Seattle Center City Streetcar Workshop Report

January 2007

Nelson|Nygaard
consulting associates

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Chapter 1 Introduction

Process

In 2004, the Seattle Department of Transportation (SDOT) published its "Seattle Streetcar Network and Feasibility Analysis," laying out potential alignments for extensions of the South Lake Union and Waterfront streetcar lines. Building upon that document, community members involved in the Seattle Streetcar Alliance explored additional streetcar routes, seeking to create a more comprehensive streetcar network for the Center City. The Seattle Streetcar Alliance is a community based alliance with public sector partners facilitated by the Urban League. Participants include Cascadia Center for Regional Development, Allied Arts, Transportation Choices Coalition, Futurewise, Build the Streetcar, Downtown Seattle Association, Seattle Chamber of Commerce, neighborhood and labor councils.

To help the Streetcar Alliance focus their efforts, SDOT hosted an all-day workshop on July 20, 2006, bringing together Alliance members and an array of technical and agency staff. The goals of the workshop included:

- Develop evaluation criteria for successful streetcar applications in Seattle
- Explore feasible streetcar alignments
- Prioritize alignments that best meet the agreed-upon criteria

This document provides a summary of the workshop outcome.

A Brief History

Seattle's underlying urban framework was shaped largely by the extensive streetcar network laid out in the late 19th and early 20th centuries. Nearly every neighborhood commercial street follows an old streetcar line, and many of the odd curves and anomalies in the city's grid result from adjustments allowing streetcars to climb the city's hills. All of the city's Urban Villages have a former streetcar corridor at their core.

Between 1902 and 1918, the city bought up the private streetcar franchises to establish the Municipal Street Railway, one of the earliest publicly owned transit systems in the US. By 1941, however, mounting debts, combined with the lower costs and greater flexibility of motor buses, caused the abandonment of the city's streetcar, with most routes replaced by electric trolley buses or diesel buses.

In 1982, the City began the reestablishment of its streetcar network with the inauguration of the Waterfront Streetcar. Using historic cars, it was an immediate success with visitors and was extended in 1990. The South Lake Union line, funded in part by a $25 million Local Improvement District Contribution, is scheduled to begin service in fall 2007.

The 1915 streetcar and cable car system is shown in Figure 1-1.

Figure 1-1 1915 Streetcar and Cable Car System

Resources
For more information on how streetcars shaped Seattle, see: http://www.historylink.org/essays/output.cfm?file_id=2707.
For the story of the Waterfront Streetcar, see http://www.historylink.org/essays/output.cfm?file_id=7271.
For the South Lake Union line, see http://www.seattle.gov/transportation/stcar_slu.htm.
More on Seattle streetcar planning: http://www.seattle.gov/transportation/streetcarnetwork.htm

Background Documents

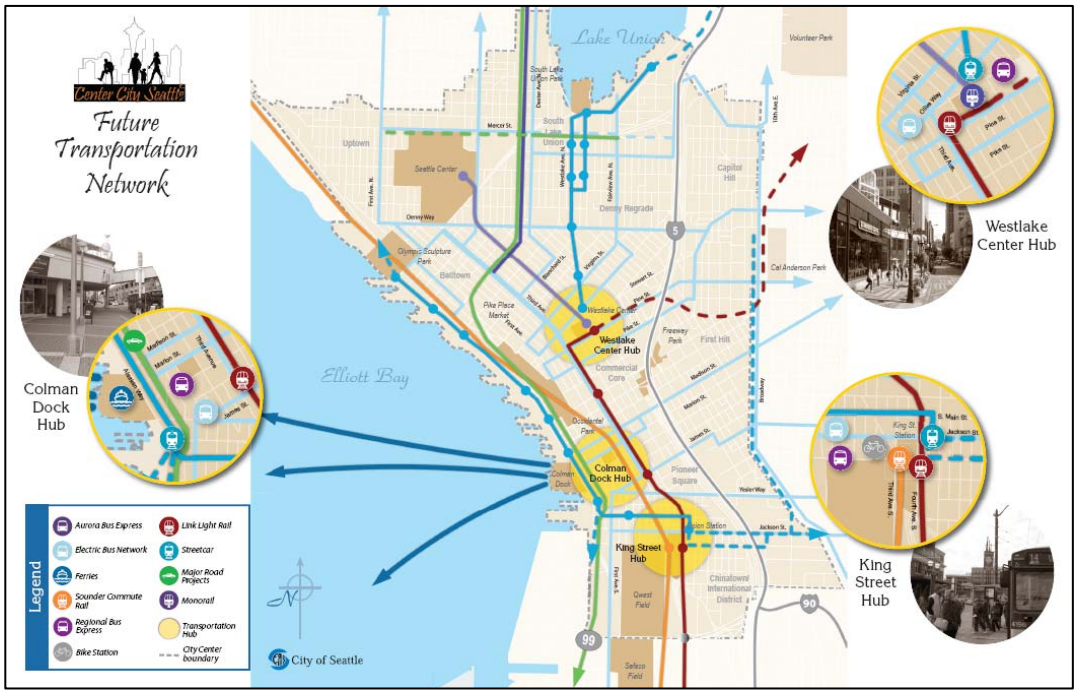
Thinking about the future of streetcars in Seattle requires not only attention to the past, but also coordination with other transportation planning efforts underway in the region. Key among these efforts includes:

Center City Plans

Due to major geographical barriers on all sides, Seattle's Center City faces some of the most difficult access constraints of any city of its size in North America. To address these constraints and allow for planned growth downtown, Seattle has developed a series of planning documents, including the Center City Circulation Study, the Center City Access Strategy, and the Mayor's Center City Seattle Strategy. Key among the recommendations of these reports is a fast, frequent, reliable and comprehensible transit network connecting all of the city's Urban Villages to each other and Center City.

Any plans for streetcars should follow or complement the primary transit network lines described in these documents, as well as the citywide Seattle *Transit Plan* and King County Metro's draft *Transit Development Plan*. For example, a streetcar line could replace one of the proposed high frequency bus lines, or it could serve as a local complement to a proposed rapid transit line, or it could provide important connections between major destinations or hubs. Streetcars should also connect to the city's three major transportation hubs, Westlake Center, Colman Dock and King Street Station. Public investments in streetcars must support the city's larger mobility goals as well as neighborhood revitalization goals. The primary transit lines and hubs for Center City are shown in Figure 1-2.

Figure 1-2 Center City Future Transportation Network



Link Light Rail

The Link Light Rail line now under construction, along with its funded extension to the University District, will be part of the backbone of Seattle's transit network, and any future streetcar network will need to complement it.

Unlike streetcars, Link will provide high speed, high capacity service. It will connect SeaTac, the Rainier Valley, through downtown to Capitol Hill and the U District. For more detail see www.soundtransit.org and Figure 1-3.

Alaskan Way Viaduct

The construction of the Alaskan Way Viaduct replacement plans for a double track in the street from Main Street to Broad Street along Alaskan Way. During construction there is potential for operating a limited segment between Broad Street and Pine Street, but it is anticipated there will be no service between Pine Street and King Street Station. Operating the short segment would require a temporary storage barn and extension north of Broad Street since the historic streetcars must be stored under cover.

Figure 1-3 Link Light Rail

Resources
Mayor's Center City Seattle Strategy:
http://www.seattle.gov/dpd/Planning/center_city/Overview/
SDOT's Center City Access Strategy
http://www.seattle.gov/transportation/centercityaccess.htm
SDOT's Center City Circulation Study
http://www.seattle.gov/transportation/ppmpcentercity.htm
SDOT's Seattle Transit Plan
http://www.cityofseattle.net/transportation/transitnetwork.htm
King County Metro Transit Development Plan
Currently being updated; available soon at www.metrokc.gov

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Chapter 2 Successful Streetcars

Streetcar Benefits

All else being equal, replacing a bus line with a streetcar will typically increase ridership by 40%. In some special applications, streetcars have doubled or tripled transit ridership compared to buses. Creating a streetcar line, however, costs so much more than running better bus service that cities do not build streetcar lines merely for ridership reasons. Cities build new streetcar lines because of streetcars' unique ability to organize development and catalyze economic development strategies. In the case of the Portland Streetcar, it has been claimed that property values along the streetcar line increased by 40%, and that the area served by the streetcar has attracted $3 billion in private investment. While much of this investment would have happened without the streetcar, the new line expedited and shaped the new development patterns, producing a clear positive return on the public investment in the line.

Resource:
For extensive background on streetcars, see the Seattle Streetcar Network website at http://www.seattle.gov/transportation/streetcarreport.htm

Investors and riders like streetcars for a variety of reasons:

- The capital outlay in tracks and stations makes the investment seem permanent, and therefore increases the perceived property values for lenders and buyers.
- Streetcars offer a superior ride quality over most buses, with more stability, less noise and greater comfort.
- For lines with historic or high-end modern cars, the vehicles themselves can be an attraction for riders and non-riders alike. Having streetcars passing by transforms the character of a retail street, allowing for higher value and more retail activity.
- Streetcars are more flexible than light rail, since they are more maneuverable and can operate in mixed traffic better than light rail.

Streetcar Challenges

Streetcars have some major drawbacks that prevent them from being applicable in many situations:

- They cannot maneuver around obstacles. If a delivery truck is double-parked on the tracks or a car is queued in front of a streetcar to turn left or right, the streetcar cannot maneuver around, unlike buses. If streetcar streets are not carefully managed to be free of obstacles, streetcars can operate so slowly that they lose their attractiveness to riders.
- They have very specific grade, clearance and turning requirements that make them less flexible than buses. Streetcars need level, straight routes with few complicated intersections.
- They have higher operating costs and significantly higher capital costs than buses. Despite ridership benefits, streetcars generally result in a higher cost per passenger ride compared to bus improvements in the same corridor. To cover these extra costs, streetcars generally need to capture part of the real estate value they generate in order to justify their extra cost.

Streetcar Success

Corridors where streetcars can be successful have the following characteristics:

- Because they are slower and lower capacity than light rail, streetcars tend to be more successful on relatively short corridors, typically running no more than 3-5 miles from the central business district.
- Streetcars thrive in locations where there are many short trips, particularly convenience trips. So they work best in corridors with a rich mix of uses, including retail, employment, residential and institutional uses.
- All transit relies on density for success, since increased density results in a larger potential rider market, which results in greater frequency, which in turn results in even higher ridership. Because of their higher costs, streetcars need higher density than buses to be successful.
- In order for passengers to walk to and from streetcar stops, the entire corridor must have a high level of walkability.
- The most effective streetcar lines generate high all-day ridership in both directions, requiring a strong terminus on at least one end of the line and ideally both ends. One end will almost certainly be Center City, ideally one of the major hubs there: King St Station, Colman Dock and/or Westlake Center. The other end can be a major destination like Seattle Center, a neighborhood shopping street and/or another primary transit line.
- To allow for operational efficiency, a new streetcar should replace all or part of an existing bus line.
- Successful streetcar corridors have existing, strong economic development potential and a clear economic development strategy.
- Finally, successful corridors have a plan in place to capture part of the real estate value streetcars create – and ensure that existing residents and businesses are not displaced by rising rents and property values.

Streetcar Criteria

Keeping all of the above factors in mind, workshop participants agreed to the following key criteria for judging potential future streetcar alignments:

Physical Criteria	
Grade	Because they run on metal wheels on metal tracks, streetcars cannot climb steep hills, and they may slip when braking on descents, particularly in Seattle's rainy weather. Different streetcar vehicles can handle different grades, with most able to travel safely on slopes up to 6%. Some can handle up to 10%, but slopes this steep may preclude modern low floor vehicles and may pose safety challenges.
Street Geometry	Streetcars are not as maneuverable as rubber-tired vehicles. Generally, they cannot turn corners tighter than 90 degrees in city streets. Weaving from one lane to another to deal with complex intersections creates operational problems. Generally, streetcar lines should avoid freeway interchanges and other intersections with complex geometry. They cannot operate safely in travel lanes less than 10′ wide, with 11′ typically preferred.
Barriers	Streetcars need clearance for their overhead power lines. A minimum of 14′ is required. The Federal Railway Administration restricts streetcars from crossing freight rail tracks.

Utilities Check major utilities under street	If possible, streetcars should avoid operating on streets with major underground utilities, and streetcar tracks should not be placed directly on top of underground utilities. Utility relocation is very expensive. If tracks are laid atop utilities, the streetcar will need to be shut down anytime the utilities need repair.
Land Use Criteria	
Existing and planned density	Streetcars need a lot of population and employment density in order to perform well. In general, streetcars should only be considered in Center City and Urban Villages.
Mixed uses and destinations	Streetcars do well when they capture a wide variety of trips – not just commute trips. The best streets for streetcars are mixed use corridors with retail, entertainment, schools, universities, hospitals, event centers and other venues that generate all-day travel.
Walkability	To be successful, streetcars require highly walkable streets for a half mile on both sides of the streetcar corridor. Passengers must be able to comfortably walk to the streetcar stop, and the whole service area, not just the streetcar street itself, must be considered.
Economic Criteria	
Economic development potential	Streetcars do not generate economic development by themselves, but they can be a powerful tool to catalyze a well organized economic development plan. The best corridors for streetcars are those with a high potential for change – especially places where the market is reluctant to create the desired change without the strong commitment of a streetcar line.
Social justice	Because streetcars create strong mobility and economic development benefits, planners should examine who benefits from streetcar investments. Who benefits in terms of ethnicity, age, disability and income? Are benefits distributed equally? Because streetcars tend to produce a significant increase in property values – around 40% -- it is also critical to examine whether communities a streetcar is designed to benefit might be *displaced* as a result. Might the project create local rent increases, tax increases and evictions, and if so, what protections can the existing community be provided? If residents and retailers in a potential streetcar corridor are primarily low-income, ethnic minority renters, but the property owners are high income whites, how can the project ensure both property owners and renters benefit appropriately? Similarly, to what degree should local property owners be required to fund a Local Improvement District to fund a streetcar? Should a lower threshold be set in areas with historic under-investment? Finally, to what degree should *geographic* equity be considered, regardless of neighborhood demographics – do streetcar investments need to be spread equally throughout the City?
Transit System Criteria	
System integration: support Transit Plan and planned investments	Seattle, Sound Transit and King County Metro have a coordinated plan of major transit investments throughout the city. Future streetcar investments must fit into this planned network, tying into existing and planned major transit stations and hubs. Potential streetcar investment should focus on the Urban Village Transit Network routes outlined in the Center City Circulation Plan and Seattle Transit Plan. In general, at least one end of proposed streetcar lines should terminate at one of the three major hubs – King Street Station, Colman Dock or Westlake Hub – or at a key Link Light Rail station.

Speed and reliability	Transit riders make their decision to take transit based largely upon speed and reliability. While streetcars generally do not have the infrequent stops of *rapid* transit, they should still meet Metro's speed standards for regular buses. Since streetcars cannot maneuver around obstacles, it is especially important that streetcar corridors be managed to be relatively free of congestion. Major bottleneck locations should be avoided.
Operating cost savings: replace existing bus service?	Given Seattle's and King County Metro's financial constraints and the higher operating cost of streetcars than buses, streetcars will be more feasible if they can replace entirely or in part existing bus services. The major Urban Village Transit Network bus corridors are good candidates, including "short run" segments of these corridors running through the densest neighborhoods in Center City.
Phasing and Funding Criteria	
Private funding commitment	Streetcars require a mix of funding sources in order to be viable, and they generally need financial support from those property owners who will benefit from the project. Corridors where property owners would support taxing themselves in the form of a Local Improvement District have the greatest chance of success.
Linkage/shared funding with other projects	Streetcar projects should also be prioritized if they can share funding with another project, such as Sound Transit's proposal for a First Hill streetcar as part of its Link Light Rail extension to the University District.
Meets federal and other funding criteria	Meeting the federal government's tough cost effectiveness criteria will make a Seattle streetcar eligible for highly competitive federal funds, and will also help ensure project success.

Potential Alignments

Workshop participants divided into four groups to explore potential streetcar alignments, and they presented their work in the form of maps and discussion. Technical experts and other participants commented upon and critiqued each plan, with the goal of arriving at a single, consensus-based plan. All potential alignments are presented here with a brief description of the major issues that were raised for each. More detail on the recommended alignments is presented in the next section. Images of the groups' work are shown in Figure 2-1.

Group 1

Group 1 focused on extending the Waterfront line east on Jackson Street to 23rd Avenue, serving the core of the Central Area Neighborhood. It could then be extended south via Rainier Avenue to the Link Light Rail station at McClellan Street, then further out Rainier Avenue to Columbia City. An additional extension might be possible north on 23rd Avenue toward the University District.

In the discussion, the group realized that 23rd Avenue north of Jackson Street lacked the necessary existing or planned density or major economic development potential, plus grades would prevent it from being extended to the University, so that option was dropped.

South of Jackson Street, two corridors are quite strong: Rainier Avenue to McClellan Street or 23rd Avenue to McClellan Street, each with the possibility of going all the way to Columbia City via Rainier Avenue. A more detailed economic and corridor analysis would be necessary to select which option is superior.

The discussion also noted that these corridors have high concentrations of low income residents and people of color, so there could be strong social justice arguments for investing in streetcars here. On the other hand, others suggested that the area's demographics would make it more difficult to arrange a local

financial contribution toward streetcar construction. It is also possible that there is a high potential value increase in this corridor, and that a value capture mechanism could raise significant revenue. Additional market research is necessary. Certainly, mechanisms would need to be put in place to ensure that streetcar-induced increases in rents and property values would not displace the very community these lines would be designed to serve.

Group 2

Group 2 created a comprehensive network of streetcars throughout the city, starting with an extension of Sound Transit's First Hill line north all the way to the University District. Other lines included:

- A new line connected King St Station via 1st Avenue to Uptown, later connecting via Seattle Center to the South Lake Union line.
- The South Lake Union line was extended via Eastlake Avenue to the University District and via Westlake Avenue to Fremont and Ballard.
- The South Lake Union line was extended south via 5th Avenue to King Street Station and east to Capitol Hill.
- A loop was created via Jackson Street, 23rd Avenue, Madison Street and 12th Avenue
- The Jackson Street line was extended via Rainier Avenue to McClellan Street
- The Waterfront Line was extended to Interbay
- Finally, Ballard and the University District were connected via NE 45th Street and Wallingford

In the discussion, it became clear that several of these alignments had fatal flaws or had a poor return on investment. While Jackson Street itself meets the density and development criteria, the residential neighborhoods north of Jackson, east of First Hill and east of 12th Avenue, for example, have too low a density and too little development potential for streetcar to be an optimal transit technology. The same is true of the N/NE 45th Avenue corridor. Similarly, the topography of the Westlake neighborhood north of Valley Street provides such limited access to the half-mile radius around potential stops as to produce insufficient benefits; that is, one side of Westlake Avenue is water, and the other side is a steep slope and the barrier of Aurora Avenue. The Interbay line ran into comparable problems, though it offered more development potential at its north end.

The group was intrigued, however, by the ideas to connect to the University District, both via the Eastlake Avenue alignment and the Broadway/10th Avenue alignment.

The 1st Avenue connection to Uptown and Seattle Center was also strong, but the group realized this would have to be done after the completion of the Alaskan Way Viaduct replacement project.

The idea of an east-west connection in the South Lake Union area also generated considerable discussion, and was developed further by Group 4.

Group 3

Group 3 began their plan with an analysis of all the underlying transit services, especially the most successful bus lines. Like Group 2, they proposed extensions to the University District via both Eastlake Avenue and Broadway/10th Avenue. They also included Group 1's Jackson Street and Rainier Avenue extension, and Group 2's Interbay line. Finally, like Group 3, they included an east-west connection to Uptown and Seattle Center, but they assumed a level crossing of Aurora Avenue at Harrison Street.

As with the other groups, the Eastlake Avenue, Broadway/10th Avenue-to-U-District, Jackson Street and Rainier Avenue alignments emerged as the strongest candidates in the discussion, though each had advantages and disadvantages that are addressed in more detail in Chapter 3.

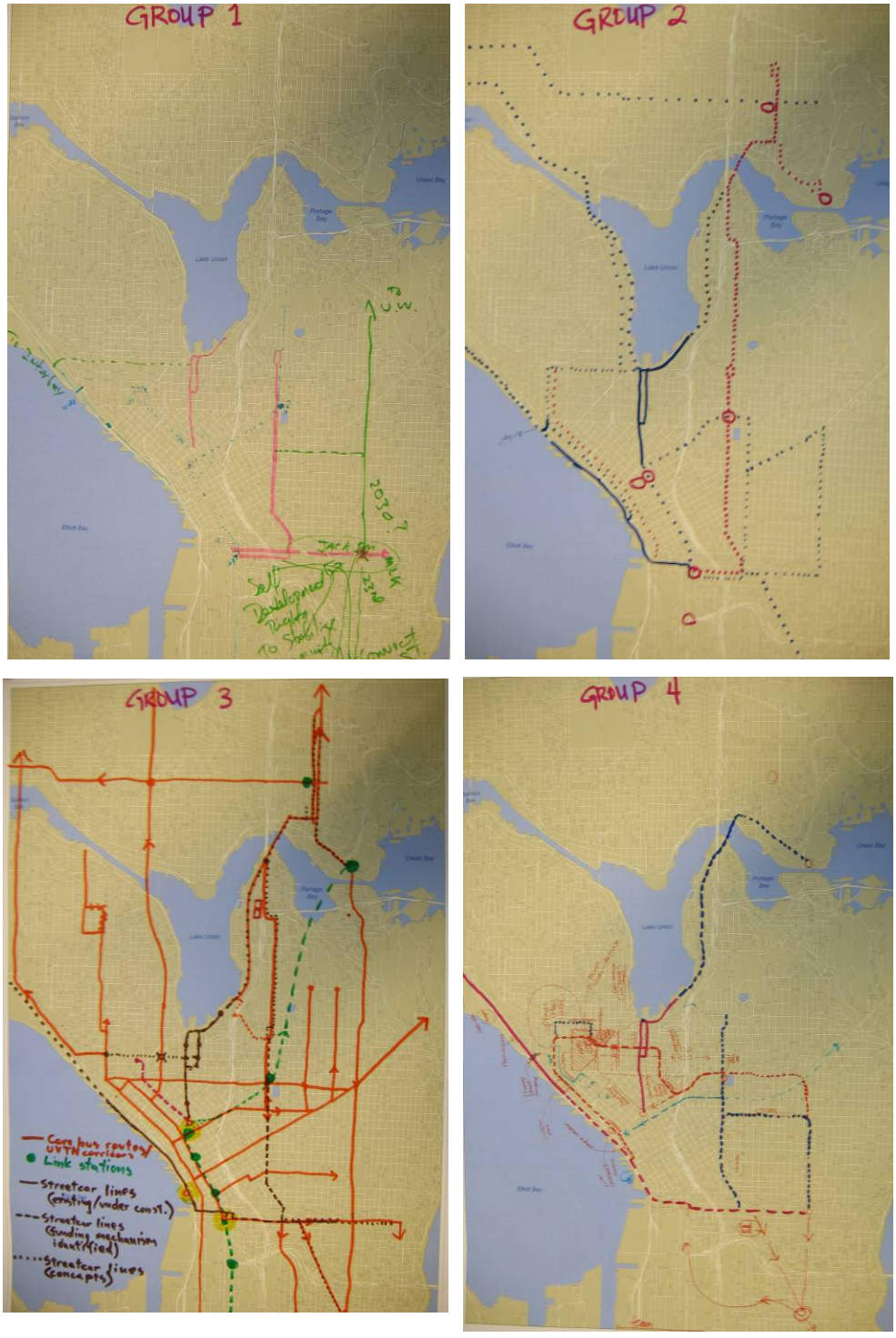
Group 4

Group 4 included the Eastlake Avenue, Jackson Street, Rainier Avenue, 1st Avenue and Interbay lines of the other groups. To these they added considerable thinking about east-west connections from Uptown to Capitol Hill.

The east-west alignment they selected went from Uptown and Seattle Center via Harrison Street to Fairview Avenue to Boren Avenue to Olive Way, to the Capitol Hill Link Station, then beyond Madison Street and 23rd Avenue.

There was initial negative reaction to this east-west route, in part because it requires Aurora Avenue to be "lowered" to allow a level crossing at Harrison Street, and also because of its circuitousness. A "partially lowered Aurora" is currently the preferred alternative under the Alaskan Way Viaduct Project, but it is unclear at this time when it would be funded and implemented. There was also concern that it largely duplicated the Monorail and South Lake Union Streetcar, which connect the Seattle Center and South Lake Union areas to Westlake Hub; why connect these places to the Capitol Hill Station as well, particularly given the difficult grades on Olive Way.? When this route was suggested as a replacement for the Denny Way bus lines, however, the group warmed to the idea, given the rich mix of destination and neighborhoods the line would serve, and the fact that Denny Way west of I-5 will always be a poor transit street due to its congestion and poor pedestrian environment. For more detail, see "Further Study" in Chapter 3.

Figure 2-1 Workshop Maps by Group



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Chapter 3 Recommended Plan

Pulling together the best aspects of all four group presentations, the agencies and technical staff team developed a recommended conceptual plan. The plan was built from a base that includes three key elements:

- **Existing Rail Network**. The plan starts with the city's existing and funded rail network, including Link light rail, the Monorail, the South Lake Union Streetcar and the Waterfront Streetcar. Sound Transit's proposed extension to Capitol Hill/First Hill is included since conceptual design is complete and this project is included in various Sound Transit 2 funding packages which will go to the voters in 2007. It is important that any new streetcar investments capitalize upon the existing and planned system, connecting to key stops and hubs.
- **Existing Core Bus Network.** These are the trunk lines of the city's transit system, running every 15 minutes or better all day long for at least 18 hours a day. Some of these routes are the best candidates for replacement with streetcar, in part since most of them are historic streetcar routes.
- **Center City transportation hubs.** The routes connect to one or more of the hubs at King Street Station, Colman Dock or Westlake Center.

Recommended streetcar corridors were then applied to this base in three tiers: 1) two alignments that appear achievable within the next 10 years, 2) another extension that would be a priority but needs additional analysis before a commitment is made, and 3) four further projects that require significant analysis and/or time to determine their feasibility.

The recommended corridors are mapped in Figure 3-1, and a summary evaluation table is provided at the end of this chapter in Figure 3-2. More detail on each corridor follows. Note that no detailed planning analysis or engineering analysis has been completed for any of these options; planners built on previous transit and Center City work, examined Geographic Information Systems data provided by City staff, and spoke briefly with a limited number of agency and stakeholder representatives at the workshop.

1. Ten Year Plan

Between now and 2016, it is reasonable that the following two streetcar extensions might be implemented:

South Lake Union to University District via Eastlake

This line would extend the South Lake Union service currently under construction via an historic streetcar alignment to the University District. It would continue along Fairview Avenue North, take Eastlake Avenue to the University Bridge, then terminate at one or both of the planned Link light rail stations in the University District.

This line has several major advantages:

- It is the only streetcar extension in the City's adopted Transit Plan.
- The land use characteristics along the way, including the density, mix of uses, and major institutions support a streetcar investment.
- There is significant development potential in the corridor.
- The existing economic base in the corridor suggests a strong possibility of a local funding match through a Local Improvement District.

- Both ends of the line terminate at two of the City's strongest anchors: Westlake Hub in the heart of the retail district, and the University Link station in the densest district outside the Central Business District. In between are three of the city's most rapidly growing neighborhoods.
- May allow King County Metro to restructure or replace local bus service through Eastlake, creating operating cost savings.

The line also has some challenges that would need to be addressed:

- Much of the corridor is currently congested, and congestion is expected to grow. Maintaining necessary speed and reliability for the streetcar will be a challenge.
- Eastlake Avenue is the only continuous corridor connecting these neighborhoods and must accommodate all modes – bicycles, freight, transit and automobiles..
- The routing and terminus on the University end still needs to be determined. Terminating at NE 45th Avenue and University Way NE would allow for a future extension further north, but would create impacts on the retail district. Both alignments are a fairly far walk from the center of the University itself.
- While streetcar service would provide significant overall benefits to most Eastlake businesses, depending on where the stops are located, it may result in a loss of parking in the business district.
- With Link Light Rail and the South Lake Union streetcar, some neighborhood interests may feel that this portion of Seattle has already received its fair share of investment.
- The grades along Eastlake Avenue, the narrowness of the Eastlake Avenue/Fairview Avenue intersection, and the complexities at the University Bridge will all need further analysis.
- Both the Fairview Bridge and University Bridge need upgrades to support streetcars.
- In terms of social justice and geographic equity, this line serves a primarily white, affluent area.

Jackson Street to First Hill/Capitol Hill to Aloha Street

Sound Transit is proposing to extend the Waterfront Streetcar from King Street Station through the International District then via Jackson Street to First Hill, then up Broadway to the Capitol Hill Link Light Rail Station at John Street. Extending it farther to Aloha Street would allow it to serve the heart of the Capitol Hill commercial district, enhancing the value of the line.

This line has several advantages:

- The Sound Transit proposal provides a strong connection from First Hill to Link heading north to the University, as well as Link, Sounder and other services heading south from King Street Station.
- Adding the short segment to Aloha Street connects the centers of two of the City's densest neighborhoods, allowing First Hill's residents access to Capitol Hill's abundant retail and entertainment, and allowing Capitol Hill residents access to First Hill's abundant jobs.

It also has challenges:

- Broadway along Capitol Hill is congested so ensuring adequate streetcar speed and reliability will be a challenge.
- On-street parking is important to Capitol Hill merchants, so it will be important to examine impacts on on-street parking at streetcar stops. If streetcars and buses serve the same stops, or if streetcars replace existing buses, parking impact may be minimal.

Figure 3-1 Recommended Plan Map

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- Terminating the line at Aloha Street means that it does not end at a hub or at the intersection of other important transit lines. It would provide one streetcar line connecting the Broadway business district with the residential areas on the north end. This may be able to replace the existing bus transit route that terminates at Aloha Street. This line does not replace existing bus services that extend to the north or provide as strong all-day ridership in both directions as would a terminus at, say, the University District. Terminating at John Street, however, reduces ridership potential by avoiding the Capitol Hill commercial district.
- It is unclear if business and property owners in Capitol Hill would be interested in raising money to support this extension.
- It is unclear if a streetcar extension here would result in any more economic development than would happen without the streetcar. For this reason, other neighborhoods seeking economic development support may express concern that Capitol Hill and First Hill were prioritized for streetcar investment.
- In terms of social justice, this line provides new service to First Hill, which was bypassed by Link Light Rail. Serving the diverse International District, the diverse employment base in First Hill and the community services in both neighborhoods provides strong social justice benefits.
- Likely does not replace any existing bus service, but provides additional capacity in this critical primary transit corridor.

2. Priority Extensions Post-2016

Beyond the 2016 construction horizon, but still meriting near-term planning, is an eastward and southward extension of the Jackson Street line. These routes had no fatal flaws, satisfied most evaluation criteria, but are weak in some criteria areas.

Jackson Street and Rainier Avenue Corridor

This line would be designed to serve the Central Area neighborhood as an extension from Sound Transit's proposed route along Jackson Street to First Hill. There are two possible alignments, each with a logical terminus either at the North Rainier Link Station at McClellan Street and Rainier Avenue, or continuing all the way to Columbia City via Rainier Avenue. At the north end, both alignments would terminate at King Street Station or continue along the waterfront.

Each alignment has advantages and challenges:

Jackson Street to 23rd Avenue S to Rainier Avenue

Advantages:

- This alignment serves the neighborhood business district of the Central Area, near the corner of Jackson and 23rd Avenue S.
- It would also directly serve the new Urban League Village and Northwest African American Museum at the former Colman School, near the corner of 23rd Avenue S and S Massachusetts Street.

Challenges:

- Commercial land uses along Jackson are fairly low density, currently dominated by surface parking. While not well suited to streetcar in its current form, the corridor could support significant new development, particularly at the important corner of 23rd Avenue S and Jackson Street.

- This stretch of 23rd Avenue S is primarily residential and relatively low density. Increasing residential density here may result in displacement of existing residents, an issue that would need to be addressed.

Jackson Street to Rainier Avenue

Advantages:

- This option takes the more direct route to the North Rainier Link station.
- It tends to be more commercial and industrial than the Jackson Street/23rd Avenue S route, offering potentially more development opportunities.

Challenges:

- I-5 and the I-90 ramps take up a big share of the potential ridership "capture area" of the streetcar corridor on this alignment.
- While the 23rd Avenue S alignment would directly serve the African American Museum, the Rainier Avenue alignment would stop three blocks from the museum.

Other Issues for Both Sub-Options

Advantages

- While both alignments are of lower density and lack the current intensity of activity as the Eastlake and Capitol Hill lines, the entire Central Area has significant untapped development potential that a streetcar could help catalyze.
- Unlike the other corridors discussed above, the Central Area has a high percentage of low-income residents and people of color. In addition to helping the City address social justice issues, a streetcar in this corridor would tend to generate higher ridership per capita than the other corridors.
- If extended to Columbia City, may allow King County Metro to replace the 34 line and restructure the 7 line, resulting in significant operating cost savings.

Challenges:

- Before considering advocating for a streetcar here, however, neighborhood residents and business leaders should carefully consider its economic impacts. A streetcar would likely increase property values – and therefore residential and commercial rents – by about 40%, as noted in Seattle's 2004 streetcar study. If this results in the displacement of the community the streetcar was designed to serve, then a streetcar project would not be a good investment.
- If the primary goal of the neighborhood is improvement of conditions for existing residents and retailers, then there may be more cost effective tools for achieving this goal than a streetcar. For example, the same funds might better be used for streetscape improvements, micro-loans, entrepreneurship training, façade improvements, etc.
- Likely, neither alignment would allow Metro to replace an existing bus route unless streetcar service was extended all the way to Columbia City. As a result, both alignments could potentially add significant operating costs for Metro. A shorter first phase, connecting the International District and Central Area as far as 23rd and Jackson, however, might provide significant economic development benefits at minimal additional operating cost.

3. Further Study

These routes require further study to determine if they should be part of the plan. More analysis is necessary to determine if these routes are feasible, or how well they meet the criteria.

Uptown and Seattle Center

The Uptown neighborhood and Seattle Center both offer enticing destinations for a streetcar extension, but viable alignments will not be available for many years. Access south to the Central Business District will be hampered by the construction of the Alaskan Way Viaduct replacement project, which will create major congestion problems on downtown's north-south streets, with construction expected to begin in 2010 and continue for nearly a decade. While much of 2nd, 3rd and 4th Avenues will be reserved for transit service during this time, streetcar operations are incompatible with the skip-stop, leapfrog bus transit pattern that will be necessary on those three streets.

A connection from Uptown and Seattle Center eastward toward the Capitol Hill Link station is likewise prevented by the lack of an adequate crossing of Aurora.

Once the Viaduct Replacement project is complete, including the partially "lowered Aurora," however, two interesting streetcar alignments merit further analysis:

First Avenue to Seattle Center

Advantages:

- First Avenue is downtown Seattle's "main street" and it connects directly into the heart of Uptown.
- It ties together some of the most important transit hubs and destinations in Seattle, including King Street Station, Colman Dock, Pike Place Market, Belltown, Uptown and Seattle Center. This is potentially one of the strongest streetcar routes in the City.

Challenges:

- First Avenue is a narrow, slow, congested retail street, with cars regularly queuing to turn or back into parking spaces. It would be a challenge to make this a reliable streetcar corridor.
- It would produce a loss of on-street parking spaces to accommodate streetcar platforms.
- Putting a streetcar on 1st Avenue would require a complete rethinking of the character of 1st Avenue and its role in the overall downtown transportation system.
- This line does not replace existing bus service, but it could act as a "shortline" for service continuing north of Uptown, helping to expand capacity efficiently.

Seattle Center to Capitol Hill

The Denny Way corridor is a planned core transit route connecting some of the most rapidly growing areas in the city. Because Denny Way is where two of downtown's main grids collide, however, it will be a congestion bottleneck line for the north edge of the downtown. Moreover, the odd angles of its intersections make it a poor pedestrian and retail street. As a result, it is worthwhile to consider east-west alternatives to Denny Way for a major transit corridor.

One possibility is to cross a "lowered" Aurora Avenue on Harrison Street, then take Fairview Avenue to Boren Avenue to Olive Way to Broadway. This is considerably more circuitous than Denny Way, but it is not necessarily slower if appropriate transit reliability protections are put in place.

Advantages:

- Potentially superior east-west alternative to Denny Way.
- This alignment would serve Uptown, Seattle Center, South Lake Union, Denny Triangle and Capitol Hill, terminating at the Capitol Hill Link Light Rail station.

Challenges:

- It is entirely dependent upon a new level crossing of Aurora, which would be a major project.
- The grades on Olive Way are marginal and would require further analysis to determine if they are adequate.
- Both Boren Avenue and Olive Way currently serve a critical traffic distribution function that would need to be rethought before considering streetcars there.
- In terms of economic development potential, it is unclear if a streetcar in these corridors would result in any more economic development than would happen without it. At best, it could increase visitor travel overall, as well as increase the utilization of Seattle Center, bringing direct and indirect financial returns to the City. At worst, it would merely serve to increase housing prices in neighborhoods with a current strong development market.
- Starting construction on a streetcar project to Uptown and Seattle Center will not be viable until after the Viaduct replacement project is complete.
- It is unclear how this line would affect the existing bus network and whether operating cost savings would accrue.

Either of these options would create new economic development potential in both Uptown and the Seattle Center area; as a result, planning for these lines would logically be combined with a future planning effort focused on development and urban design.

Interbay

Continuing the existing Waterfront Streetcar farther north toward Interbay has been discussed for years, and it may seem like a logical possibility.

Advantages:

- It is a readily available corridor.
- It serves major employers along the waterfront and significant development potential in Interbay. These may provide partnership opportunities.

Challenges:

- Good transit corridors have high densities and a strong mix of uses for the entire half mile radius around stations. Along the north waterfront, however, most of the service area is eliminated by the freight railroad and steep grades to the east and Elliott Bay to the west. While there is considerable development immediately along the edge of the potential streetcar route, the development parcels are very shallow.
- This corridor is primarily employment, without the same balance of retail, entertainment, residential and institutions as the other corridors examined. The ridership patterns will therefore tend to be one-direction and peak oriented. This does not produce cost effective streetcar service.
- It may be desirable for transit heading to Interbay to connect to Ballard in order to be a part of a coherent network, Ballard having been identified as a key node in the Seattle Transit Plan. Since

the City is already pursuing Bus Rapid Transit from Ballard to downtown via 15th Avenue, a streetcar to Interbay may be redundant and increase overall transit operating costs.

Streetcars may merit further analysis in this corridor if they were funded largely by the major employers or destinations that would benefit from such a service.

Broadway to University District

To take further advantage of the Sound Transit streetcar line to First Hill and Capitol Hill, an extension all the way to the University District is worth exploring. Between Aloha Street and the University, the streetcar would take 10th Avenue to Roanoke Street and cross the University Bridge to connect to the Eastlake Line.

This extension is almost entirely residential and with fairly low residential density, comparable to the Rainier Avenue and 23rd Avenue corridors. Unlike Rainier, however, there is very little new development potential here.

Advantages:

- It connects to the University District, one of the most important transit destinations in the city after the Central Business District. Capitol Hill has a high share of students and employees commuting to the University.
- Link's one Capitol Hill stop is at the far south end of the neighborhood, so this line connects the whole neighborhood to both Link and the University District.
- Broadway/10th is one of the highest ridership bus lines in the region. Extending a streetcar its entire length builds upon this success and allows Metro to fully replace some bus lines with a streetcar.

Challenges:

- The main disadvantage of this extension is cost and the lack of new development potential along it.
- This line is redundant with Sound Transit's Phase 2 extension from Capitol Hill to the University District. As such, the streetcar would primarily be used for local trips between the Capitol Hill station and the University or Brooklyn stations. The gap between these stations is over 2 miles, however, so the streetcar service would provide more of a local complement to the rapid Link Light Rail line rather than compete against it.
- This line serves a primarily white, affluent area. In terms of geographic equity, it connects to the University, which would likely have already received a streetcar investment via Eastlake.

South Lake Union to King Street Station

Connecting the South Lake Union streetcar line through the heart of downtown to King Street Station and the Jackson Street line is logical for many reasons.

Advantages:

- It would bring together all of the City's streetcar services, allowing for a single storage and maintenance facility.
- More importantly, it would serve the heart of the downtown, reducing the number of transfers riders must make, and significantly increasing ridership.

Challenges:

Under current conditions, however, there is no adequate alignment for such a connection. All of downtown's north-south streets present severe challenges, at least until the Viaduct replacement project is complete:

- Western is too steep at its north end to connect to the South Lake Union line.
- 1st Avenue's problems are noted in the section on Uptown/Seattle Center. It may offer a possible alignment after the Viaduct replacement project is complete.
- 2nd and 4th Avenues' capacity will be consumed by vehicles displaced during the Viaduct replacement project construction, along with heavy bus volumes. It is important that transit vehicles traveling in the right lane be able to maneuver around cars queued to turn right, as well as avoid parked cars during times when parking is allowed.
- 3rd Avenue will be entirely dedicated to bus transit through the duration of the Viaduct replacement project. Bus stops along this street are arrayed so that buses leapfrog each other, requiring transit vehicles to move from the outside lane to the inside lane. Confined to a single lane, streetcars would disrupt this pattern, resulting in capacity problems.
- 5th Avenue has the narrowest right of way, and is routinely congested at the freeway ramps.
- 6th Avenue has grade, discontinuity and freeway ramp problems.

Providing this connection should be considered as a post Viaduct replacement project implementation. At that point the street system would be functioning without the impacts of construction.

Figure 3-2 Recommended Plan Summary Evaluation

	10 Year Plan		Priority Extension	Further Study			
Route	SLU to U District via Eastlake	Jackson to First Hill/ Capitol Hill	Jackson to Rainier	Uptown/ Seattle Center	Waterfront to Interbay	Broadway to U District	Westlake to King St Station
Physical Criteria							
Grade	OK	Check grades on 12th.	OK	OK	OK	OK	OK
Street Geometry	Detailed analysis needed at University Bridge and Fairview/ Eastlake intersection	Check turns at Jackson/12th	Check freeway crossings and ramps	Major issues. Will need detailed analysis	Check for adequate right of way width, especially through park.	Major issues. Will need detailed analysis	Major issues. Will need detailed analysis
Barriers	OK	OK	Check freeway crossings	Major issues. Will need detailed analysis	Streetcar cannot cross freight tracks.	OK	OK
Utilities Check major utilities under street	Some info from 2005 report.	Water utilities on 12th Avenue and on Jackson Street	Unknown	Unknown	Unknown	Unknown	Unknown
Land Use Criteria							
Existing and planned density	Existing density is supportive. Significant TOD potential in Eastlake.	Existing density is very supportive, with significant development potential throughout.	Exiting density only moderately supportive. Increased density raises displacement concerns.	Existing and planned density very supportive, with significant additional development potential.	Existing and planned density not very supportive and limited by water and railroad.	Existing and planned density not very supportive; little development potential.	Existing and planned density very supportive.
Mixed uses and destinations	Excellent mix of employment, retail, residential and institutional.	Excellent mix of employment, retail, residential and institutional.	Good mix of retail and residential. Some employment, with potential for more.	Excellent mix of employment, retail, residential and institutional.	Mainly employment; other uses limited.	Mainly residential, with major destinations at each end of line.	Excellent mix of employment, retail, residential and institutional.
Walkability	Highly walkable neighborhoods, with potential for improvements as part of project.	Highly walkable neighborhoods, with potential for improvements as part of project.	Highly walkable neighborhoods, with potential for improvements as part of project.	Highly walkable neighborhoods, with potential for improvements as part of project.	Excellent waterfront path planned, but east-west connections limited.	Highly walkable neighborhood.	Highly walkable neighborhoods, with potential for improvements as part of project.

	10 Year Plan		Priority Extension	Further Study			
Route	SLU to U District via Eastlake	Jackson to First Hill/ Capitol Hill	Jackson to Rainier	Uptown/ Seattle Center	Waterfront to Interbay	Broadway to U District	Westlake to King St Station
Economic Criteria							
Economic development potential	Significant potential for increased development not only along corridor, but also along existing SLU line.	Significant potential for increased development.	Significant potential for increased development, but raises displacement concerns.	Significant potential for increased development.	Limited potential for increased development due to land constraints.	Limited potential for increased development in built-out residential neighborhood.	Significant potential for increased development.
Social justice	Mostly affluent, white area.	Serves diverse International District, important employment and community services on First Hill.	Serves largely low-income, ethnic minority neighborhoods.	Serves primarily affluent, white neighborhoods.	Serves primarily affluent, white areas.	Serves primarily affluent, white areas.	Serves primarily affluent, white areas.
Transit System Criteria							
System integration: support Transit Plan and planned investments	Included in City's Transit Plan. Connects Westlake Hub to major Urban Center.	Being planned as part of Sound Transit 2 proposal	Connects King Street Station and McClellan Link Light Rail Station. If extended to Columbia City, replaces major bus line.	Connects King Street Station, Colman Dock and Seattle Center.	Competes with Ballard BRT; no strong terminus at north.	Connects Capitol Hill Link Station with University District station.	Connects South Lake Union line to King Street Station.
Speed and reliability	Entire corridor experiences congestion.	Entire corridor experiences congestion.	Less congestion than other corridors, but would benefit from transit priority.	Extremely challenging ;all north-south downtown streets congested; competition with buses on 2nd, 3rd, 4th Aves. Requires significant transit priority post Viaduct replacement completion	Mostly dedicated right of way available.	Requires significant transit priority.	Extremely challenging. Requires significant transit priority post Viaduct replacement completion

	10 Year Plan		Priority Extension	Further Study			
Route	SLU to U District via Eastlake	Jackson to First Hill/ Capitol Hill	Jackson to Rainier	Uptown/ Seattle Center	Waterfront to Interbay	Broadway to U District	Westlake to King St Station
Operating cost savings: replace existing bus service?	May replace or allow restructuring of local buses on Eastlake Ave.	Likely does not replace service, but addresses some capacity issues in this major corridor.	With service to Columbia City, could allow route replacement and restructuring.	Acts as shortline, expanding capacity .	Competes with planned BRT.	Could replace and restructure existing routes.	Addresses downtown capacity issues.
Phasing and Funding Criteria							
Private funding commitment	Existing Local Improvement District could be expanded.	Likely to be funded by Sound Transit	Local Improvement District would need to be explored.	Local Improvement District would need to be explored.	Needs significant support from corridor employers,	Limited potential due to residential nature of corridor.	Local Improvement District would need to be explored.
Linkage/shared funding with other projects	Could build on existing Local Improvement District.	Already being pursued by Sound Transit.	Could be extension of Sound Transit's First Hill service.	Could be part of future development and urban design plan.	Could be funded as part of private development expansion.	Unknown	Could be funded through downtown developer mitigations
Meets federal and other funding criteria	Good potential for cost effectiveness.	Good potential for cost effectiveness.	Cost effectiveness requires added development intensity.	Good potential for cost effectiveness.	Would likely need to be locally funded.	Low density makes cost effectiveness challenging. Needs ridership analysis.	Good potential for cost effectiveness.

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Chapter 4 Next Steps

This report was developed following a one-day workshop with Streetcar Alliance members and limited involvement from local and regional agency staff. It should therefore be viewed as a starting point for ongoing discussions with community groups, elected officials and staff at the City of Seattle, King County Metro, Sound Transit and other agencies. The following are recommended next steps for the city to consider.

Systemwide Next Steps

The first issue for the City to consider is where streetcars fit in the larger transportation and economic development context. There are at least four different approaches to this systemic question, each of which has advantages and challenges as noted below:

Streetcars are an integral part of the City's transportation network.

If the City wishes to create a streetcar network that is integrated into its larger transportation and transit strategies, it will need to consider how that should be addressed in the City's *Transit Plan* as well as King County Metro's *Transit Development Plan.* Significant new analysis would need to be completed on all of the proposed corridors, including capital cost estimates, ridership estimates, operating cost estimates and economic development return-on-investment estimates.

This option has certain advantages:

- It is highly valuable to see how streetcars fit into the larger transportation context and consider whether they are indeed the optimal technology for a given transit corridor. For example, a longer, more cost effective Bus Rapid Transit project may meet the City's goals better than a streetcar project, or a more costly light rail extension may be preferred.
- In a comprehensive look, it is easier to prioritize streetcar corridors on comparable terms, particularly on the important topics of capital cost, net operating cost, net ridership and economic development potential.
- It can address common system elements, such as a maintenance facility, storage yard, operator training, transit prioritization treatments, etc.

This option also presents one major challenge:

- This level of effort is costly and time consuming, costing hundreds of thousands of dollars and taking at least two years. The City has urgent priorities it must address over the next couple of years and limited financial resources.

Streetcars Investments Arise from a Streetcar Plan

This is an alternative approach that may still enable the city to create a stand-alone streetcar plan that relates to existing transit and transportation plans. A comprehensive streetcar plan would build upon the 2004 *Seattle Streetcar Network and Feasibility Analysis*, this document, the 2006 Eastlake line study and the 2006 Sound Transit First Hill study. It would conduct a level of engineering analysis for all the suggested lines in this study comparable to the 2006 Eastlake study. It would also add detailed analysis of the economic development potential in each of the corridors, identifying total return on investment. It would examine operational costs and cost savings, along with funding opportunities. Finally, it would include additional community input.

Advantages:

- It achieves many of the goals of the comprehensive transportation plan above, but at a significantly reduced cost.
- It adds economic return-on-investment analysis not addressed in the Eastlake and First Hill studies.
- It adds operating costs and operating savings not addressed in current plans.
- It allows different streetcar corridors to be compared against each other in detail, helping with prioritization and funding.
- It can address common system elements, such as a maintenance facility, storage yard, operator training, transit prioritization treatments, etc.

Challenges:

- While less expensive than the comprehensive transportation plan, it is still costly and time consuming, at a time when Seattle is addressing major transportation projects. This would cost in the low hundreds of thousands of dollars and take at least one year.
- This approach focuses on single technologies rather than comprehensive solutions to Seattle's transportation challenges.

Streetcars Respond to Immediate Transportation Opportunities

It is possible to respond to streetcar opportunities on a case-by-case basis. This is how the South Lake Union and First Hill lines arose, and indeed this is how most cities develop their streetcar lines. The other recommended lines in this report also respond to immediate opportunities and the requests of community members.

In this option, the City would complete additional analysis on a line-by-line basis, beginning with the priorities outlined in this report, but adjusting them continually as conditions change. If, for example, an employer wished to largely fund a Waterfront Line extension, the City could shift resources to prioritize that project sooner. In this scenario, the City would study one line at a time, examining costs, ridership, return on investment and community support.

Advantage:

- It allows the City to focus its limited staff and financial resources on other priorities, while still moving forward on streetcar investments.

Challenges:

- It is more difficult to prioritize streetcar investments among each other, since no comprehensive analysis is completed.
- It is more difficult to determine whether streetcar is the right technology for a given corridor.
- Common system needs like maintenance facility and storage yard are more difficult to address.

Streetcars Respond to Immediate Economic Development Opportunities

Considering that streetcars are a better economic development tool than they are a transportation tool, the City may also focus streetcar development on the economic development aspects. In this scenario, the question becomes, what is the most cost effective mix of investments to achieve neighborhood economic development goals? Streetcars would emerge as an outcome of Local Improvement District formation and overall economic strategy. Streetcar planning would still be coordinated with SDOT, but economic concerns and opportunities would lead, rather than transportation.

Advantages:

- Allows streetcars to do what they do best: support economic development along corridors.
- Allows SDOT to focus on major transportation priorities.
- Prioritizes local funding support, allowing limited transportation dollars to go further.

Challenges:

- Creates greater risks that streetcars will not be an integral component of larger transportation system.
- Makes appropriate technology selection more challenging.
- Common system needs like maintenance facility and storage yard are more difficult to address.

Corridor Next Steps

This section examines next steps for each of the recommended corridors:

South Lake Union to University District via Eastlake

This line has an already-completed conceptual engineering study, published on the City's website. To build upon that work, the following next steps are suggested:

- Additional community outreach should be conducted along the corridor to determine how well the community supports this proposed extension. Impacts to parking and traffic would need to be discussed, as well as economic development potential.
- The City would need to study key elements that were not addressed in the engineering study. Most important is what the likely return on investment would be from such an extension. Related to that is a funding strategy, including the potential for a Local Improvement District in the corridor. Additional community outreach would also be necessary, along with some urban design analysis. Finally, it will be important to consider operating costs, net operating savings by restructuring existing Metro routes and an operating plan.
- With a funding plan and community support the City would need to conduct more detailed engineering analysis and costing, followed by funding and implementation of the project.

Jackson Street to First Hill/Capitol Hill to Aloha Street

Planning work for this line is already well underway by Sound Transit. The City should leverage Sound Transit's lead work by focusing on detailed implementation aspects of the project, including:

- Consider the opportunity of the construction disruption to improve the pedestrian realm and other aspects of the streets through an urban design plan for the corridor. The City would also need to pay careful attention to detailed design elements of the project itself, particularly the design and placement of stops, overhead wire poles, etc.
- The streetcar will significantly change the development potential in the International District, First Hill and Capitol Hill. The City should capitalize on the project and work to minimize negative implications through a corridor economic development strategy.
- Address traffic issues and transit prioritization issues presented by the project, including the terminus details at Aloha.

Jackson Street and Rainier Avenue Corridor

Significant new analysis is required to examine the engineering costs of this corridor and its economic impacts. Since it would be built as an extension of Sound Transit's First Hill line, one option is to wait until that line is operating and its overall impacts are assessed. If the First Hill service meets the community's goals, the next steps would be to fund a study that would include all of the following elements:

- Conceptual engineering should be completed..
- A planning and real estate analysis would examine the potential for increased economic development and density in the corridor. This analysis would carefully examine the impacts of gentrification and displacement, as well as the opportunities to mitigate their negative implications. It would also include the potential for a Local Improvement District or other local revenue generation.
- An urban design analysis would address increased densities and improved pedestrian connections in the corridor.
- Community involvement would focus on economic development and gentrification issues, determining whether a streetcar investment best meets the community's goals, or whether other programs, such as jobs training, façade improvements and pedestrian improvements would be more suitable.
- A ridership analysis, cost effectiveness analysis and overall return-on-investment analysis would follow, taking into account increased densities and development.
- A funding and implementation strategy would be developed.

If the results of this work are positive and the community supports implementation, the corridor would follow similar implementation steps as the South Lake Union or First Hill lines.

Uptown and Seattle Center

Until issues related to the Alaskan Way Viaduct replacement project are resolved and completed, this line raises too many complex and speculative questions. It should be considered after the Viaduct replacement project is complete.

Interbay

The Interbay line has low total density, potentially conflicts with the Alaskan Way Viaduct replacement project, and competes with the Ballard Bus Rapid Transit project. As a tool for mitigating trips and increasing value to various parcels along the waterfront, however, it would still be useful. As a result, if an employer or other destinations along the line were to provide funding for this extension, it is worth devoting City staff time to it.

Broadway to University District

Further planning on this line would not occur until after the First Hill/Capitol Hill line and the Eastlake line were built. By that time, the City and King County Metro would have needed to update their transit plans, in which case such an extension may be analyzed in a comprehensive manner. Should the University of Washington or other funding partner step forward to help fund this extension, however, the City should prioritize it.