

Executive Summary

This Streetcar Feasibility Study is being conducted in conjunction with the Access Minneapolis Ten-Year Transportation Action Plan, which lays the groundwork for transportation improvements that are designed to meet the long-term objectives of the Minneapolis Plan, the City's comprehensive plan.

Streetcars have been successfully implemented or are being implemented in over a dozen cities in North America and are being planned in many more. Streetcar service offers the benefits of a legible, high amenity transit service without the high costs and large scale of a light rail system. The goals for developing a streetcar line include:

- Increase transit ridership by regular and occasional riders; especially by providing enhanced and attractive local circulation service connecting city neighborhoods with the downtown core.
- Increase the attractiveness of transit to new markets by providing a unique vehicle and customer experience.
- Provide connections and distribution between high capacity regional transit and local neighborhoods.
- Enhance the environment by replacing diesel bus service with clean and quiet electric vehicles.
- Catalyze and organize development and redevelopment potential around a transit investment by providing a quality transit line with a sense of permanence.

This study evaluated fourteen Primary Transit Network (PTN) routes identified in the Ten-Year Transportation Action Plan as highly productive transit routes. The study focused on both physical feasibility and the ability of each potential route to meet the objectives articulated above. While all of the seven corridors included in the long-range streetcar network for Minneapolis may not meet each objective to the same degree, they all contribute an important link to a long-term streetcar system.

Long-term Streetcar Network

The long-term streetcar network is a 20-50 year vision for streetcar service in Minneapolis. The long-term network was developed from corridors that are both physically feasible for streetcar service, and that offer the greatest potential for long-term streetcar operation that meet the goals described above.

The fourteen candidate corridors were analyzed in a series of phases using six different categories of evaluation criteria. These were:

- Physical and Geometric Constraints

- Transit Supportive Land Use
- Economic Development Potential
- Transit Operations
- Transit Demand
- Cost-Effectiveness

Figure ES-1 presents a map of the long-term streetcar network and Figure ES-2 highlights the markets served, strengths and constraints for each long-term corridor. As the figures show, all of the corridors in the long-term network are anchored in the greater downtown area, with the exception of the Midtown Corridor. The Midtown Corridor is very different from the other corridors in a number of key ways. These include:

- The Midtown Corridor is a cross-town corridor that is designed to provide local circulation and connectivity between high employment nodes and two light rail lines.
- The exclusive right-of-way offered by the Midtown Corridor provides an opportunity for a completely separated transitway that avoids conflicts between cars and transit vehicles. This separated right-of-way also offers some advantages in the ability to utilize different construction techniques and some sections of single track which reduce construction cost. The right-of-way, which is owned by the Hennepin County Regional Railroad Authority, also brings some unique challenges related to vertical circulation, stop placement and impacts on historic bridges.
- The line would be built alongside a very popular bicycle and pedestrian trail, with unique design and safety constraints presented by the high volume of non-motorized traffic alongside the streetcar.
- The operating plan for the Midtown Corridor streetcar would be essentially dictated by the operation of the light rail lines it touches. Unlike the other streetcar lines, service in the Midtown Corridor would primarily supplement rather than replace existing bus service.
- Unlike the other streetcar lines, the Midtown Corridor service would not be easily visible from the street, particularly Lake Street which is the primary business corridor in the area.
- The Midtown Corridor is not designed for direct physical connections to the other streetcar lines, although connections will be possible at Chicago, Nicollet and Hennepin via vertical circulation.
- The Midtown Corridor would likely be implemented in a single segment, rather than beginning with a starter line (minimal operable segment) and expanding out from there.

Additional information about the Midtown Corridor can be found in Chapter 3. Chapter 4 in this report presents more detailed information about the other long-term corridors and

compares operating costs, capital costs and ridership estimates among each of the long-term streetcar corridors.

Phasing and Implementation

The implementation of most new streetcar systems begins with a relatively low-cost short segment that can serve as a building block to an ultimate line or system. In addition, almost all new streetcar systems in this country have begun with one end “anchored” in the central business district, primarily because all residents have a stake in a healthy downtown. Because of this, “minimal operable segments” were identified for each of the long-term corridors. Initial operating plans, operating costs, capital costs and ridership estimates were then developed for each minimal operable segment. The minimal operable segments are about 2-3 track miles (1- 1.5 route miles) and can serve an important short-term circulation function.

There are several possible phasing scenarios for implementing the long-term streetcar network. One scenario would be to develop a single corridor in logical segments until an entire corridor is built before starting another corridor. The primary advantage of this option would be that a significant share of bus service in the corridor could be replaced with streetcar service. Another option is to construct several minimal operable segments out from the downtown core, before completing any one long-term corridor. While the amount of bus service that could be replaced in this scenario is limited, this scenario may have some benefits in terms of economic development and internal downtown circulation. This report does not make a final recommendation as to which segment(s) should be implemented first, or which phasing approach is more appropriate. Additional work is needed before this decision is made to determine the level of community support in each corridor, the level of private sector interest and the ability to generate sufficient capital and operating funding.

As discussed in Chapter 5, the following minimal operable segments were identified.

- **Hennepin Avenue** from Groveland to 5th Street in downtown (connects to Hennepin Avenue corridor and could be implemented with MOS for Central and University Avenue corridors)
- **5th Street Downtown to East Hennepin area** (connects to Central and University Avenue long-term corridors and could be implemented with MOS for Hennepin Avenue corridor)
- **W. Broadway/Washington Avenue** from 10th Street to either 5th Street/Nicollet or 5th Street/Park Avenue (connects to W. Broadway long-term corridor)
- **Nicollet Avenue** from 13th Street/Grant Street to Washington Avenue (connects to Nicollet Avenue long-term corridor)

- **Chicago Avenue S** from 14th Street/Chicago or Franklin/Chicago to Nicollet Avenue/5th Street via 9th/10th Streets (connects to Chicago Avenue long-term corridor)

As described above, the Midtown Corridor is recommended to be implemented in its entirety due to the close relationship between ridership on the Midtown Corridor and the SW LRT corridor.

The estimated operating costs, capital costs and ridership figures for the minimal operable segments are summarized in Figure ES-3.

Maintenance and Storage Facilities and Potential Sites

One of the most important factors influencing the decision on where to begin building a streetcar network is the ability to find a location to house and maintain the vehicles. These facilities must be located as near as possible to the “revenue” line to minimize the cost. Assuming a fleet size of 8-10 vehicles, a one- to two-acre site would be needed, preferably flat and generally rectangular in shape. Prefabricated steel buildings are a low cost alternative for a maintenance facility if area zoning and design requirements allow for their use.

It is estimated that the development of a fully functional storage and maintenance facility would cost in the range of \$2-4 million plus any cost for property acquisition.

Although specific sites were not identified in this study, a general review of current zoning identified the following areas as having potential for location of a streetcar maintenance and storage facility:

- Dunwoody Boulevard and I-394
- North of the Basilica of St. Mary
- Industrial Park northwest of Washington Avenue and 10th Avenue North
- Area east of Metrodome
- Nicollet Avenue and 31st Street (Bus Garage)
- On the east end of the Midtown Corridor (near 28th St E and 21st Ave S).

Owner/Operator Arrangements

Nationally, streetcar implementation has been approached somewhat differently than implementation of other transit investments, due to the unusual financial arrangements that have often provided a high level of city and private funding to streetcar projects.

Chapter 6 presents several owner/operator arrangements that summarize the experience of other cities (Portland, Memphis and Seattle). Based on the three case studies, and the options that seem most likely in Minneapolis, it is recommended that the City take responsibility for implementation of the first streetcar line (with the possible exception of the Midtown corridor). This recommendation is made primarily because the City is the only governmental unit strongly advocating for streetcar at this time, the funding will likely come from private and city funds, and the initial primary circulation benefits will be to city residents, employees and visitors. Given their experience in successfully operating rail transit in Minneapolis, it is likely that Metro Transit would be the operator of streetcar service, either directly or through contract with the city. Additional dialogue with Metro Transit will be needed to finalize any operating plans for streetcars.

Figure ES-1 Long-Term Streetcar Network (Corridors Outside of Downtown)



0 0.25 0.5 1 1.5 2 Miles

Source: MetroGIS, Met Council, and the City of Minneapolis

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Figure ES-2 Summary of Long-Term Streetcar Corridors

Corridor	Markets Served	Strengths	Constraints
W Broadway Ave	<ul style="list-style-type: none"> Short term: Developing close-in high density residential neighborhoods in North Loop to downtown Long term: Improved local service to residential / commercial neighborhoods in North Minneapolis; long-term potential for moderate density redevelopment in corridor; connecting to regional routes at Robbinsdale transit center 	<ul style="list-style-type: none"> Economic development potential in North Loop, W Broadway and Robbinsdale. If aligned with Park Avenue; strong economic development potential in East Downtown. Good opportunity for maintenance/storage facility near 10th Ave N. Provides additional service in a developing underserved corridor. Adequate right of way width; limited conflict with bus volumes. 	<ul style="list-style-type: none"> Not the strongest mix of uses – mostly residential with limited commercial. No major special generators along the corridor limits visitor/tourist appeal. If via Park Avenue, would not penetrate the core of downtown. Depends on new development to achieve high ridership. Minimal bus replacement until the route gets to Robbinsdale transit center. Dependent on alignment and transit technology decisions in Bottineau Blvd Alternatives Analysis (currently underway)
Hennepin Ave S	<ul style="list-style-type: none"> Short term: tourists, downtown workers, MCC students and visitors to entertainment district, Walker Art Center / Minneapolis Sculpture Garden and residents in Loring Park. Long term: Uptown to Dinkytown route connecting downtown with two of the most active neighborhoods in the city. Possible game day connection to Twins new stadium. 	<ul style="list-style-type: none"> Economic development potential along Hennepin in greater downtown (near 10th Street) and in the East Hennepin area. Has the highest potential for ridership if Uptown is linked with University Once route reaches Uptown – significant bus replacement – could potentially replace all buses if alignment serves Uptown-Dinkytown. Serves multiple anchors, special generators and mix of uses 	<ul style="list-style-type: none"> Short term conflicts with high bus volumes on Hennepin. Need solution to I-94 Bottleneck to provide connection to Uptown Traffic and on-street parking issues on Hennepin between Groveland and Uptown.
Central Ave NE	<ul style="list-style-type: none"> Short term: tourists, downtown workers, visitors to entertainment district, East Hennepin residents and businesses connected to core Long term: Residents and businesses along corridor; connecting regional routes at Columbia Heights transit center 	<ul style="list-style-type: none"> Moderate economic development potential especially East Hennepin area and near Lowry and Shoreham Yards. Opportunity to replace significant numbers of buses once the alignment reaches Columbia Heights transit center (if connected to Nicollet). Maintenance and storage potential at Shoreham Yards. 	<ul style="list-style-type: none"> Relatively modest ridership until bus replacement begins. Bridge crossing required to reach downtown (likely Hennepin Avenue). Needs to be connected to another corridor to serve significant ridership. No special generators and limited mix of uses.
University Ave SE /4th St SE	<ul style="list-style-type: none"> Short term: tourists, downtown workers, visitors to entertainment district, East Hennepin residents and businesses connected to core Long term: University students, staff and local residents. 	<ul style="list-style-type: none"> Moderate economic development potential in East Hennepin area and along river. Long term has the highest potential for ridership if linked with Hennepin and Uptown. Potential to replace most buses in the Hennepin and University/4th corridor Serves multiple anchors (downtown, Uptown, U of M), special generators and mix of uses. 	<ul style="list-style-type: none"> Requires a bridge crossing – likely on Hennepin Avenue.
Nicollet Ave S	<ul style="list-style-type: none"> Short term: tourists, downtown workers and visitors to inner core, Convention Center and very dense downtown neighborhoods. Long term: serves high density residential neighborhoods south of I-94 and all of Nicollet Avenue S., connecting to regional routes at I-35W BRT 46th Street station 	<ul style="list-style-type: none"> Prominent downtown circulator service on Nicollet Mall Potential to reduce bus service once the line reaches Lake Street; could essentially eliminate buses on Nicollet Avenue once the line reaches 46th. Potential for higher density development between downtown and Franklin Avenue. Opportunity to “knit together” Nicollet Ave at Lake Street with redevelopment potential. Very high ridership potential, especially as buses are replaced. 	<ul style="list-style-type: none"> Limited breadth and intensity of economic development potential downtown and south of Franklin (except at Lake Street). Limited opportunity for maintenance and storage facility if line does not connect to Lake Street. Dependent on SW LRT Corridor decision. Requires significant capital costs to connect Nicollet to Lake Street (reconnection of Nicollet Avenue) Conflicts with high bus volumes on the Nicollet Mall in the short term.
Chicago Ave S	<ul style="list-style-type: none"> Short term: Local circulation near-downtown neighborhoods including Elliot Park. Long term: Potential redevelopment in East Downtown; employment centers at HCMC, Children’s Hospital and Abbot-Northwestern Hospital and related facilities. 	<ul style="list-style-type: none"> Economic development potential especially in Elliot Park and East Downtown. High ridership potential if the alignment goes to Lake St or 38th St. Opportunity to replace significant numbers of buses in downtown long term. Can leverage City street reconstruction. 	<ul style="list-style-type: none"> Limited opportunity for maintenance and storage facility on line. Limited economic potential between downtown and Midtown Corridor.
Midtown Corridor	<ul style="list-style-type: none"> Local connections to regional service connecting two LRT lines with Uptown and high employment district between I-35 and Chicago; intensification opportunities along corridor; local neighborhood circulation. 	<ul style="list-style-type: none"> Connectivity to employment and residential from LRT lines Development potential on corridor but less intensity and breadth than other downtown serving corridors Existing grade separated ROW – no conflict with other modes; higher speed potential. Potential for single track construction which reduces cost. 	<ul style="list-style-type: none"> Trench location requires vertical circulation and limits stop spacing and visibility Limited opportunity for maintenance and storage facility on line. Dependent on SW LRT Corridor decision. Very limited opportunity to reduce bus service (with the exception of Route 53).

Figure ES-3 Summary of Minimal Operating Segments Characteristics

	<i>Hennepin Avenue</i>	<i>Central and University Avenues</i>	<i>W Broadway/Washington Avenue to Nicollet Avenue (Option A)</i>	<i>W Broadway/Washington Avenue to Park Avenue (Option B)</i>	<i>Nicollet Avenue (Option A)</i>	<i>Nicollet Avenue (Option B)</i>	<i>Midtown Corridor</i>	<i>Chicago / 9th/10th Streets to Nicollet Avenue (Option A)</i>	<i>Chicago / 9th/10th Streets to Nicollet Avenue (Option B)</i>
From	Groveland	5 th Street / Hennepin Ave	10 th Avenue N/ Washington Ave	10 th Avenue N/ Washington Ave	Nicollet Avenue / 5 th Street	Nicollet Avenue / 5 th Street	West Lake Station (SW LRT)	Nicollet Avenue / 5 th Street	Nicollet Avenue / 5 th Street
To	5 th St / Hennepin Ave	Central Avenue NE	5 th Street / Nicollet Avenue	5 th Street / Park Avenue	13 th Street S	Franklin Avenue	Lake St/Midtown Station	14 Street / Chicago Ave S	Franklin Ave / Chicago Ave S
Operating Characteristics									
Peak Vehicle Requirement	2	2	2	2	2	2	5	2	2
Annual Service Hours	11,448	11,448	11,448	11,448	11,448	11,448	28,175	11,448	11,448
Estimated Annual Operating Costs (assuming \$149.75/hour)	\$1,714,338	\$1,714,338	\$1,714,338	\$1,714,338	\$1,714,338	\$1,714,338	\$4,219,206	\$1,714,338	\$1,714,338
Ridership Estimates									
Estimated Annual Ridership	463,000 – 566,000	364,000 – 445,000	338,300 – 413,500	307,300 – 375,600	402,000 – 491,400	446,900 – 546,200	1,000,000 ¹	310,600 – 379,600	329,800 – 403,100
Economic Development									
Special Use Generators	High	Moderate	Moderate	Moderate	High	High	Moderate	Moderate	Moderate
Development Opportunity	Moderate to High	Moderate to High	Moderate	High	Moderate	Moderate	Moderate to High	High	High
Capital Cost Estimates (\$2007)									
Track Miles	2.6	2.2	2.2	3.4	1.8	2.7	4.4	2.2	3.1
Capital Cost (excluding vehicles and maintenance facility) ²	\$26,000,000	\$22,000,000	\$22,300,000	\$33,900,000	\$17,900,000	\$26,900,000	\$24,850,000	\$21,900,000	\$30,800,000
Additional Capital Costs	1) Center Stations (5 th – 10 th) - \$300,000 2) LRT Crossing - \$50,000	1) Hennepin Bridge (Miss. River) - \$2.08 M 2) Center Stations (5 th – Washington) - \$150,000	1) 4 th Avenue N Bridge - \$70,000 2) LRT Crossing - \$50,000 3) Mall Modifications - \$300,000	1) 4 th Avenue N Bridge - \$70,000 2) LRT Crossing - \$50,000	1) LRT Crossing - \$50,000 2) Mall Modifications - \$2,100,000 3) I-94 Bridge - \$400,000	1) LRT Crossing - \$50,000 2) Mall Modifications - \$2,100,000 3) I-94 Bridge - \$400,000	1) Side Track - \$6,200,000 2) Vertical Circulation - \$2,000,000 3) At-Grade Embedded Track - \$382,000	1) I-94 Bridge - \$660,000 2) LRT Crossing - \$50,000	1) I-94 Bridge - \$660,000 2) LRT Crossing - \$50,000
Subtotal	\$26,350,000	\$24,100,000	\$22,700,000	\$34,000,000	\$20,450,000	\$29,450,000	\$33,500,000	\$22,600,000	\$31,500,000
Vehicle Costs ³	\$12,000,000	\$12,000,000	\$12,000,000	\$12,000,000	\$12,000,000	\$12,000,000	\$18,000,000	\$12,000,000	\$12,000,000
Non-revenue track ⁴	\$4,500,000	\$4,500,000	\$4,500,000	\$4,500,000	\$4,500,000	\$4,500,000	\$2,800,000	\$4,500,000	\$4,500,000
Maintenance Facility ⁵	\$4,000,000	\$4,000,000	\$4,000,000	\$4,000,000	\$4,000,000	\$4,000,000	\$4,000,000	\$4,000,000	\$4,000,000
Total Capital Costs (\$2007)	\$46,900,000	\$44,600,000	\$43,200,000	\$54,500,000	\$40,950,000	\$49,950,000	\$58,300,000	\$43,100,000	\$52,000,000

¹ Annual ridership on the Midtown Corridor estimated based on 3,300 weekday boardings developed in the Southwest Transitway Alternatives Analysis Study. Saturday boardings are estimated to be 80% of weekday and Sunday boardings are estimated to be 60% of weekday.

² Assumes approximately \$9,950,000 per track mile for embedded track and approximately \$5,650,000 for ballasted track (Midtown Corridor).

³ Assumes \$3,000,000 per vehicle. Costs include one spare vehicle per minimal operable segment. If all segments were implemented together, the number of spare vehicles would likely be lower.

⁴ For planning purposes, it is assumed that ½ mile of single track would be required to access a maintenance facility.

⁵ Maintenance facility costs would only apply to the first shortest operable segment.

Hennepin County has jurisdiction over the streets/right-of-way where several of the streetcar corridors are proposed including Midtown, West Broadway, Hennepin and University/4th. Mn/DOT has jurisdiction over the Central Avenue corridor. These agencies will need to be closely involved in any future work in these corridors.

All of the corridors have some potential for the development of a public-private partnership or even a private not-for-profit owner/operator arrangement. The extent to which this is feasible will vary depending on the corridor and its development potential.

Potential Funding Options

A preliminary review of options for funding the development, capital and operating costs associated with streetcar implementation in Minneapolis is identified in Chapter 7. Several potential sources are explored, including federal, state and local sources, as well as private financing options. The primary funding options that were explored include:

Federal Funding

- Project Earmarks/Federal Demonstration Projects
- Federal Transit Act Formula Funds
- Housing and Urban Development Funds

State and Local Funding Options

- Taxes (e.g, local sales tax, hotel guest tax, convention center tax, etc.)
- Fees (e.g., transit impact development fee, in-lieu of parking fee, etc.)
- Benefit Districts (e.g., Local Improvement District, Tax Increment Financing, Special Assessment District, etc.)
- Parking (e.g., meter and/or ramp revenues)
- Streetcar funding (e.g., farebox revenue, advertising revenue, naming rights)
- Other (e.g., air rights, non-profit status, etc.)

A review of six streetcar systems around the U.S. was conducted to better understand the variety of funding mechanisms that have been used to pay for capital and operating costs. While there is no single funding option that appears to be a perfect fit for funding streetcar services in Minneapolis, there are a number of options that could be pursued. New legislation may be required to develop a full funding package, which is likely to include a variety of sources.

Next Steps

This study identified a long-term streetcar network which will require at least twenty or more years to achieve. The study also identified a number of possible starting places, each of which offers different advantages to riders, to the City and to other stakeholders.

The next major steps in developing a streetcar network are to determine a financing strategy and to select a minimal operable streetcar segment to begin building the long-term network. The following “next steps” have been identified to help move this process forward. These steps are discussed in more detail in Chapter 8.

1. Develop detailed funding plan
2. Identify site for maintenance and storage facility
3. Gauge developer support and economic development potential
4. Develop design guidelines for streetcar construction (will ensure that streetcar requirements are considered when streets are reconstructed)
5. Determine who will own and operate the service
6. Further evaluate the impact on the local bus network
7. Continue to gauge political and community support

Once a preferred initial segment is identified, there are a number of steps required to move toward implementation. The responsibility for each step will depend on the organizational structure selected for implementation and operations phases.

- Preliminary engineering
- Environmental Assessment (EA) or Environmental Impact Statement (EIS)
- Finalize funding plan
- Final Design
- Develop public information campaign during construction
- Solicit construction bid
- Procure and prepare vehicles
- Solicit bid for operations (if not being administered by Metro Transit)
- Develop marketing materials and initiate advertising campaign
- Testing and training
- Final implementation details