Urban Transit Loop Investigation

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THE CITY OF CALGARY

Onward! Provide a safe, accessible, customer-focused public transit service that is the preferred mobility choice of Calgarians.

1.0 Streetcars in Calgary

On July 5, 1909, the first streetcars of the Calgary Municipal Railway began to provide service to Calgarians. Historic streetcar routes produced important commercial corridors and neighbourhoods that thrive to this day, such as 10 Street Northwest (Hillhurst and Sunnyside), 17 Avenue SW (Beltline) and 9 Avenue Southeast (Inglewood). Many of the streetcar routes are still served by Calgary Transit buses, although the routes have been extended from their historic terminus' to serve an expanding city. Current routes 1, 2, 3, 4, 6, 7 and 9 follow part (and in some cases, almost all) of their historic streetcar routes of the same number. Figure 1 shows Calgary's streetcar network in 1909.

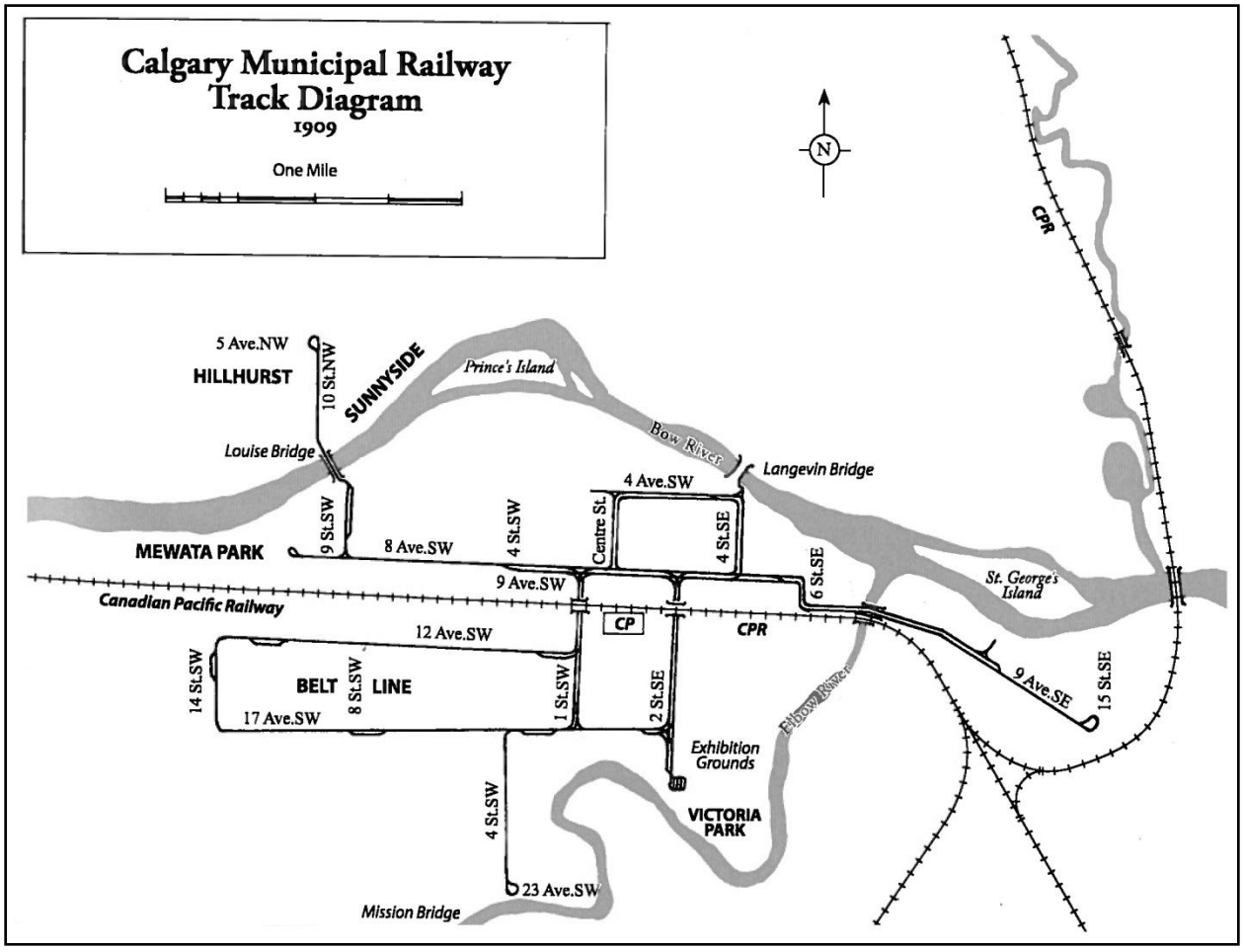


Figure 1. Reproduced from Hatcher and Schwazkopf (2009)

The streetcar era came to an end in Calgary in 1950. After 41 years of steady expansion into the suburban communities, the streetcars were parked and most of the rails were ripped up. Prior to 1950, the Calgary Municipal Railway, which became Calgary Transit, had already purchased electric-powered trolley buses and gasoline or diesel-powered buses to phase out the streetcars. The gasoline and diesel buses provided more flexibility as they were not restricted to rails and overhead power lines, while the trolley buses provided the mechanical simplicity and efficiency of a streetcar. In addition, the trolley buses could continue to use the existing overhead wires and power system.

1.1 Streetcars Today

Modern streetcars are very different from the mostly wooden cars that plied the streets of Calgary in the first half of the 20th Century. Today, streetcars are introduced to improve mobility, but they are also used as a tool to assist in the redevelopment of under-utilized parts of urban areas. In Portland, Oregon, the streetcar was part of a plan that saw the redevelopment of a brownfield site (abandoned industrial and railyard property) into a mixed-use, medium-density neighbourhood, called the Pearl District.

Another factor that has changed since the early days of streetcars on Calgary's streets is the amount of vehicle traffic. As vehicle congestion increases, the effectiveness of a streetcar running in traffic is drastically reduced. A 1994 study by the Transit Cooperative Research Program (TCRP) recommended that streetcars are separated from motor vehicle traffic "by a more substantial element than striping". Additionally, a 2004 study by Greg Cormick and On Track Consulting, noted the North American average for separated right-of-ways for streetcar systems is approximately 90%, while most new-build systems are 100%. Separated right-of-ways give streetcars priority over motor vehicles, allowing the streetcar to move faster, stay on schedule and reduces operating costs for the transit agency. For comparison, Toronto's streetcar system is approximately 20% separated right-of-way, but more recently streetcar corridors include a separated right-of-way on Spadina Avenue and St. Clair Avenue West.

Benefits of streetcars include:

- permanent infrastructure is a signal to residents and the development community that service will be in place for the long term
- relatively quiet
- efficient electric motors used to power vehicles
- electricity can be sourced from renewable sources, such as wind energy
- can entice riders who choose not to ride a bus
- can provide faster and more reliable service compared to buses in mixed traffic when a dedicated right of way is utilized
- can be used as a redevelopment tool to promote redevelopment of communities
- utilize accessible, low-floor cars
- higher passenger capacity per vehicle compared to buses

Challenges with streetcars include:

- rail-based vehicles are not able to manoeuvre around stoppages/closed roads
- capital start-up costs are high
- operating costs are higher than buses
- routes cannot be easily changed to respond to changing land use or ridership
- turning radius can be an issue in existing urban setting

1.2 The Portland Effect

Portland is often heralded for the redevelopment of a brownfield site into a new urbanist, mixed-use, medium-density neighbourhood. The Pearl District is a former railyard and industrial area adjacent to downtown Portland. As cities de-industrialized in the mid-20th Century and transportation shifted from rails to roads, businesses and rail companies left the district. Low rents in the area attracted small businesses and artists. By the late 20th Century plans had been developed, studies had been commissioned and organizations were pushing to redevelop the

area as a beautiful neighbourhood with lots of activities and amenities. In 1998 the Portland Development Commission (PDC) created the River District Urban Renewal Area (RDURA) which has contributed to the Pearl District's revitalization.

To keep this in context, the renewal and redevelopment of the Pearl District has been assisted by streetcars, but it has not been *because* of the introduction of streetcars. The RDURA is similar to the community revitalization levy (CRL) used in Calgary to fund the redevelopment of East Village and surrounds. In Calgary, the use of streetcars as a redevelopment tool may be more effective in corridors outside the Centre City, such as 17 Avenue Southeast.

2.0 Costs of Implementing Streetcars

Streetcars have shown a variety of benefits that have been well documented; however, the initial start-up costs of a streetcar system are substantial. Calgary Transit is focussing efforts on improving reliability on the existing LRT system as much of the original system turns 35 years old. A new rail system in Calgary, without additional capital funding, could stretch infrastructure funds.

Figure 2 shows the magnitude of infrastructure construction costs per kilometre for a variety of transit technologies.

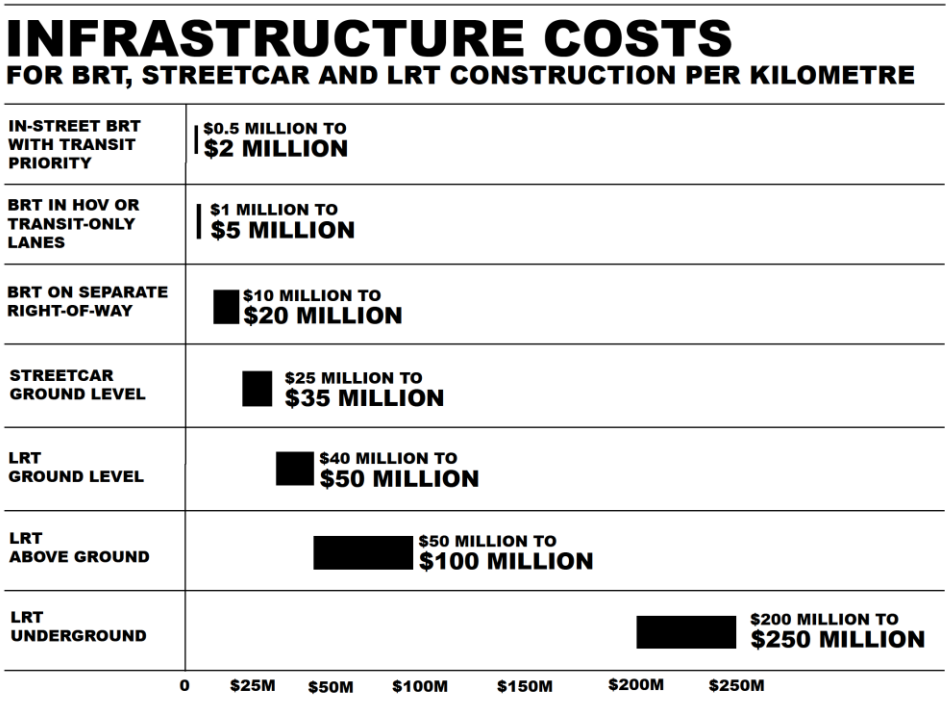


Figure 2. Reproduced from RouteAhead (2013)

Approximate costs for a number of possible streetcar routes are provided below. The cost of construction, vehicles and maintenance facilities is based on research, mainly from American cities that are currently undertaking streetcar projects. Actual costs will vary and would have to be determined as part of the regular planning and design process.

Cost estimates:

- Maintenance facility: $100,000,000 for 50 vehicle capacity
- Track and way: $25-$35 million per kilometre
- Vehicles: $4,000,000 per vehicle

Administration has investigated the merits of a streetcar system and recommends focusing resources on the existing bus and LRT system. The capital costs to implement a new vehicle type are prohibitive at this time. Streetcars for Calgary should not be dismissed outright and further analysis should be undertaken in the future to determine compatibility with Calgary's goals for transportation and mobility.

2.1 Annual Operating Costs

Route	Annual Operating Cost ($000)	
	Bus	Streetcar
A - Victoria Park/Stampede Station to Westbrook Station via 17 Avenue SW	4,000	7,000
B - Centre City Circulator Option 1	3,000	5,000
C - Centre City Circulator Option 2	4,000	8,000
D - Elbow Drive/4 Street SW to Eau Clair Market	3,000	5,000

Expected annual operating costs are based on current costs of bus service in Calgary at approximately $110 per hour. Streetcar hourly costs are estimated at $225 per hour based on information from transit agencies and Calgary Transit's experience with rail vehicles. Fare revenue would offset some of the operating costs, however this analysis was not included in this report.

2.2 Estimated Fleet and Construction Capital Costs for Possible Routes

Route	Estimated Construction Capital Cost ($000)		Estimated Fleet Capital Cost ($000)	
	Bus	Streetcar	Bus	Streetcar
A - Victoria Park/Stampede Station to Westbrook Station via 17 Avenue SW	600	180,000	3,000	24,000
B - Centre City Circulator Option 1	500	150,000	2,500	20,000
C - Centre City Circulator Option 2	700	210,000	4,000	32,000
D - Elbow Drive/4 Street SW to Eau Clair Market	400	120,000	2,500	20,000

Estimated construction capital costs are based on $100,000 per kilometre for bus service and $30,000,000 per kilometre for streetcar service. Estimated fleet capital costs are based on $500,000 per bus and $4,000,000 per streetcar.

Maps of the possible routes are shown in the Appendix.

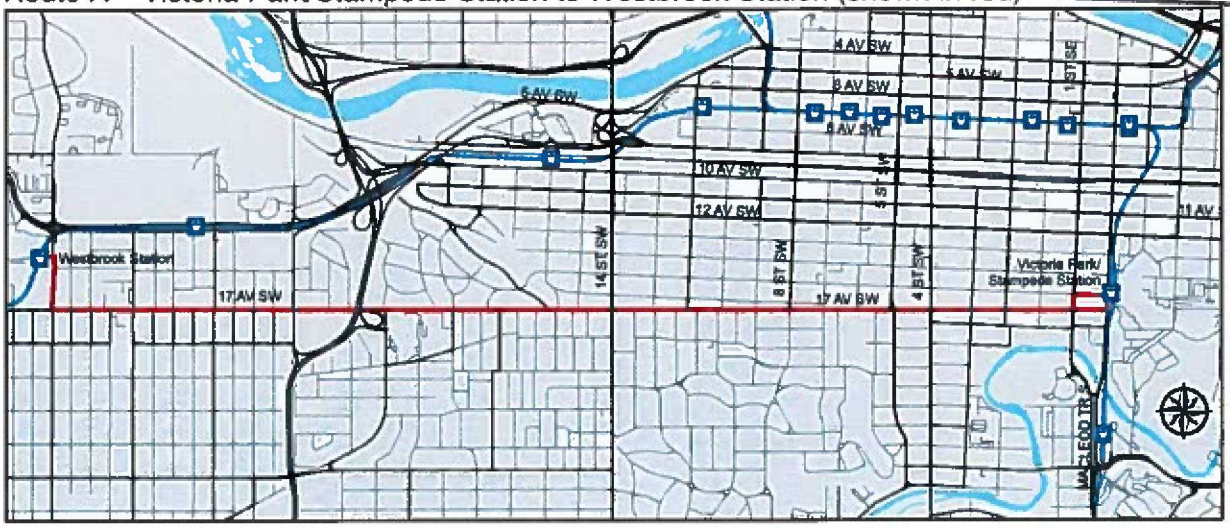
3.0 Conclusion

A streetcar system can be utilized as a tool for urban mobility in Calgary. The return on investment could be realized through redevelopment or higher densities in the Centre City, or other areas of Calgary. Despite low ridership on existing Centre City bus routes, ridership characteristics of a streetcar may be different. While ridership builds on the streetcar network, the net cost to taxpayers would be higher. However, as ridership builds the fare revenue generated by the system would increase. Construction impacts of the streetcar routes presented in this report would be significant to adjacent residents and businesses. Each of these costs and opportunities would have to be investigated before implementing a streetcar network.

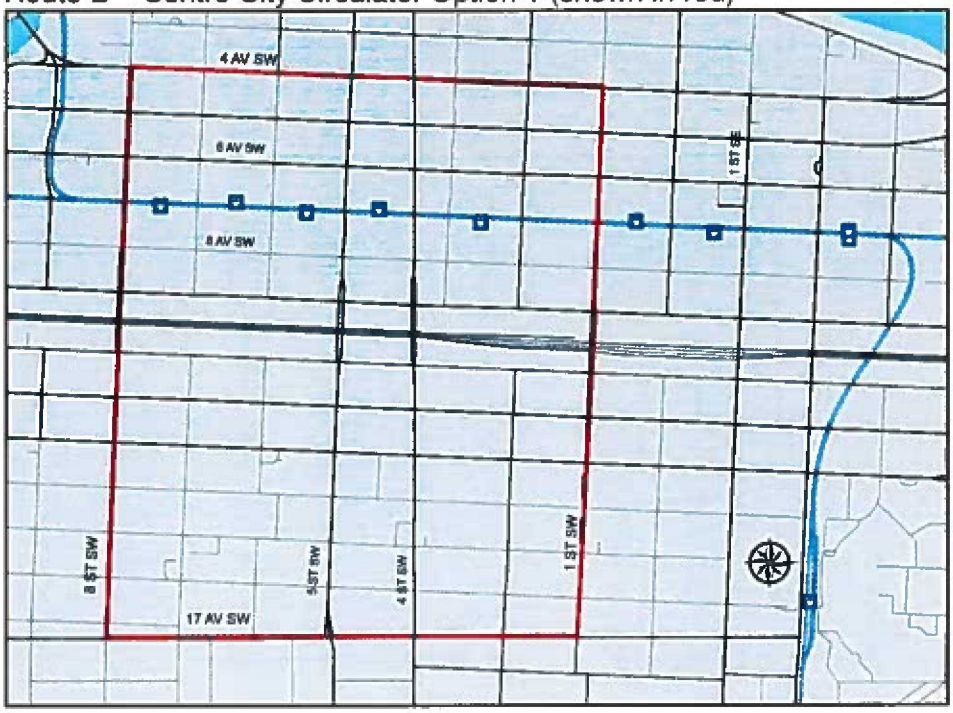
Given the current capital funding constraints and Calgary Transit's focus on maintaining the LRT system, it is not recommended by Administration that streetcars are considered further at this time. In the short and medium term Administration recommends bus-based transit priority measures in the Centre City to improve transit service and enhance the customer experience (see Attachment 2).

Appendix

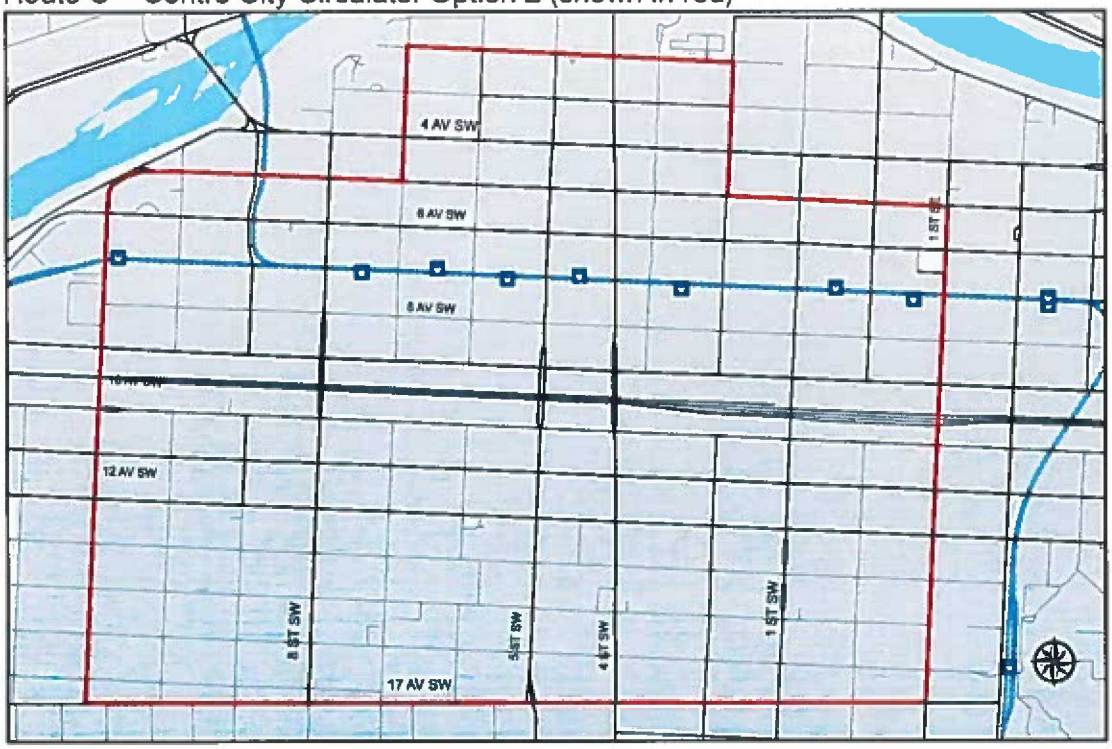
Route A – Victoria Park/Stampede Station to Westbrook Station (shown in red)



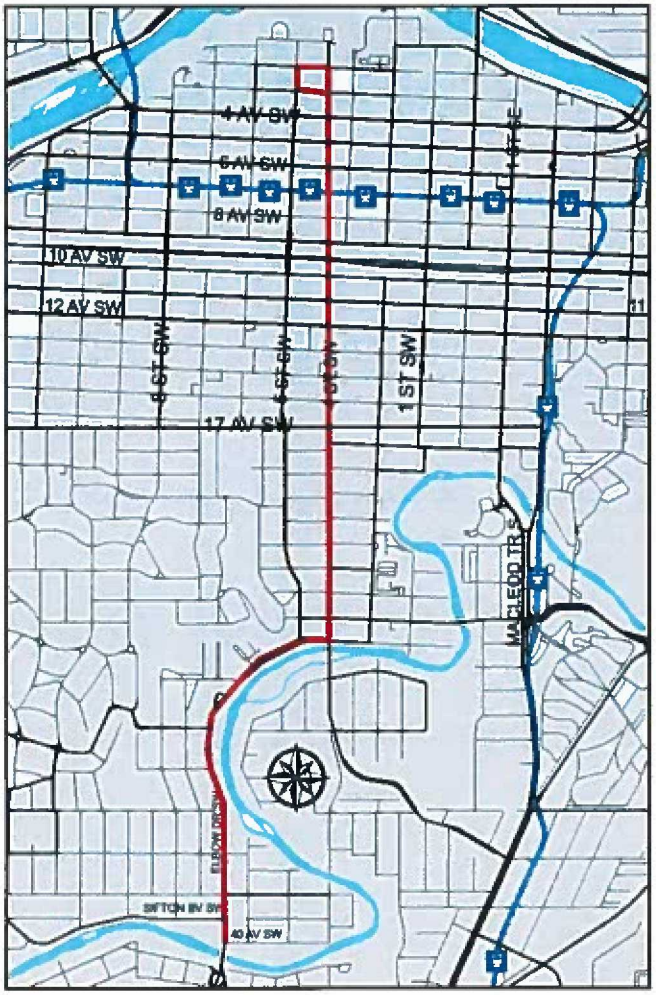
Route B – Centre City Circulator Option 1 (shown in red)



Route C – Centre City Circulator Option 2 (shown in red)



Route D – Elbow Drive/4 Street SW to Eau Claire Market (shown in red)



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