



SEATTLE STREETCAR CENTER CITY CONNECTOR

University of Pennsylvania
Weitzman School of Design
CPLN 675: Multimodal Transit
Yunfan Xu & Myron Banez

The background of the slide is a teal color with a white grid pattern. A thick yellow line starts from the top left, goes diagonally down to the right, then turns vertically down to the bottom center, and finally turns horizontally to the right. The text 'CONTEXTUALIZING C3' is centered in the upper half of the slide.

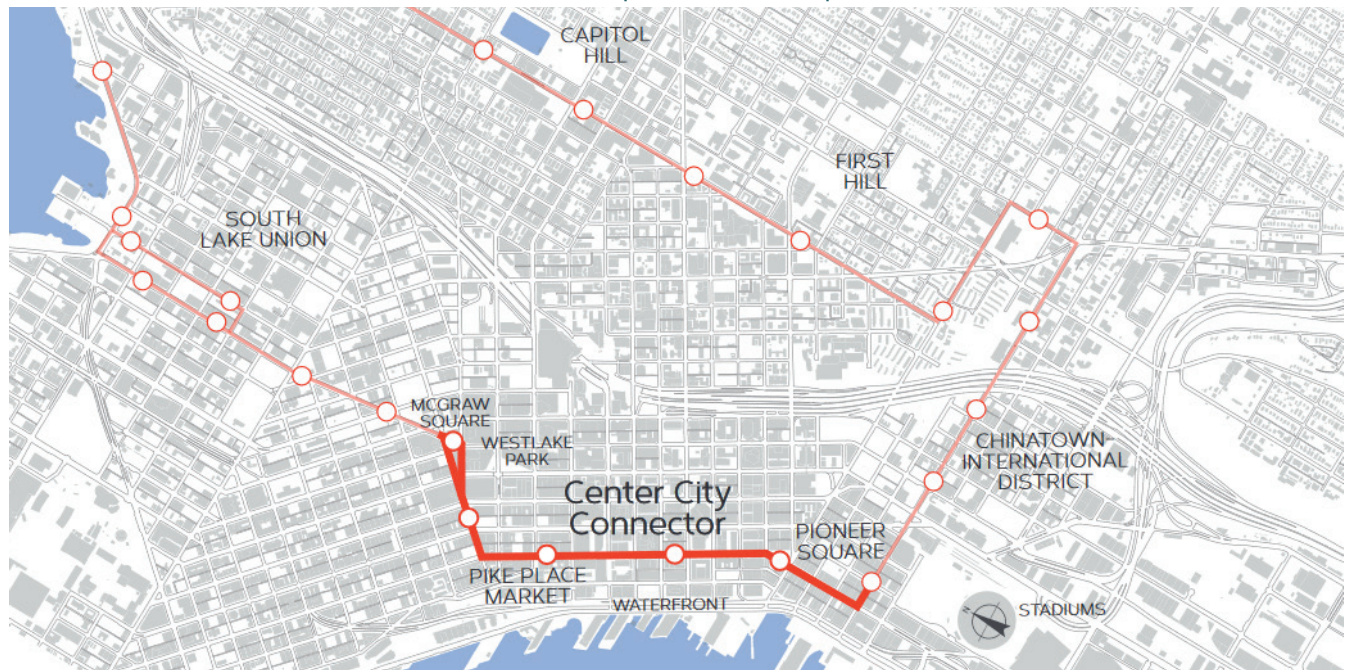
CONTEXTUALIZING C3

Motivation

Loved and used by many, the Seattle Streetcar has proven to be a preferred, reliable, and efficient mode of transportation for riders along the First Hill and South Lake Union lines. Managed by the Seattle Department of Transportation (SDOT), The First Hill line runs through the First Hill, Capitol Hill, Central District, Chinatown-International District, and Pioneer Square neighborhoods while the South Lake Union line runs through the South Lake Union and Belltown neighborhoods. Although the existing lines provide service to the major hubs for work and recreation, there is a clear gap in the transit network.

The Seattle Streetcar does not have an existing line that runs along the downtown core that would increase greater access to major attractions and workplaces such as Pike Place, the Seattle Municipal Tower, waterfront, Seattle Art Museum, and Seattle Public Library. In an effort to bridge this gap in the transit network, SDOT proposed the Center City Connector (C3) plan that would create a new streetcar line to connect the existing First Hill and South Lake Union lines with service running through the major economic and population hubs in the downtown core. As early as 2012, the idea of creating a streetcar route going through Center City has been part of Seattle's Master Transit Plan¹. While the manifestation for the C3 project brings excitement, the project also raises caution for city council and the general public in regards to funding.

Figure 1: Map of Center City Connector line with existing lines.
Source: Seattle Department of Transportation



¹ Seattle Department of Transportation. "Seattle Transit Master Plan Final Summary Report April 2012." Office of The City Clerk, April 2012. <http://clerk.seattle.gov/~ordpics/31367ata.pdf>.

Financing C3

Looking back to the conceptualization of the plan, C3's budget and expected capital costs have been a point of concern to Mayor Jenny Durkan for many years. In 2015, the initial estimated cost was projected at \$143 million, rising to \$166 million in 2016¹. With this project hitting the ground and becoming conceptualized, the Federal Transit Administration (FTA) announced President Obama's FY 2017 budget proposes \$75 million grant to C3. In the first quarter of 2018, Mayor Durkan halted all operations for the plan after a preliminary assessment was conducted and concluded that C3 may face a capital shortfall of \$23 million, resulting in a cost projected around \$197 million. As a result, Durkan issued an independent technical review of the plan's budget to determine its feasibility and to promote transparency with taxpayers of the City of Seattle².

By June of that year, auditing firm KPMG had been identified to conduct the technical review of C3. Reporting their initial findings in July, KPMG learned that the cars utilized for C3 will be bulkier than the cars utilized for the First Hill and South Lake Union lines and that the capital shortfall may be well over \$23 million³. The initial findings brought even greater concern to Mayor Durkan and taxpayers of Seattle. However the final assessment published in August 2018 reported a much higher final figure for capital costs to be estimated at \$252 million⁴. Despite the detriments of the budget, KPMG reported that SDOT was relatively accurate with their own assessment of the budget as it was on par with many other transit agencies across the country.

The outcome of the initial assessment called for an additional engineering and design analysis of the project to further investigate the integration of C3, platforms, vehicle suitability, and maintenance⁵. As a result the updated January 2019 capital and operating costs reported the project will now cost approximately \$286 million. The increase in capital expenses leaves the city of Seattle to be heavily reliant on ensuring they are able to acquire the \$75 million Small Starts Grant that C3 is eligible for according to the FTA, a grant that was proposed for this project has been eligible for since 2016. Mayor Durkan found the analysis to be fruitful and transformative for the city of Seattle by noting C3's impact in connecting the city's major attractions, increases investment in Seattle's future, and adheres to the city's commitment to creating a climate friendly transit system. Understanding the financial transparency, socioeconomic and cultural impacts that C3 has generated enough interest for her and her council to ensure continual engagement with the community, businesses, and transit partners to push for the implementation of C3, providing the project with a more stable and secure capital foundation.

1 Johnson, Graham. "Streetcar Cost Now More than \$100 Million above What City Estimated Three Years Ago." KIRO 7 News Seattle. KIRO 7 News Seattle, September 1, 2018. <https://www.kiro7.com/news/local/streetcar-cost-now-more-than-100-million-above-what-city-estimated-three-years-ago/824874831/>.

2 Hightower, Kamaria. "Following Preliminary Assessment of Costs, Mayor Durkan Halts Center City Connector." Office of the Mayor, March 30, 2018. <https://wayback.archive-it.org/3241/20211217210902/https://durkan.seattle.gov/2018/03/following-preliminary-assessment-of-costs-mayor-durkan-halts-center-city-connector/>.

3 Formas, Stephanie. "Office of The Mayor," July 2018. https://wayback.archive-it.org/3241/20131221183307/www.seattle.gov/audit/docs/FinalPlanningAndDevelopmentCashHandlingAudit5_04_09.pdf.

4 Hightower, Kamaria. "City Releases Initial Summary of Independent Report on Seattle Streetcar." Office of the Mayor, September 4, 2018. <https://wayback.archive-it.org/3241/20211217181902/https://durkan.seattle.gov/2018/08/city-releases-initial-summary-of-independent-report-on-seattle-streetcar/>.

5 Hightower, Kamaria. "City Releases Updated Capital and Operating Costs for the City Center Connector Streetcar." Office of the Mayor, January 17, 2019. <https://wayback.archive-it.org/3241/20211217151433/https://durkan.seattle.gov/2019/01/city-releases-updated-capital-and-operating-costs-for-the-city-center-connector-streetcar/>.

As the city commits to pushing forward with the C3 project, additional excitement has spurred as SDOT released a 2019 report finding that in 2018, ridership for the streetcar system had on average increased by 18%¹. Notably the First Hill Line received a 36% increase, as the line runs through the bustling center of activity and nightlife in Capitol Hill to the historic Pioneer Square neighborhood². With a positive outlook on the performance of Seattle's Streetcar, this report created greater anticipation for the development of the C3 project. The increase in ridership on the Seattle Streetcar system as well as SDOT's ability to create a stronger and more feasible budget led to the city council appropriating \$9 million for SDOT to move forward in the design process of C3³.

State of C3

Although the city of Seattle had an optimistic outlook for the impact that would be generated from the implementation of C3, the project was abruptly halted in June 2020 due to COVID-19. A handful of SDOT projects persisted despite the global pandemic, however a majority of planned projects including C3 were put on pause in order for SDOT to address revenue shortfalls and avoid debt.

The future for C3 is not ultimately bleak. According to a September 2021 SDOT blog post, Mayor Jenny Durkan plans to continue the development of C3. In addition to resuming operations for C3 to create investments for the city, continuation comes at a critical moment. Mayor Durkan choosing to resume operations is intentional and timely by allowing SDOT to begin strategizing how to move forward with the design and development of the project while integrating the project with Sound Transit 3 (ST3), a project being carried out by Sound Transit to expand current service of the light rail by adding an additional 62 miles.

1 Clark, Jeanne. "Moving Forward with the Center City Connector Streetcar Project" SDOT Blog, September 11, 2019. <https://sdotblog.seattle.gov/2019/09/09/moving-forward-with-the-center-city-connector-streetcar-project/>.

2 Siddick, Salma. "Seattle Streetcar Reports 18-Percent Ridership Increase!" SDOT Blog, February 12, 2020. <https://sdotblog.seattle.gov/2019/07/26/seattle-streetcar-reports-18-percent-ridership-increase/>.

3 Trumm, Doug. "Committee Greenlights \$9 Million to Continue Center City Streetcar Project." The Urbanist, August 7, 2019. <https://www.theurbanist.org/2019/08/07/committee-greenlights-9-million-for-streetcar/>.



PROJECT BACKGROUND

Overview

As Seattle Department of Transportation (SDOT) has proposed, the Center City Connector (C3) of Seattle is a 1.3 miles long streetcar line with 4 stations in downtown Seattle, from the current Westlake Hub station to the Occidental Mall Pioneer Square station. Once completed, the Center City Connector will join the existing two streetcar lines of South Lake Union and First Hill, establishing an advanced north-south connection with a total length of 5 miles and 23 stations. The finished streetcar system will provide access to many of the city's important destinations, such as Pike Place Market, Colman Dock, and other transit systems such as the light rail. SDOT predicts that by 2035, there will be 20,100 daily linked trips and 6,338,400 annual linked trips for the C3 line.¹

The C3 line is designed to operate in mixed traffic for 0.4 miles then has its right of way in an exclusive lane for 0.9 miles. The total travel time from Westlake to Pioneer Square is around 10 minutes. There will be 10 modern low-floor streetcars with off-wire operating capabilities in this line, which are friendly to disabled individuals and safer to operate compared with traditional wired streetcars such as the Kawasaki 1980. The C3 project has transit signal priority and off-board fare collection system, while also contains multi-modal approaches such as intersection and sidewalk improvements. SDOT set the service frequency to be 5 minutes for the C3 during daytime hours on both weekdays and weekends. In the evenings, the frequency will decrease to every 7.5 minutes.

The construction of C3 is divided into four segments. The first one is Pioneer Square, from the First Hill streetcar station to First Avenue and Columbia Street. The second segment is the Madison Office Core, from Columbia Street to Union Street. The last two segments are along First Avenue, from Union Street to Stewart Street then to the Westlake Station. The construction began in fall of 2017 and is predicted to take up to 2 years to complete. However, the construction is paused in 2020 due to the pandemic.²

¹ Seattle Department of Transportation. "Center City Connector Small Starts Project Development." Federal Transit Administration, November 2019. <https://www.transit.dot.gov/sites/fta.dot.gov/files/2021-05/wa-seattle-center-city-connector-project-profile-FY22.pdf>

² Shaner, Zach. "Center City Connector Takes Another Step Forward." Seattle Transit Blog, January 2, 2017. <https://seattletransitblog.com/2016/05/11/center-city-connector-takes-another-step-forward/>.

Multimodal Transit Approach

The C3 streetcar is designed as an important part of Seattle's multimodal transportation system. Within 0.25 miles (reasonable walking distance) of each C3 station, there are multiple stations of Link light rail such as University Street Station and Chinatown Station, where people can transfer to the tram that goes to University of Washington in the north or Tacoma international airport in the south. People can also easily access the D line and E line of Rapid Ride bus service, connecting the downtown area to north and northwest Seattle. Furthermore, there are many regional bus lines near C3, such as Route 3, 4, and 5 that run on 3rd Avenue, providing connections to areas in the Seattle metropolitan region, including Queen Anne, Madison Park, Madrona, and Judkins Park.

The C3 is also close to the ferry and water taxi in Seattle. The Madison and Cherry stations of C3 are less than 1,000 feet from the Seattle Ferry Terminal and several piers, where people can take ferries to Bainbridge, Bremerton, and Vashon Island, etc. The stations are connected with bike lanes as well. There are bike lanes on Pike Street, Spring Street, and Cherry Street, where cyclists could quickly join the bike network of downtown Seattle after getting off the C3 streetcar. The sidewalk system around C3 is very complete as other blocks in downtown Seattle, creating very walkable districts that have an hourly average pedestrian count around 1,800 at summer peak times.

Figure 2: Map of Center City Connector line with existing multimodal transit options.

A: With Railways



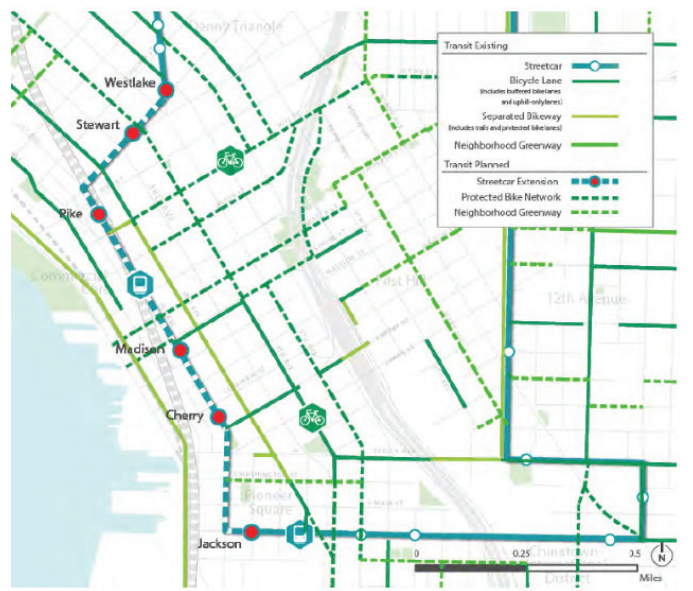
B: With Rapid Ride



C: With Regional Rail



D: With Bike Network



Design Details

“Integrate streetcar transit into downtown streets while allowing the unique, existing qualities of each street to define the physical design.”

The main design goals of the C3 streetcar are to have a quite integration with the urban context of Seattle downtown while prioritizing pedestrian and cyclist, creating a safe environment for walking and biking, as well as high quality design elements for the stations such as materials and furnishings, and comfortable user experience, including clear wayfinding system and accessibility for everyone (figure 3).

The design of the segment on Pioneer Square Boulevard follows the goals. The existing one car lane and one parking lane will be reduced to only one lane for cars, while the previous car lane will be turned to the streetcar lane with right of way, so people can keep the greenbelt in the center of the street. For the safety part, intersections will be redesigned which includes raising the curbs and implementing scramble intersections. Cars from all directions need to wait for the light so that pedestrians can take their time to safely cross the intersection. Considering the situations in which bicycles will pass over the streetcar tracks and sharing the road with cars, SDOT provides several alternative bike routes. On Jackson Street, SDOT plans the first alternative to reroute the bicycles to the sidewalk, creating a 12 feet width shared sidewalk of pedestrian and cyclist. The second alternative is to reduce the width of sidewalk to 5 feet, so a bike lane can be added between the streetcar station and the sidewalk, and the preferred alternative is to have the streetcar station platform at the center of the street and creating a bike land on one side and a shared line of vehicles and bikes on the other side (figure 5).

The station will be equipped with steel railings, concrete and cast-iron delineators to ensure safety. There are also shelters on the station to provide comfortable waiting experiences, and trash bins to collect wastes to keep the environment clean. To create a more natural feeling, some parts of the station will use stone transitway, stone delineators, and brick roadways, as well as plant red oaks in the station. All the design measures are aiming to establish a safe and comfortable environment for the riders.¹

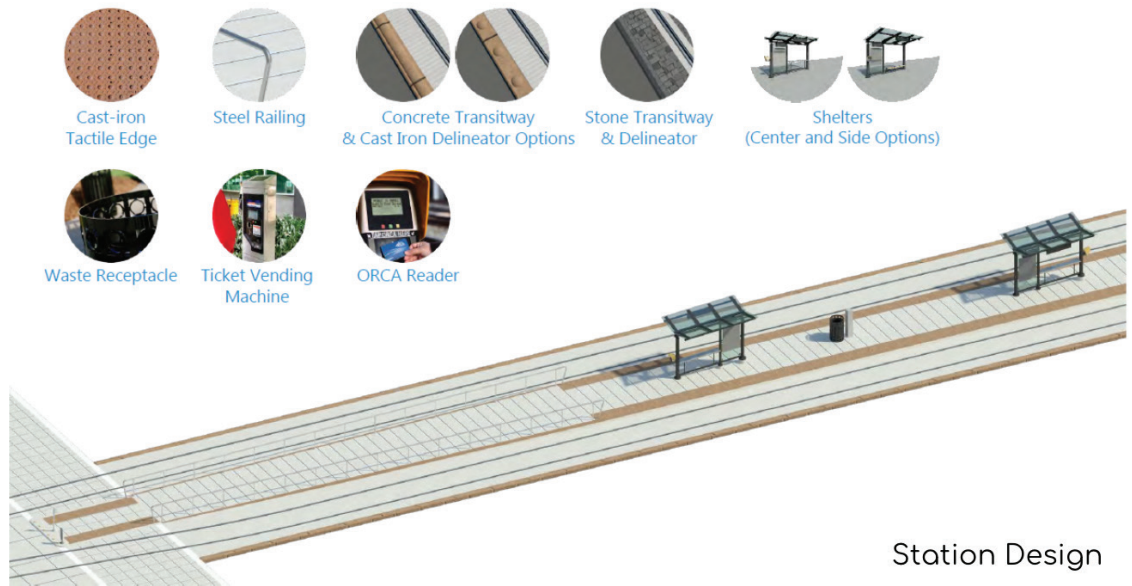


Figure 3:
Proposed station design for stops along the C3 line.

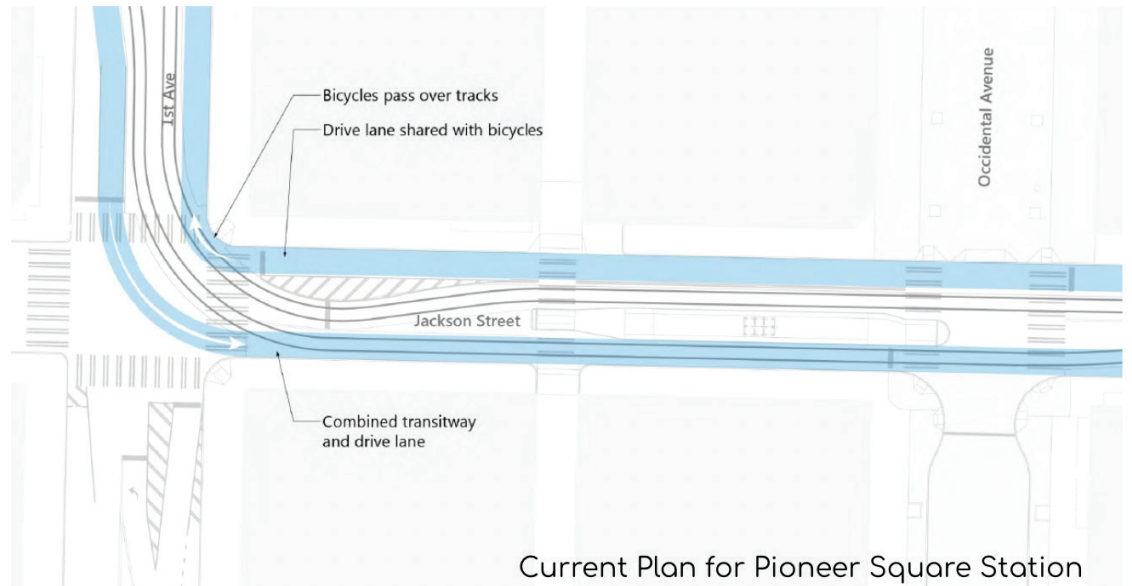


Figure 4:
Current design plan for Pioneer Station stop.

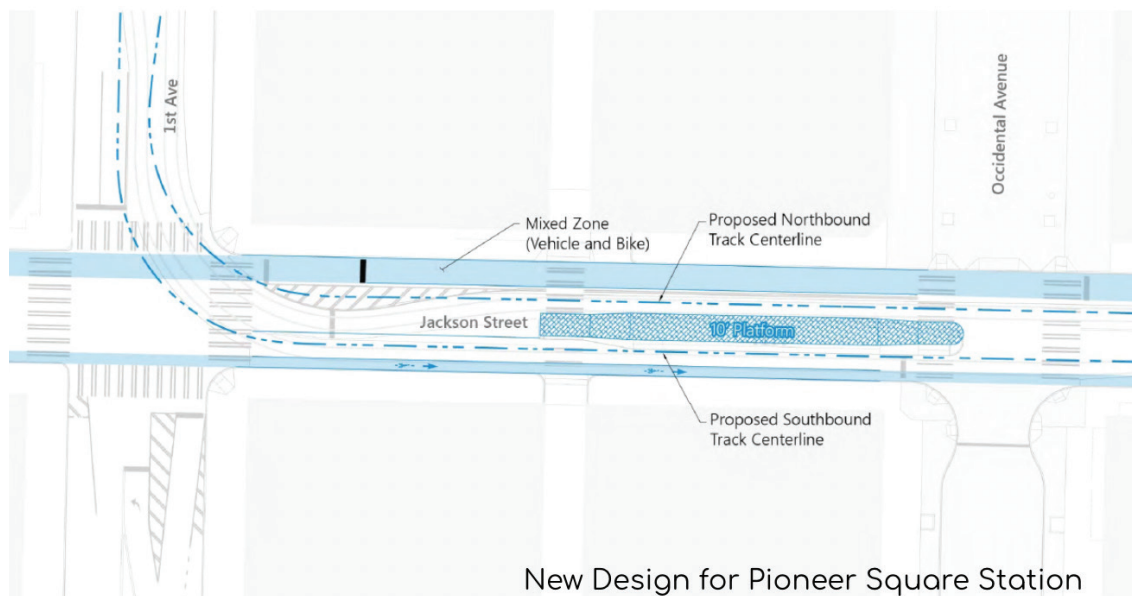


Figure 5:
Proposed design plan for Pioneer Station stop.

The background is a light teal color with a white grid pattern. A thick yellow line starts at the top left, goes diagonally down to the right, then turns vertically down, and finally turns horizontally to the right at the bottom. The text is centered in the upper half of the image.

ISSUES & CONTROVERSIES

From the beginning of C3's design work and assessments, the project has faced major issues and controversies regarding its estimated capital and operating costs from the general public and council members. While it is widely agreed and accepted that C3 would greatly serve the city by connecting two existing lines to the downtown core with major economic hubs and tourist destinations, envisioning the project's feasibility raises much controversy.

As previously discussed, SDOT's ability to move forward with C3 has been severely impacted due to the project's exorbitant costs, which for skeptics is absurd. A prominent figure in opposition against moving forward with C3 and the project itself is Councilmember Lisa Herbold of District 1 on the basis of project costs. In a city council meeting regarding C3, the vote resulted in a 6-1 decision with Councilmember Herbold being the proprietary vote against the project¹. Among many of her claims against the project such as low ridership and disparate impacts on small businesses, the capital cost of the project serves to be a main issue. Councilmember Herbold has continued to question the worth of C3 and whether or not it is a viable use that deserves financial allocation from the city's transportation budget, bringing her to ask if C3 is advancing transportation or economic development needs². Councilmember Herbold has also indicated that funding for the project detracts from other transportation projects that would receive more benefit from funding such as the expansion of the light rail system³. Reading between the lines, Councilmember Herbold is implying that the implementation of other transit projects such as the light rail system will benefit the greater public of the region and will actually advance transit mobility options. Lastly, Councilmember Herbold is concerned about the lack of multimodal connectivity that the C3 could create. While the main objective of C3 is to connect the First Hill and South Lake Union lines to many of the light rail stations in the city, what is the point if there is a sufficient amount of buses that already provide access to these stations?

Another line of controversy that C3 has faced is regarding the financial health of the Seattle Streetcar system as a whole. Both of the existing lines receive funding from different sponsors. One of the most notable sponsors for the First Hill line is SoundTransit, who provides \$5 million to ensure that the line is in operation⁴. On the other hand, one of the most notable sponsors for the South Lake Union line is Amazon. Although both lines receive funding from major sponsors in the Pacific Northwest, the funding from SoundTransit and Amazon are set to end in 2023 and 2024 respectively. At this point the controversy points to the fact that although the creation of C3 is meant to connect the First Hill and South Lake Union lines, it may not be feasible as these lines are already facing financial hardships in the extremely near future.

1 Trumm, Doug. "City Council Funds Continued Work on Downtown Streetcar with Herbold Dissenting." The Urbanist, August 14, 2019. <https://www.theurbanist.org/2019/08/14/city-council-funds-continued-work-on-downtown-streetcar-with-herbold-dissenting/>.

2 Robertson, Author: Kipp. "Seattle Councilmember Asks If Money for Streetcar Would Be Better Spent Elsewhere." king5.com, January 29, 2019. <https://www.king5.com/article/news/politics/seattle-councilmember-asks-if-money-for-streetcar-would-be-better-spent-elsewhere/281-91f4a73d-efb8-4dee-bc3c-8b29c8e07be0>.

3 Ibid.

4 Robertson, Author: Kipp. "Seattle Councilmember Asks If Money for Streetcar Would Be Better Spent Elsewhere." KUSA.com, January 29, 2019. <https://www.9news.com/article/news/politics/seattle-councilmember-asks-if-money-for-streetcar-would-be-better-spent-elsewhere/281-91f4a73d-efb8-4dee-bc3c-8b29c8e07be0>.

C3 has a history of a repeating cycle of the project being paused and resumed. Prior to COVID-19, C3 had received \$75 million in the form of the Small Starts Grant from the FTA. However, because the project was halted due to COVID-19, the implementation plan had not been carried out, therefore resulting in expired and unused funds¹. This fact alone led Councilmember Herbold to recall that a major issue with C3's inclusion in Mayor Durkan's 2022 Budget is now securing funding and repeating the grant process to obtain the once promised funds that had been expired². As of April 2022, there has been no update or official statement regarding the progress of funding from the FTA.

From the community level, the Chinatown-International District (C-ID) has expressed concern over the delayed and unknown status of C3. Executive Director of the Seattle Chinatown-International District Preservation Development Authority (SCIDpda) Maiko Winkler-Chin stated "Our community was told our pain and suffering during the [First Hill Streetcar] construction phase would be worth it because we'd have a connected system to benefit our residents and businesses."³ Indicating that the City of Seattle has essentially left the C-ID with empty and false promises as a result of C3 being paused. During the creation of the First Hill Line, the community was essentially impaired as construction would block access to key businesses as well as services for the abundant senior population living in the neighborhood, and primarily in the International District Village Square. The construction process posed many safety hazards as its development would occur directly adjacent to a senior assisted living facility. However, the project pushed forward with the promise that the C-ID would have direct access to many of the various and popular neighborhoods via C3. Project delays or complete cancellation of C3 means that the C-ID community can perceive their pain and fear from the First Hill Line construction as being taken advantage of.

The issues and controversies that C3 has faced has ultimately stemmed from capital costs and funding associated with the project. From the conception of the project, the budget has been precarious because of how the estimated costs seemed to be extremely higher than expected for a project of this magnitude. The concerns have not only been echoed from Councilmember Herbold, but from Mayor Jenny Durkan as previously mentioned at the onset of discussions around funding the project. With that, the funding sources for the First Hill and South Lake Union lines are set to lose funding from its sponsors in 2023 and 2024 respectively. The ridership projection for these lines also creates concern as although there was an increase, it does not seem to be significant enough. The uncertainty and unstable source of additional funding such as that from the FTA adds another layer of complexity to C3's dilemma, and is the most recent and pressing controversy.

1 "Councilmember Alex Pedersen." Councilmember Alex Pedersen's Blog. Accessed May 7, 2022. <https://pedersen.seattle.gov/>.

2 Packer, Ryan. "Center City Streetcar Dominates at Initial Transportation Budget Discussion." The Urbanist, October 28, 2021. <https://www.theurbanist.org/2021/10/18/center-city-streetcar-dominates-at-initial-transportation-budget-discussion/>.

3 Lloyd, Sarah Anne. "Center City Connector Streetcar Gets the Green Light-and a Much Longer Timeline." Curbed Seattle. Curbed Seattle, January 17, 2019. <https://seattle.curbed.com/2019/1/17/18187191/center-city-connector-downtown-streetcar>.



SIGNIFICANCE & POTENTIAL IMPACT

Despite many controversies about the C3 streetcar project including the issue of funding and increasing cost and the impact of the pandemic, there are still some significance to constructing the C3 streetcar. The population of potential riders of C3 in the Seattle downtown area is considerable, and the C3 is connecting the most important economic drivers in Seattle, as well as the famous tourist attractions.

Potential Riders

Seattle is a city in which its public transit system has been effectively utilized by residents and commuters, and this trend creates an important foundation for the potential users of the C3 streetcar. The study uses data from census tracts 80.02, 82, 83, 85, and 92 of King County, WA to represent the Seattle downtown area. According to the 2019 American Community Survey, there are 2,500 commuters (22.5%) who use public transit as the primary means of transportation, which is significantly higher than the national data of the United States, that only 4% of commuters use public transit (figure 7). With the multi-modal approach of the C3 streetcar, the riders of Seattle public transit will have a better experience in the downtown area since the C3 will create a complete streetcar network around this region and establish easy transfers to other public transit such as buses light railways that go to different districts in the Greater Seattle region.¹

Moreover, the workplace and home location analysis of the OnTheMap service of the U.S Census bureau indicates that 64% of people who work in downtown Seattle also live in adjacent areas. Thus, the majority of the working population (40% of commuters) in these 5 census tracts walk to their workplace, which is significantly higher than the U.S data of only 2.5% of the population walking to work. The commuting distance for walking in downtown Seattle is around 1 – 1.5 miles, which can be covered by the C3 streetcar with its 1.2 miles route in the center city area. Therefore, we can predict that C3 can attract riders from the large walking population in downtown Seattle and considerably improve their commuting experience.²

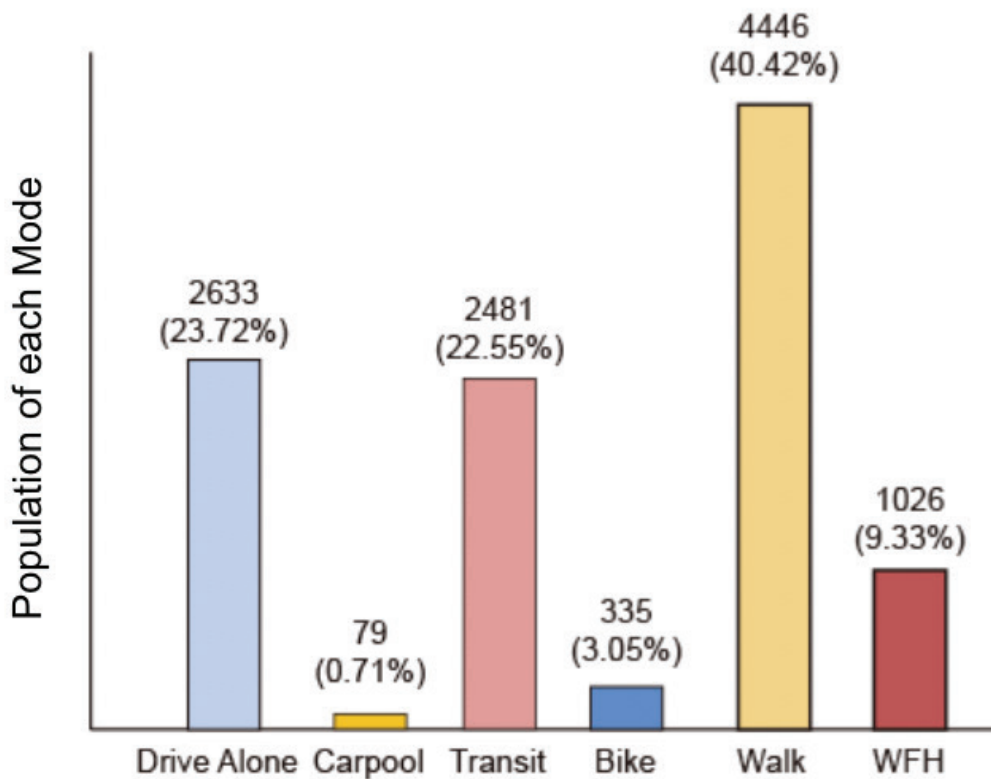
1 American Community Survey. "Means of Transportation by Age of Workers." U.S Census Bureau, 2019, data.census.gov

2 "Work and Home Location." OnTheMap, U.S Census Bureau, 2022, onthemap.ces.census.gov/.

Figure 6: Potential ridership for the C3 line.
Source: Yunfan Xu, 2022



Figure 7: Methods of transit for commuters going into downtown Seattle.
Source: US Census Bureau OnTheMap, 2022



Economic Booster

Providing more accessibility and transit options for people in downtown Seattle, the most important economic driver of the metropolitan region, the C3 streetcar could work as an economic booster for this vital area. According to the economic report by the Downtown Seattle Association, the residential population in this area has increased by 67% from 2010 to 2021, and the total number of jobs has increased by 47%. The downtown area has 87% of the city's total hotel rooms, 81% of total office space inventory, 51% of total job opportunities, and collects 52% of the business taxes. Thus, with the growth of population and blooming of economic activities, the transportation capability and convenient access to different places in downtown Seattle provided by the C3 streetcar is vital to support the economic hub of Seattle.¹

Specifically, the headquarters of many international corporations and local companies are located along the route of the C3 streetcar (figure 8). The Amazon Spheres is less than a quarter mile from the Westlake station of C3, and the Amazon headquarters could be reached by the completed streetcar network established by C3 and the existing First Hill Line. Other influential companies, such as Oracle, Bluekai, and HTC, are located within 300 feet of a C3 station, while ESRI and Intel are located less than a half mile from the Pioneer Square station. Thus, once C3 is completed, it will stimulate the economic vitality of downtown Seattle.

Figure 8: Major companies along the proposed C3 line.
Source: Yunfan Xu, 2022



¹ "Downtown Seattle 2021 Report Card." Downtown Seattle Association, April 13, 2022. <https://downtownseattle.org/programs-services/research/economic-report/downtown-report-card/>.

Tourism

Proximity to major tourist attractions of Seattle, the C3 streetcar can also provide essential support for the city's tourism. Seattle is one of the most popular tourist cities in the U.S. According to statistics, in 2018, more than 40.9 million visitors spent over 7.9 billion dollars in the city and King County, which is a 2.5% and 5.8% increase respectively from the previous year.¹ Although tourism was hardly hit by the pandemic since 2020, the recent trend shows a good recovery from the outbreak of Covid-19. The main attractions of Seattle, such as Pike Place Market, Art Museum, Pioneer Square, and Occidental Square are near a C3 station (figure 9). Also, the C3 route is only 1,200 feet from the waterfront of Seattle, where the tourists will have comfortable access from the downtown to the Seattle Aquarium, the Great Wheel, and other water entertainments like cruisers. After the construction is finished, the C3 streetcar will be an important component of the tourism industry of Seattle.

Figure 9: Major tourist attractions along the proposed C3 line.
Source: Yunfan Xu, 2022



¹ "Visit Seattle: 40.9 Million Visitors Spent More than \$7.9 Billion in 2018." Longwoods International. Accessed May 7, 2022. <https://longwoods-intl.com/news-press-release/visit-seattle-409-million-visitors-spent-more-79-billion-2018>.