not be extended by the grantors past the current expiration dates. This report defers to SDOT assumptions on the status of current and future negotiations regarding the extension of operations funding sources and contributions (i.e., Sound Transit and KCM Interlocal Agreements) beyond current expiration dates.
- Uncertainty around system integration scope and cost. Additional analysis is necessary to identify integration scope for the CAF vehicle.
- Contract commitments and delay claims may require additional negotiation and legal review.
- Due to the variance in operating projections between KCM and SDOT, additional collaboration will be necessary to identify the appropriate operations plan to fit the needs of the integrated C3 system. The operations plan analysis and demand-driven model reflect a high-level assessment of potential opportunities and efficiencies. A more detailed analysis involving extensive ridership modeling and bottom-up full-time employee (FTE) scheduling (which is outside the scope of this report) will be needed to confirm potential efficiencies.

Termination:

- Project costs incurred to date, committed costs, and liabilities are estimated to exceed \$55.4 million, which will require identifying additional funding sources.
- Sound Transit, KCM, and FTA operating contributions or grants may not be extended by the grantors past the current expiration dates. This report defers to SDOT assumptions on the status of current and future negotiations regarding the extension of operations funding sources and contributions (i.e., Sound Transit and KCM Interlocal Agreements) beyond current expiration dates.
- Contract commitments and termination claims may require litigation risk assessments.

Next Steps

There are several steps the City should perform depending on the decision to continue or terminate the Project. These include:

- **Additional Engineering Analysis and Design** – Should the City decide to continue the Project, additional engineering analysis and design work will need to be performed. The additional analysis will include review of necessary design changes to integrate the full streetcar system, including, but not limited to platform design, rail vehicle suitability (rail car length, weight and dynamic envelope) current platforms and C3 platform design, as well as considering combining AUP 2 and the track construction contracts, which could reduce Project coordination risk to the City. With respect to the difference between the track and rail car vehicles, this can be addressed with CAF through review of the vehicle specification and design since CAF was in the process of design at the time of the stop work order. Each of these factors impact project start time as well as capital and operating costs.
- **Coordination with FTA** – If the City moves forward with the Project, FTA has indicated that there will be additional reviews of the C3 project to confirm that the Project can continue with the changes since the FTA approved the City's Small Starts grant but funding has not been secured until the City signs the full funding grant agreement. The reviews will consider such areas as the operating costs, revised design, the change in rail cars, level of service available to passengers, Project financing and the overall viability of the Project. SDOT believes FTA will take a minimum of eight months to complete their reviews and could take as many as eighteen months. This will further delay the Project and increase the estimated escalation costs, as well as other Project time-related costs.
- **Legal Risk Assessment** – The City should consider asking the City's legal counsel to perform a legal risk assessment to gain an understanding of the legal and potential cost exposure of any claims, litigation or cost recovery that may arise from the decision to continue or terminate the Project. KPMG is not a law firm and legal services are outside the scope of services of the firm, and nothing in this report should be relied on for that purpose.