2030 Transit Master Study

Twin Cities Metropolitan Area

August 8, 2008

Metropolitan Council
390 North Robert Street, St. Paul, Minnesota 55101

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2030 Transit Master Study Overview

Setting the Stage

Nearly a decade ago, the Metropolitan Council completed the *2020 Transit Master Plan.* The plan evaluated 29 corridors for commuter rail, light rail, busways, and dedicated bus shoulders. The plan also identified bus system improvements on freeway and arterial bus corridors and addressed development issues that affect transit.

The Council incorporated the transit plan into the *Transportation Policy Plan* (TPP) created in 2001. That same year, construction was started on the region's first light-rail line, Hiawatha. The TPP recommended further studies of the highest-ranked corridors from the *2020 Transit Master Plan*.

From 2001 to 2007, those studies were conducted. As a result, implementation work was discontinued on three corridors:

- Riverview Corridor was determined to have low ridership and insufficient right-of-way for dedicated bus lanes. A limited-stop bus route was implemented in the corridor in 2004.
- The Minneapolis East (aka Northeast Diagonal) Corridor right-of-way is an active rail line east of I-35W, and the railroad does not plan to abandon freight rail service. The feasibility study showed low ridership projections.
- The Legislature placed a ban on further study of the Dan Patch corridor in 2002.

2030 Transportation Policy Plan

In 2004, the Council grouped the remaining corridors into a Tier I and Tier II prioritization in the *2030 Transportation Policy Plan,* and extended the plan implementation timeline to 2030.

The transitways in Tier I include Hiawatha, which opened in 2004; the I-394 HOT Lane, which was created in 2005 through conversion of the HOV lanes; Central Corridor; Northstar Commuter Rail; Cedar Bus Rapid Transit; I-35W Bus Rapid Transit; and Northwest (Bottineau) Busway. Tier II includes Southwest Corridor, Red Rock, and Rush Line.

Implementation of all Tier I corridors that aren't already operating is well under way, with the exception of Bottineau, where the preferred transit mode is being reexamined.

Transitways in the 2030 TPP (Adopted 2004)

Updating the 2020 Transit Master Plan

With the success of the Tier I corridors, the Council and its transportation partners determined that the time was right to undertake another evaluation of both the Tier II corridors and other potential transit corridors to see if the analysis from 10 years earlier still held. Like the 2020 Plan, this *2030 Transit Master Study* evaluates and ranks more than two dozen potential rail and busway corridors. Many of the corridors were part of the original analysis, while a handful – like County State Aid Highway 42 in Scott and Dakota Counties – were new to this study.

This study also identifies local, arterial, and express bus service improvements, and addresses land-use and demographic issues that affect transit.

Making the Case

Mobility of people and goods in the seven-county Twin Cities area fuels the region's economy. However, the region's mobility faces several challenges: population growth, growing traffic congestion, limited prospects for freeway expansion, potentially limited petroleum and increasing negative environmental impacts.

The region's continued vitality will depend on a strong transit system. A transit system designed and scaled to a variety of regional needs will promote mobility, provide access to opportunities around the region, facilitate efficient use of land and public infrastructure, and provide significant environmental benefits.

Transit ridership in the region is growing steadily. Rising fuel prices, the stress of congestion and concern about climate change are driving more people to use transit. In 2007, express bus ridership grew 11% region-wide, and Metro Transit's total ridership grew 5.3%. In just the first quarter of 2008, regional ridership grew 5.3% from the same period a year earlier.

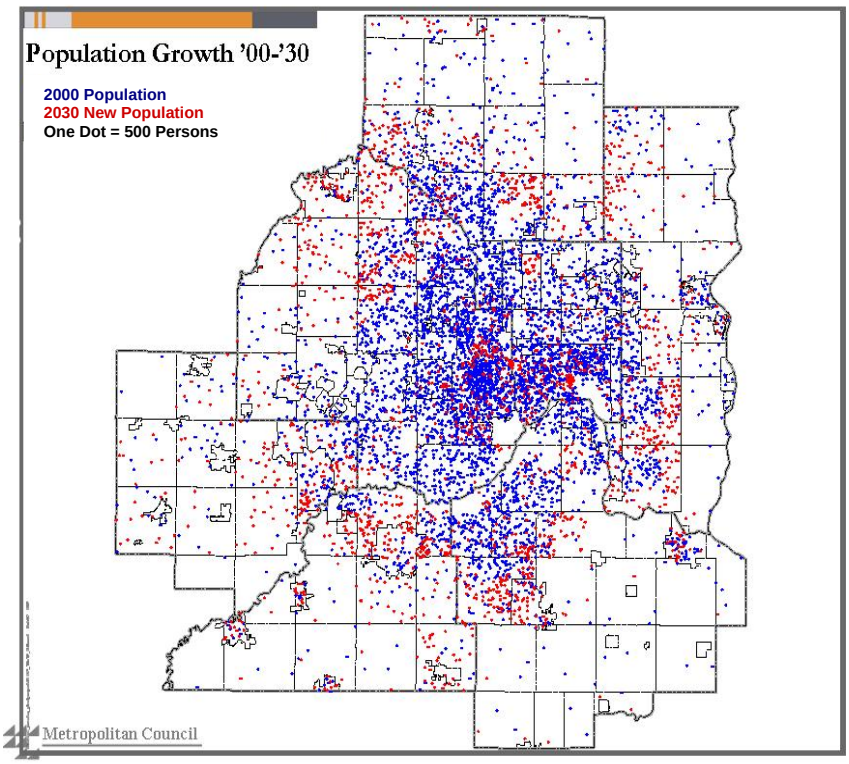
The Changing Region

Among the factors supporting the need for increased transit investments are regional population and job growth, and the resulting increase in traffic congestion.

Population Growth

The population of the seven-county Twin Cities area grew by 769,000, or 41%, between 1970 and 2000. Between 2000 and 2030, the region is projected to add nearly one million people and more than one-half million jobs.

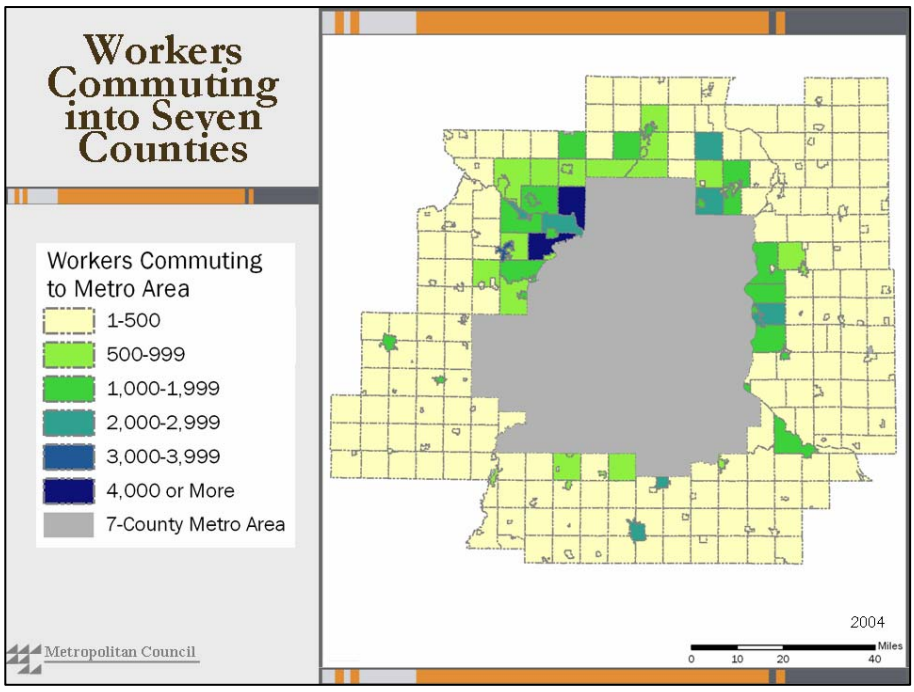
Regional population forecasts project that these additional people will concentrate in the central cities and the third-ring suburbs.



Population and Commuting Growth from Adjacent Counties

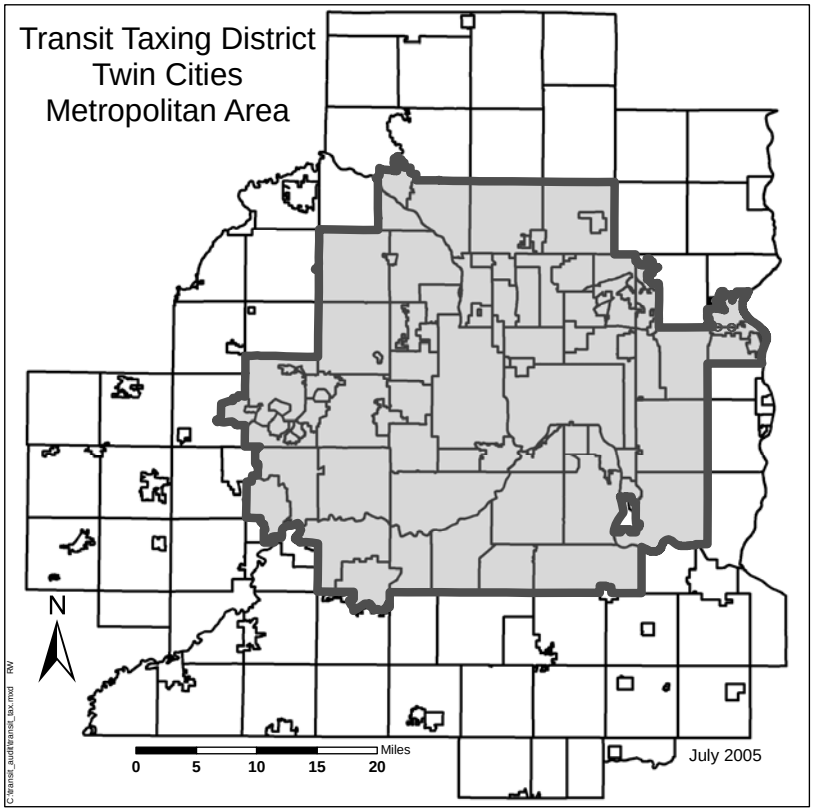
In 2000, the population of the 12 counties adjacent to the seven-county Twin Cities area was 544,000. By 2030, the population in these "collar" counties is forecasted to double to almost one million people.

Commuters coming into the Twin Cities region are concentrated to the north and east of the seven counties, along Highway 10, Highway 65, I-35W North, I-94 West, TH36, and I-94 East. It is expected that future commuter patterns will remain similar to those today, but increase in numbers.



Expanding Transit's Reach

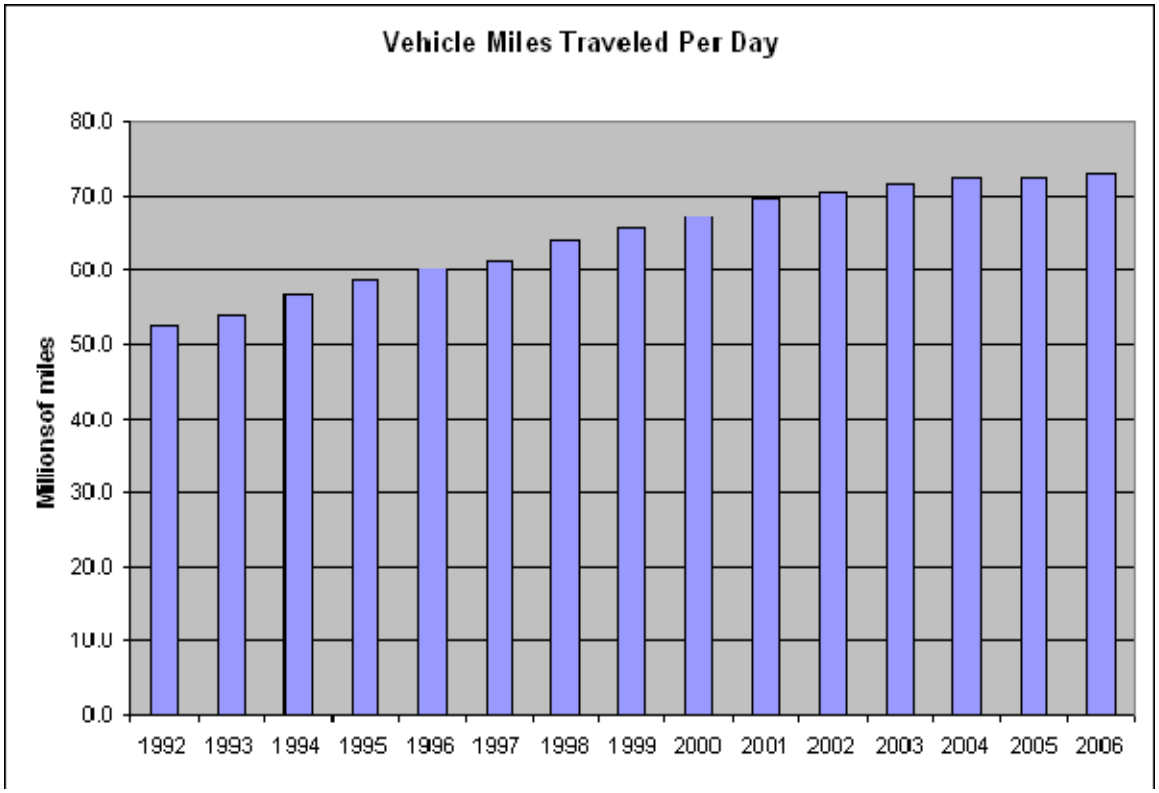
The Transit Taxing District was established in the 1970s to closely follow the original Metropolitan Urban Service Area boundary. Property taxes were levied inside the district to fund operation of regular-route bus service. While funding for transit operations shifted from the property tax levy to general fund appropriations and the Motor Vehicle Sales Tax in 2001, levy revenues are still used for transit capital expenses.



Continued growth in the second- and third-ring suburbs, as well as outside of the seven counties, requires exploring transit service beyond the historic Transit Taxing District boundary, and even beyond the boundaries of the seven-county region. Today, 25% of persons using regional park-and-ride facilities originate outside the transit-taxing district. This study takes those changes into account.

Increasing Congestion

The daily average vehicle-miles traveled on the region's roads and highways grew from 58.7 million miles in 1995 to 72.6 million miles in 2005. This growth is the result of both population growth and a growth in per capita daily travel.



While per capital daily travel has declined slightly with rising fuel prices since 2004, the region's traffic continues to outstrip peak-period capacity on the region's highways. More people are turning to the transit system for relief. Congestion-related factors are explored in detail in Appendix D.

Updating the 2030 Transportation Policy Plan

With the goal of developing a new transit plan that maximizes transit's potential in the region, the Metropolitan Council and its transportation partners explore three key transit strategies in this study:

- **Strengthen the regular-route bus system by:**
  - Expanding the local, arterial and express bus systems.
  - Making maximum use of high-occupancy-vehicle (HOV) and high-occupancy-toll (HOT) lanes, and bus-only shoulders.
- **Continue to develop the network of transitways consisting of:**
  - Light-rail transit (LRT)
  - Commuter rail
  - Bus transitways, including:
    - Bus rapid transit (BRT)
    - Dedicated busways
- **Guide development to support transit.**

The results of this study will inform the Council's 2008 update of the 2030 TPP, scheduled to be adopted in December. Preliminary work on other important transit modes, such as ADA paratransit and dial-a-ride services, is underway in separate studies and will also be incorporated into the updated TPP.

Bus System Analysis

Balancing Effectiveness, Efficiency and Equity

The region's transit operators are challenged to provide a balanced transit system in the variety of markets in the region within the parameters of effectiveness, efficiency and equity.

Effectiveness relates to transit service that meets the goals of local and regional transit plans, for example, it effectively connects workers to areas with job concentrations. Efficiency (productivity) relates to maximizing the number of transit riders a route or service carries. Equity is the reasonable distribution (coverage) of transit service throughout the region based on need within the competitive balance of efficiency and effectiveness.

Various route types and transit markets perform differently, and as such they are evaluated within, rather than across, their peer groups. For example, a freeway express route may be effective in removing cars from a lane of traffic, but would not be expected to have higher ridership per hour than an urban arterial route. A suburban local bus route might be less productive than an urban local bus route, but it provides important service coverage in an environment where transit is not as attractive as other modes.

Regional service investments through 2030 will cover all markets and service types. Transit providers in the Twin Cities are working cooperatively toward a common goal of enhancing the system to grow and meet demand for local, arterial, express and long-distance express service.

Implementing Bus Service Improvements as Resources Allow

The identified improvements to the region's bus system were developed based on a number of factors, including:

- Past planning efforts awaiting implementation, such as components of transit sector studies, and transitway plans and studies.
- New bus routes and service improvements on existing routes to serve forecasted growth in population, employment, and transit demand to 2030.
- Input from regional transit providers, Mn/DOT, counties, and cities.

The new routes and service improvements identified in this section are not fiscally constrained, and will be regionally prioritized and implemented as funding resources allow for growth of the bus system.

Types of Regular-Route Bus Service

Types of regular-route bus service in the Twin Cities include:

- **Local bus service** accounts for the majority of public transportation trips throughout the region, and includes non-express bus service from both urban and suburban market areas. Of the 118 total local routes, approximately 55 percent operate in the core cities of Minneapolis and Saint Paul, and 45 percent operate in the suburbs. Major destinations of local routes include downtown Minneapolis and St. Paul, the University of Minnesota, and key suburban shopping centers and transit centers where riders can

connect to buses headed for the downtowns or elsewhere. Destinations are not limited to major commercial nodes, however, because unlike most express routes, local routes let riders get on and off at any stop along the way.

- The **arterial transit network** is a subset of the local bus network. Arterial routes have a minimum frequency of 20 minutes during the midday[1], with increased frequency during the morning and evening rush hours. While these routes make up 10 percent of the total number of routes, they account for 66 percent of annual bus riders. Most of these high-ridership routes operate in high-density urban corridors and connect with one or more high employment areas such as an urban downtown.

  Many arterial routes also meet MetroTransit's Hi-Frequency Network (HFN) standards of 15-minute or better service from 6am – 7pm on weekdays and 9am – 6pm on Saturdays. Providing 15-minute service frequency gives customers the convenience of riding without the need of a schedule – they know that the longest they will need to wait is only 15 minutes. This program was initiated in 2006 and has received very positive feedback. There are currently 22 arterial routes, 11 of which are in the HFN.

- **Express routes** typically provide direct service from a park-and-ride then go directly to their final destination. Suburban commuters often find that their fastest and most affordable travel option is to take advantage of the express bus network. Express routes primarily serve downtown Minneapolis, downtown St. Paul and the University of Minnesota. Some express routes also provide reverse commute service, from downtown to suburban employment centers. There are currently 95 express routes throughout the region. Most express routes are anchored by a suburban park-and-ride lot, where commuters are provided with free parking during the day. Several express routes feature local pickup in residential neighborhoods and then operate via the highway. This provides a speed advantage over regular local bus service. Annual ridership growth of express routes has been strong, averaging close to 9% per year since 2004.

- **Long-distance express routes** are express routes that originate outside the seven-county region. Currently only one such route exists, the Northstar Commuter Coach service operated by the Northstar Corridor Development Authority. This service stops at two park-and-rides, one outside the seven-county region and one inside the region.

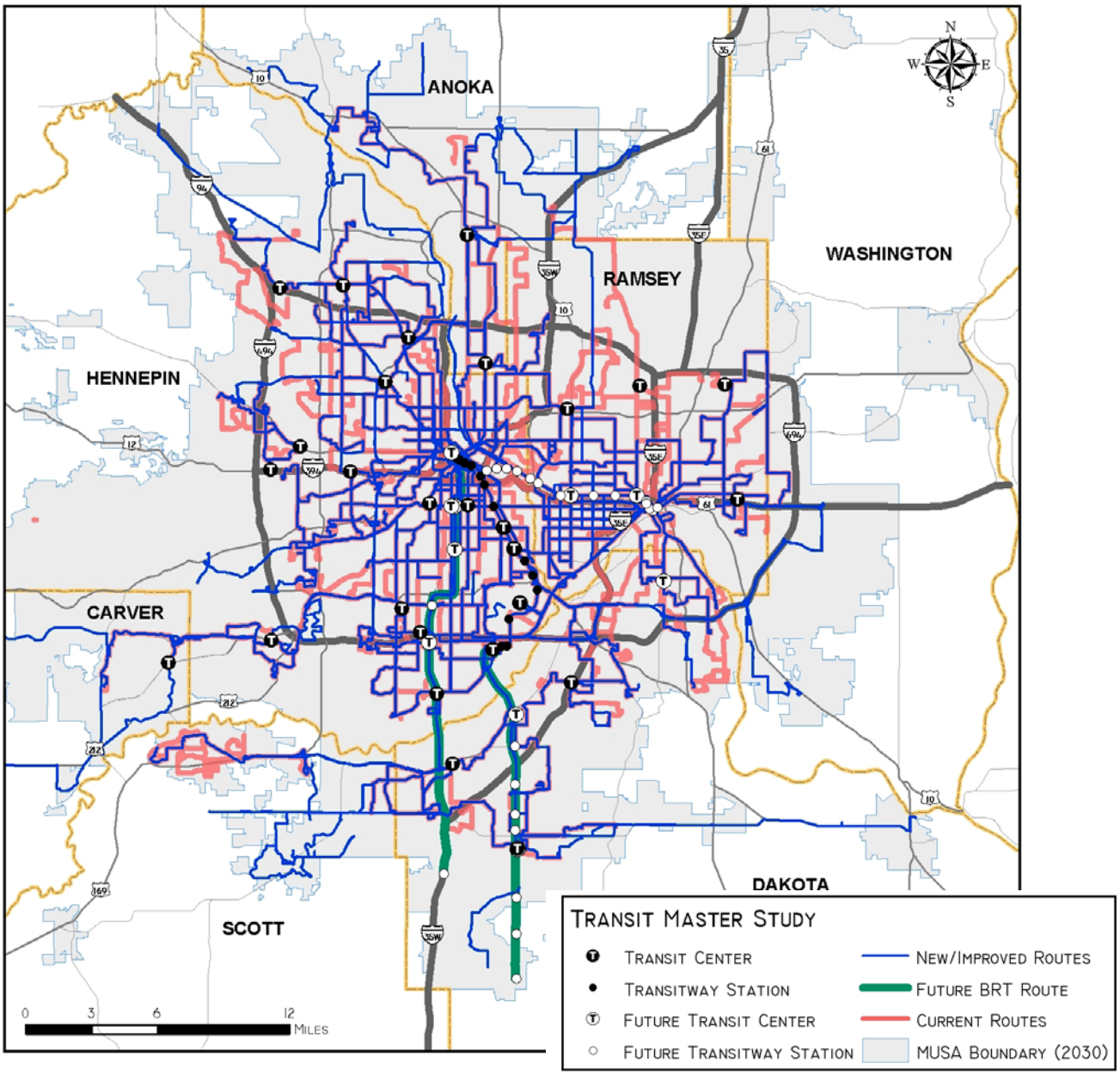
[1] Some arterial routes may have branches that operate less frequently than every 20 minutes. In this case, only the trunk portion of the route, with service every 20 minutes or better, is defined as part of the arterial service network.

2030 Local Bus Service Network

By 2030, the region may add up to 40 new local routes, primarily in suburban markets. Several of these new routes are designed to improve local access to a planned transitway, such as the Central Corridor LRT line or the Northstar Commuter Rail line. Some routes will connect suburbs, while others will improve local connections between suburbs and the downtown core.

The existing local service will see significant improvements as well. Over half of current local routes will benefit from a service improvement. The most common route enhancements are increased frequency of service, longer hours of service on weekdays and weekends, and increased coverage by extending routes to areas not currently served.

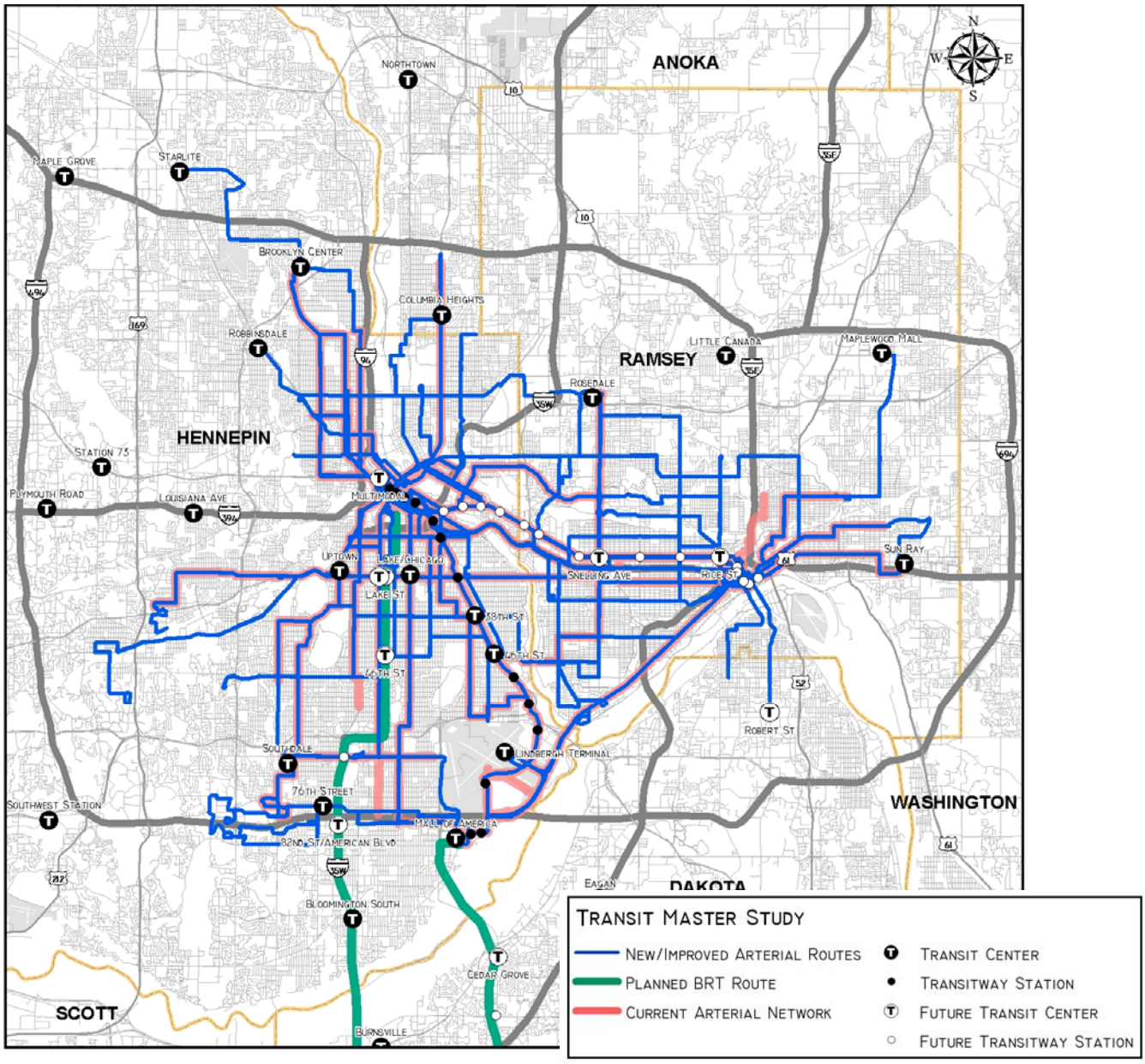
The route improvements shown below will be prioritized and implemented as financial resources permit.



2030 Arterial Bus Service Network

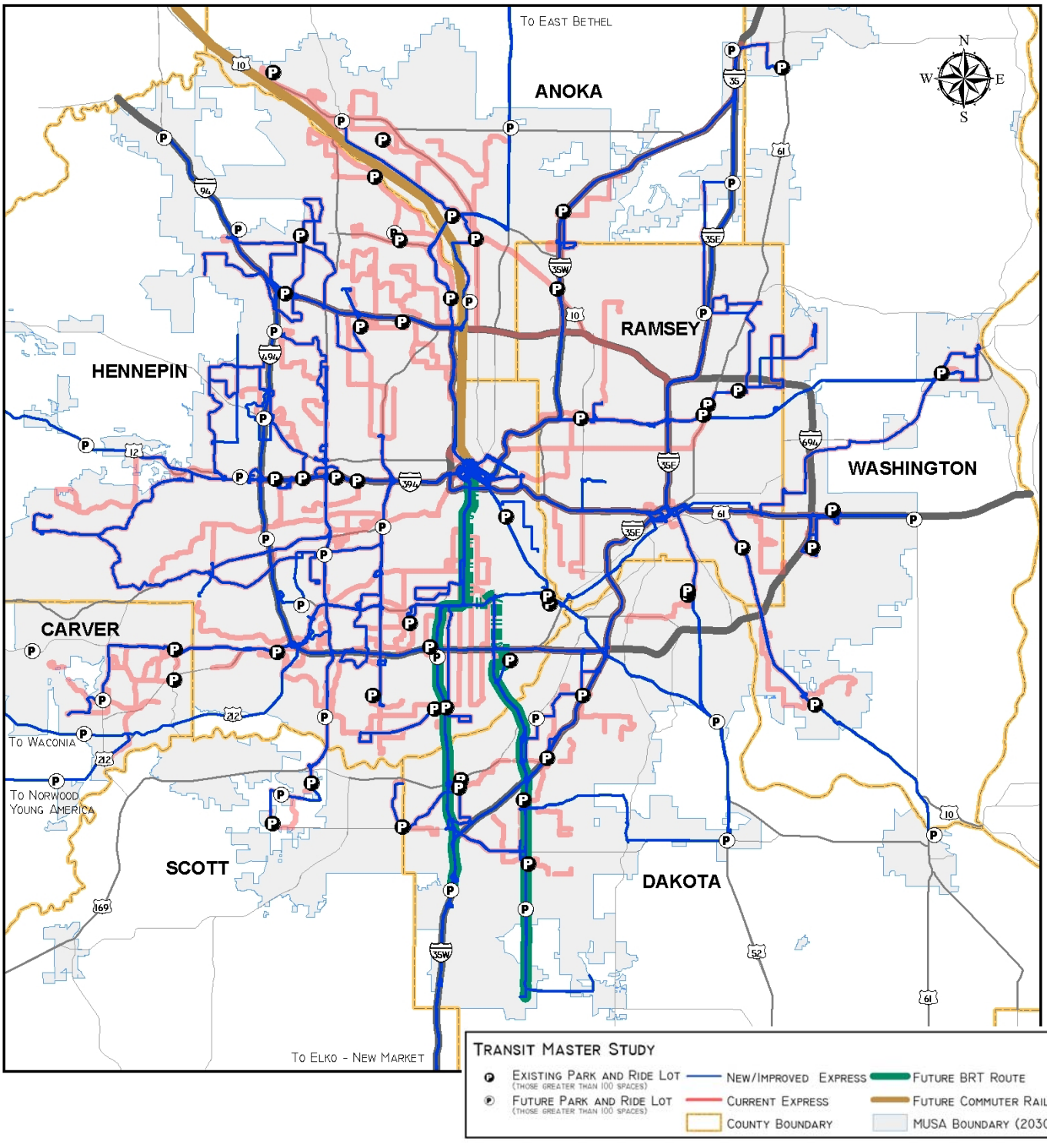
By 2030, the Council expects the number of arterial and HFN routes to double. A large portion of this growth will be on routes serving St. Paul. There will also be an expansion of limited-stop routes that overlay local service in the highest ridership corridors. There are currently two limited-stop overlay routes, Route 53 on Lake Street and Marshall Avenue and Route 50 on University Avenue. Today, these routes only operate on weekdays during the morning and afternoon peak hours. An all-day limited-stop service, Route 54, operates on West 7th Street in St. Paul and Bloomington. By 2030 MetroTransit plans to provide additional all-day limited-stop service and five new limited-stop routes on Chicago Ave., Nicollet Ave., Fremont Ave., Broadway Ave., and Maryland/White Bear Aves. Some of these routes may also be candidates for new bus rapid transit service.

The route improvements shown below will be prioritized and implemented as financial resources permit.



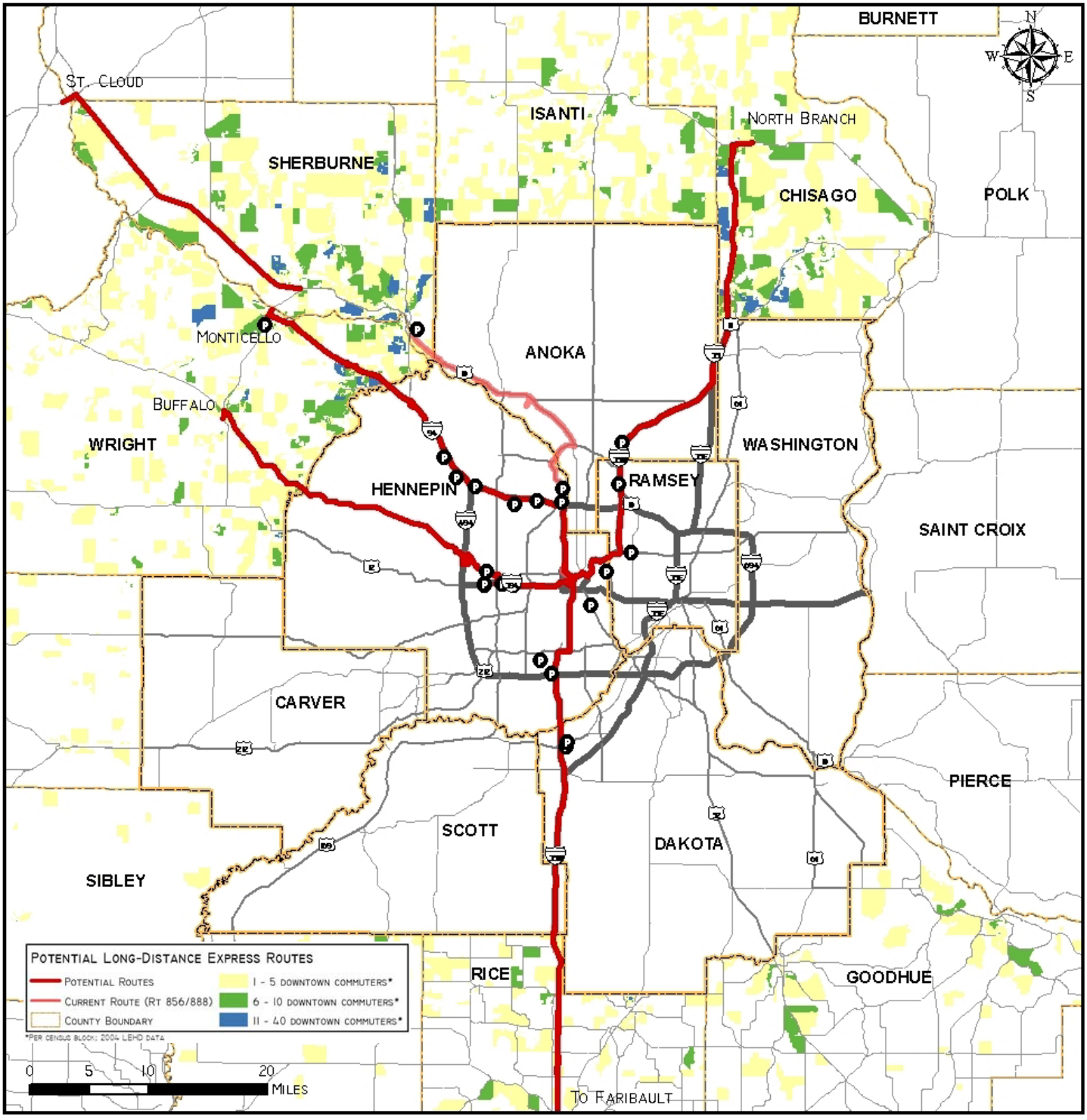
2030 Express Bus Service Network

The 2030 goal is to add 36 new express routes and make service improvements on an additional 50 existing routes. This includes adding or expanding dozens of park-and-ride lots associated with these routes. These recommendations are based on analysis of commuting patterns to downtown Minneapolis, downtown Saint Paul and the University of Minnesota, including changes in population and employment and the modal share of transit within the overall commuter market. The route improvements shown below will be prioritized and implemented as financial resources permit.



2030 Long-Distance Express Service

Long-distance express routes, originating outside of the seven-county metro area, may also be added over the coming decades. There are concentrations of commuters from the adjacent counties into the seven counties. The map below shows concentrations of commuters into downtown Minneapolis today. It is projected that these patterns will intensify between now and 2030, possibly supporting long-distance express service. Potential routes serving these concentrations are shown below, which should be refined through joint study with the Mn/DOT Office of Transit. These services will not likely be operated by the Metropolitan Council.



Bus Passenger Facilities

Safe, comfortable and convenient passenger facilities are an important element in providing quality transit service. Ranging from bus stops to transit centers to park-and-ride lots, each facility has a unique use in connecting the customer to the transit network.

Bus Stops

A bus stop, in its simplest form, is a sign indicating where the bus will stop. Busier stops can also offer a shelter, while the most active stops in our system, primarily in one of the downtown cores or at the University of Minnesota, provide riders with a larger, custom-designed shelter. As shelter size and quality increase, amenities such as heat, lighting, route information, trash disposal and greater protection from the elements are added. Shelters, both basic and custom, are owned and maintained by a variety of entities, including the Metropolitan Council, the City of Minneapolis, the U of M and private advertising companies. Bus stop spacing varies by development intensity and route design.

There are over 15,000 bus stops within the regional transit system, of which 1,200 have shelters. Because routes are constantly changing, almost a thousand stops are added and removed each year. Major improvements of shelters in downtown Minneapolis are planned, as well as other shelters throughout the region to meet growth in demand.

Transit Centers

Transit centers are enhanced facilities where several routes converge to give customers a convenient and comfortable transfer between two or more routes. Compared to a standard bus shelter, transit centers offer greater amenities such as more passenger waiting space. Routes serving a transit center are often timed to provide quick and reliable transfers between routes. Over the next several years, additional amenities such as real-time bus arrival information may also be provided at transit centers. Many transit centers are located at major regional activity centers and shopping centers, while others are located along transitways, such as the existing Hiawatha LRT line, or the Cedar Avenue and I-35W BRT lines, which are under construction. Several transit centers also include park-and-ride facilities.

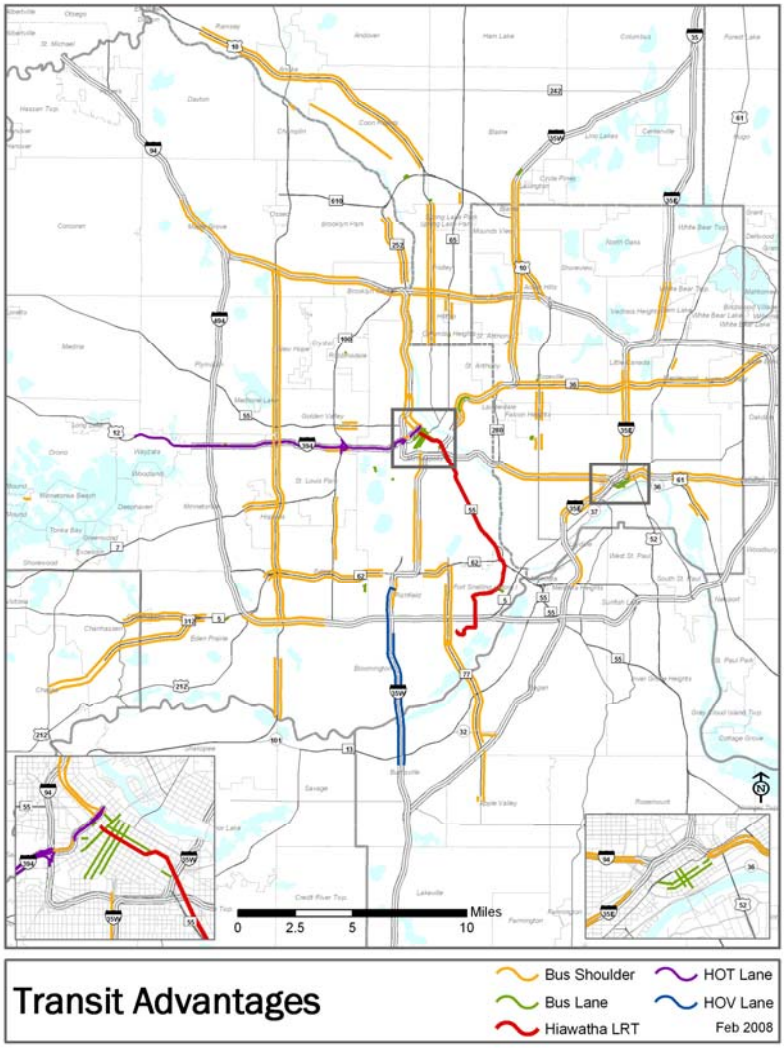
Park-and-Ride Lots

Park-and-ride lots anchor suburban commuter service to downtown Minneapolis, St. Paul and the University of Minnesota. They create a focal point of service by attracting suburban riders to one location in a corridor, rather than a local pick-up bus service through suburban areas. The scale and amenities found at park-and-ride lots varies widely. Some lots are relatively small, while others exceed 1,250 spaces. These larger lots provide frequent service and facilities that are on par with transit centers, including a heated waiting area with transit information.

There are currently 141 active park-and-ride lots, with many additional lots planned by 2030. During this time several existing lots will expand. Taken together, the total number of new spaces will be 13,000 – a 68 percent increase over the existing capacity – by 2030. This large increase is in response to high demand for express service. Park-and-ride growth has been very strong, with 10 facilities near capacity, 11 at capacity, and 14 over capacity. Annual ridership growth of express routes has been strong, growing over 14 percent during the past two years (2005 – 2007). Locations will be identified based on a defined set of criteria, including ridership demand, land acquisition cost, site access and potential future expansion.

Transit Advantages

Transit advantages are any infrastructure improvement that gives transit vehicles a speed or reliability advantage over general traffic and thereby make transit more attractive and competitive with the car.



The Twin Cities has 250 miles of bus-only shoulders, the most extensive network in the country. These “lanes” allow buses to travel on the shoulders of congested freeways. Buses use regular highway lanes when traffic is free-flowing but shift to shoulders to bypass congestion, giving transit a clear time advantage over general traffic. It is critical that shoulders be preserved for transit as changes are made to the regional highway system.

Between now and 2030, up to 145 new miles of bus shoulders could be added to meet the needs of the expanding region and to fill gaps in the existing bus-only-shoulder network. Much of this work can be done in conjunction with regular roadway rehabilitation.

Other examples of transit advantages include ramp meter bypasses, high-occupancy-toll (HOT), and high-occupancy-vehicle (HOV) lanes. Currently the Twin Cities has one HOT lane, on I-394. This lane provides carpoolers, paying users and transit vehicles with a congestion-free trip. A second HOT lane is planned for I-35W south of downtown Minneapolis. Discussions are currently occurring at Mn/DOT about expanding this network, which benefits both highway users and transit riders. An expanded network could include additional HOT lanes or it could include the creation of priced dynamic shoulder-lanes. Price dynamic shoulder-lanes would allow automobiles that pay to use the shoulder lanes like they were HOT lanes. Autos would have this option only during peak periods. As this discussion evolves, it is critical that the needs of transit be considered in the evolution and prioritization of this concept.

Exclusive bus lanes are used in downtown Minneapolis and downtown St. Paul. These lanes provide a transit advantage through congested downtown streets. In 2009, on 2nd and Marquette Avenues in downtown Minneapolis, double bus lanes will be constructed to provide a capacity and speed advantage over the existing (single) bus lanes, which are congested in peak periods.

Transit Corridor Analysis

This study identified 29 corridors and analyzed them for their potential for light rail, commuter rail, or busway improvements. Staff from the Metropolitan Council, regional railroad authorities, Mn/DOT and the core cities identified the corridors for screening. These corridors were evaluated for their potential for light rail, commuter rail, or busway improvements based primarily on ridership and cost.

Corridors that are currently in implementation or have been completed (Hiawatha, Northstar, Central, I-35W BRT, and Cedar Avenue BRT) were excluded from the screening analysis. Several corridors have recently had in-depth studies conducted and the results of these studies were used (Southwest, Red Rock and Robert Street) in lieu of additional work.

Modes/Services

In the corridor analysis component of this study, three types of dedicated transitways were examined: commuter rail, light-rail transit, and dedicated busways. The characteristics of these modes include:

Commuter Rail is a passenger rail service serving commuters into the core of the region. Commuter rail vehicles may use diesel multiple unit (DMU) vehicles or conventional diesel locomotives pulling passenger coaches. In many cases, commuter rail operates on existing freight railroad tracks that may also carry intercity passenger rail traffic operated by Amtrak, potentially using common stations. Lines are typically 20 or more miles long, with stations spaced much further apart than light rail, typically five miles apart. This spacing results in fewer stations than LRT to keep travel times low, and station areas are primarily oriented to park-and-ride uses. Initial commuter rail services operate at 20- to 30-minute frequencies during peak periods, with limited or no midday or reverse-direction service.

Light-Rail Transit (LRT) operates on rails in exclusive rights-of-way, in ballasted track or street-embedded rails. Vehicles are modern light-rail vehicles powered by overhead electrical wires. Stations are typically spaced about a mile apart. Typical LRT lines are about 10 miles long because they primarily serve densely developed areas. The number of stops on longer LRT lines makes end-to-end trip durations long, especially compared to nonstop express bus or commuter-rail services. LRT trains operate all day, with bidirectional service at frequencies of 10 minutes or better during peak periods.

For this study, rail transit that operates in mixed traffic has been separated into the distinct and separate category of streetcars, which are addressed separately. This section of the report will deal only with LRT operating in its own dedicated right-of-way.

Dedicated Busways are special roadways and lanes of roadways that are dedicated to the *exclusive* use of buses. In the corridor analysis component of this study, dedicated busway operations are identical to light rail transit.

Other busway applications can include many different bus routes using busway facilities, including local all-day service, limited-stop routes, and express bus routes. The network of routes operating on a dedicated busway can result in all-day service with very high frequencies during peak and off-peak periods.

Additional transitway modes described below have running-way advantages such as HOV/HOT lanes that offer a time advantage comparable to a dedicated busway, but can benefit carpool

and automobile users as well. Other types of services should also be examined for use in the Twin Cities:

Bus Rapid Transit: Bus rapid transit (BRT) is a transitway mode that uses bus vehicles but incorporates a number of the premium characteristics of light rail or commuter rail. These characteristics can include specialized vehicles, unique and improved stations, signal preemption or priority, off-board fare collection, improved signage and other features that allow vehicles to operate faster and more reliably than local or express buses. BRT can be run on a dedicated busway or in mixed traffic.

- **Arterial Bus Rapid Transit** operates on arterial streets in mixed traffic or dedicated bus lanes. Arterial BRT may use signal preemption or priority, off-board fare collection, increased stop spacing, queue jump lanes, dynamic parking lanes, and other speed advantages. These features allow arterial BRT transitways to operate faster than typical local buses in high-demand transit corridors. Arterial BRT offers high-frequency service during peak and off-peak periods.
- **Highway Bus Rapid Transit** uses bus-only shoulders, HOV/HOT facilities, queue jump lanes and other running-way advantages. Highway BRT also incorporates high-frequency, all-day service, branded vehicles, and improved stations, including park-and-ride facilities and online stations.

Express Bus Service with Transit Advantages including HOV and HOT lanes, priced dynamic shoulder lanes and bus-only shoulders to allow express bus routes to avoid congestion. Express buses use standard and coach transit buses, and may serve park-and-ride lots and provide local service on each end of the bus trip.

Other Transit Modes

Streetcars are vehicles running on rails that operate in mixed traffic. Streetcars can be vintage, modern or replica modern cars, but all operate on rails in mixed traffic. They are designed to stop frequently, comparable to local bus service. Because they stop frequently, they do not offer a speed advantage over local bus and auto traffic. Streetcars are also subject to service disruptions since they operate in mixed traffic and cannot circumvent traffic accidents blocking the rail line. Streetcars are typically local circulators and strong local development tools, as such they are typically funded with local development funds rather than regional transit funds. Because of this, streetcars were not included in this study. A further discussion of streetcars is included in Appendix F.

Other modes of transit were not considered for this study. Subways and monorails are typically used for areas with densities much higher than the Twin Cities. Personal Rapid Transit (PRT) has not had a full-scale implementation to provide its operating characteristics to allow for analysis. Other modes are typically for specialized applications like trolley buses for hilly areas or aerial trams for gorges.

Intercity passenger rail and bus service was not considered in this study. Intercity passenger rail service is provided by Amtrak and regulated by the Federal Railroad Administration (FRA), not the Federal Transit Administration (FTA). As such, planning for these services extends beyond the jurisdiction of an individual metropolitan planning organization and is usually planned at a state or federal level. However, existing and new intercity passenger rail services could yield rail improvements such as stations, signals, or improved track that could also be used by commuter rail transitways within the region.

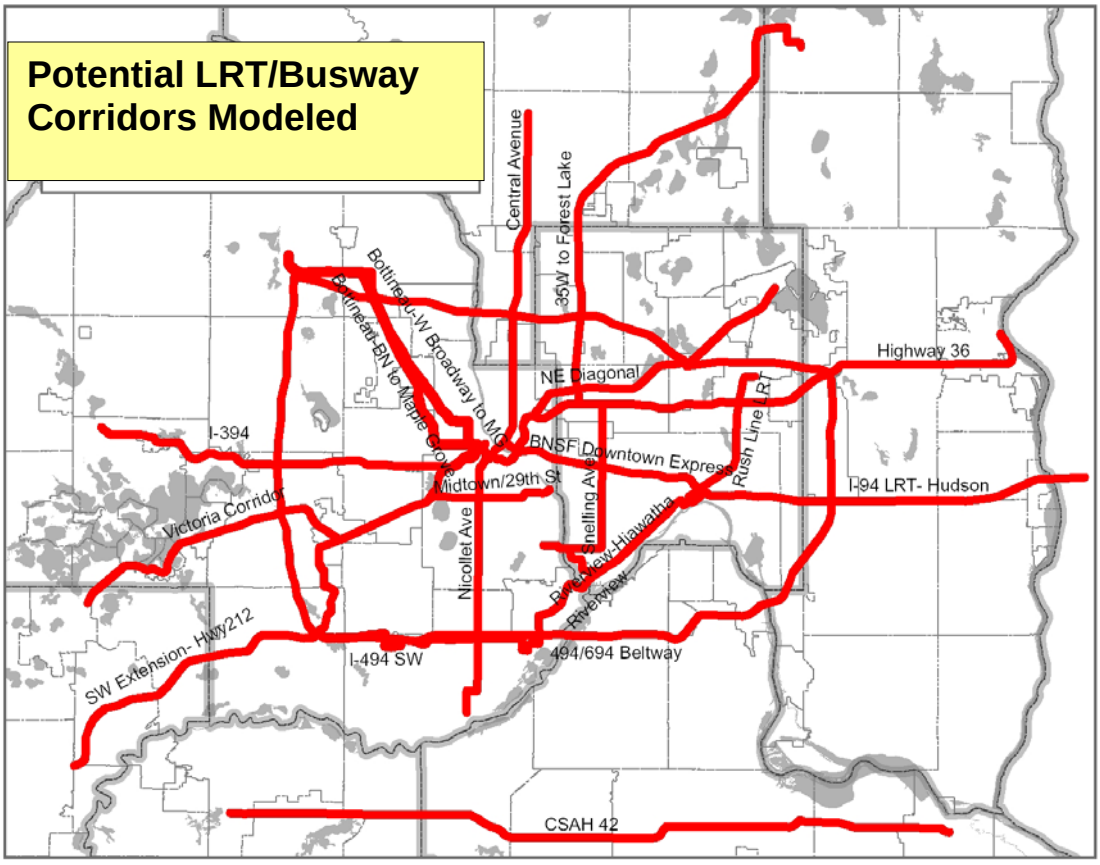
Corridors Analyzed

The following table identifies the corridors, modes, terminus, and alignment of 29 corridors analyzed for their potential for commuter rail or LRT/Busway investments. The following two maps following show the locations of these corridors.

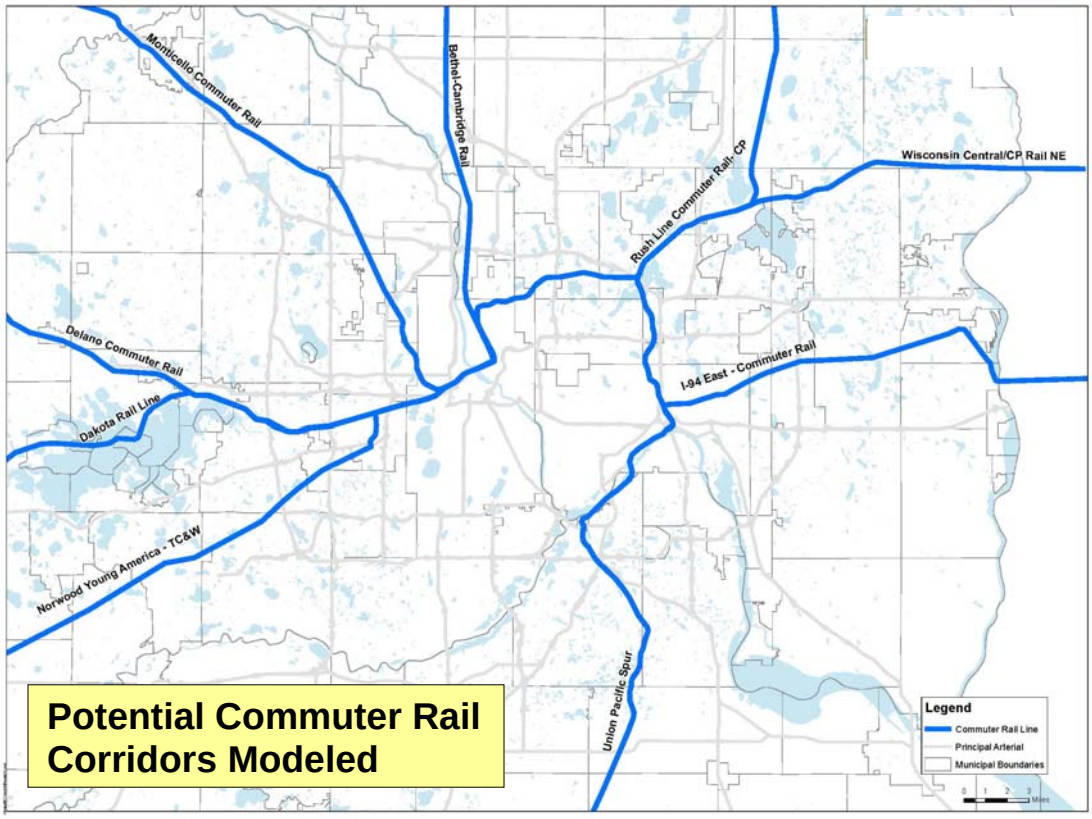
Corridor Descriptions

	Transit Corridor/Description	Mode	Terminus	Terminus	Alignment
1	Central Avenue	LRT	CSAH 14	Dt Mpls	Central Avenue
2	Bethel-Cambridge Rail	CR	Cambridge	Dt Mpls	BNSF line to Northstar alignment
3	I-394	LRT	CR 6	Dt Mpls	Highway 394 alignment
4	Dakota Rail Line	CR	Hutchinson	Dt Mpls	Abandoned ROW W of Wayzata, BNSF E of Wayzata
5	Delano Commuter Rail	CR	Delano	Dt Mpls	BNSF ROW
6	Midtown/29th St	LRT	SW LRT	Mississippi	Abandoned ROW
7	Norwood YA - TC&W Rail	CR	Glencoe	Dt Mpls	TC&W Line
8	Victoria Corridor	LRT	Victoria	Dt Mpls	Abandoned ROW to Southwest LRT
9	I-494 Southwest Quadrant	LRT	Southwest LRT	MOA	American Boulevard
10	I-494/I-694 Beltway LRT	LRT	494	694	Highway alignment
11	Riverview Corridor - to MOA	LRT	MOA	Dt St Paul	Rail alignment then Hwy 5
12	Riverview Corridor - to Hiawatha	LRT	MOA	Dt St Paul	Rail alignment to Ford Plant Spur across Ford Pkwy to 46th Street
13	Snelling Ave & Ford Pkwy	LRT	Rosedale	Hiawatha LRT	Snelling to Ford Parkway
14	Rush Line LRT Corridor	LRT	Maplewood Mall	Dt St Paul	Abandoned rail ROW
15	CSAH 42	LRT	Hastings	Savage	On CSAH 42
16	Union Pacific Spur	CR	Rosemont	Dt St Paul	Union Pacific ROW to abandoned ROW to the Union Pacific ROW
17	I-94 East- along highway	LRT	Hudson	Dt St Paul	LRT along highway
18	I-94 East- Commuter Rail	CR	Roberts, WI	Dt St Paul	Union Pacific ROW
19	Hwy 36	LRT	Stillwater	Mpls	On highway ROW
20	Wisconsin Central	CR	Marine on St Croix	Dt Mpls	CP Rail to Northstar alignment
21	BNSF Between Downtowns	CR	Dt Mpls	Dt St Paul	BNSF ROW
22	NE Diagonal	LRT	White Bear	Dt Mpls	MNNR Line from to Roseville to St. Anthony to 35W
23	I-35W to Forest Lake	LRT	Forest Lake	Dt Mpls	I-35W along highway
24	Nicollet Ave	LRT	Bloomington	Dt Mpls	Nicollet Avenue on street
25	Monticello Commuter Rail	CR	Rogers	Dt Mpls	BNSF ROW
26	Southwest LRT Extension	LRT	TH 147	Dt Mpls	Highway 212 ROW
27	Bottineau: Highway	LRT	Maple Grove	Dt Mpls	Maple Grove to Mpls via highway ROW
28	Bottineau: Rail ROW	LRT	Maple Grove	Dt Mpls	Maple Grove to Mpls via railroad ROW
29	Rush Line Corridor	CR	North Branch	Dt St Paul	CP Rail

Light Rail/Busway Options Analyzed



Commuter Rail Options Analyzed



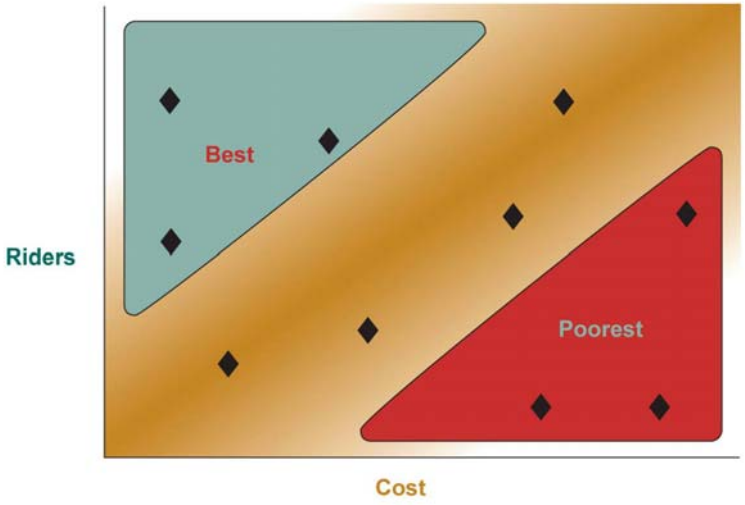
Corridor Evaluation Methodology

Each corridor was rated based on two factors:

- Ridership: The Regional Travel Demand Forecast Model was used to develop ridership estimates. This model uses the adopted population, demographic and employment forecasts for 2030 as well as travel information from the Travel Behavior Inventory and the Census to forecast travel habits. An analysis was done based on how travel habits would change if an intensive transit investment were made. This led to ridership forecasts for each corridor. Each corridor was first analyzed individually to understand its characteristics from a stand-alone perspective. Then each corridor was analyzed for interactions with other corridors to understand how the corridor would work within the transit system. The modeling was then compared against other recent modeling efforts in the region to ensure consistency.

- Costs: An analysis was done of the projected annualized capital and operating costs for each corridor. For capital costs, unit costs were developed for various types of running ways, vehicles, and stations. Costs for major bridges, including river crossings, were also estimated. Standardized costs were also applied to park-and-rides. These costs were then annualized. Operating costs were estimated based on the mode and the length of route. No costs were inflated; all were calculated in 2007 dollars. No costs for the purchase of right-of-way or access easements (in the case of commuter rail) were included.

These two items, ridership and cost, were then graphed in the following format:



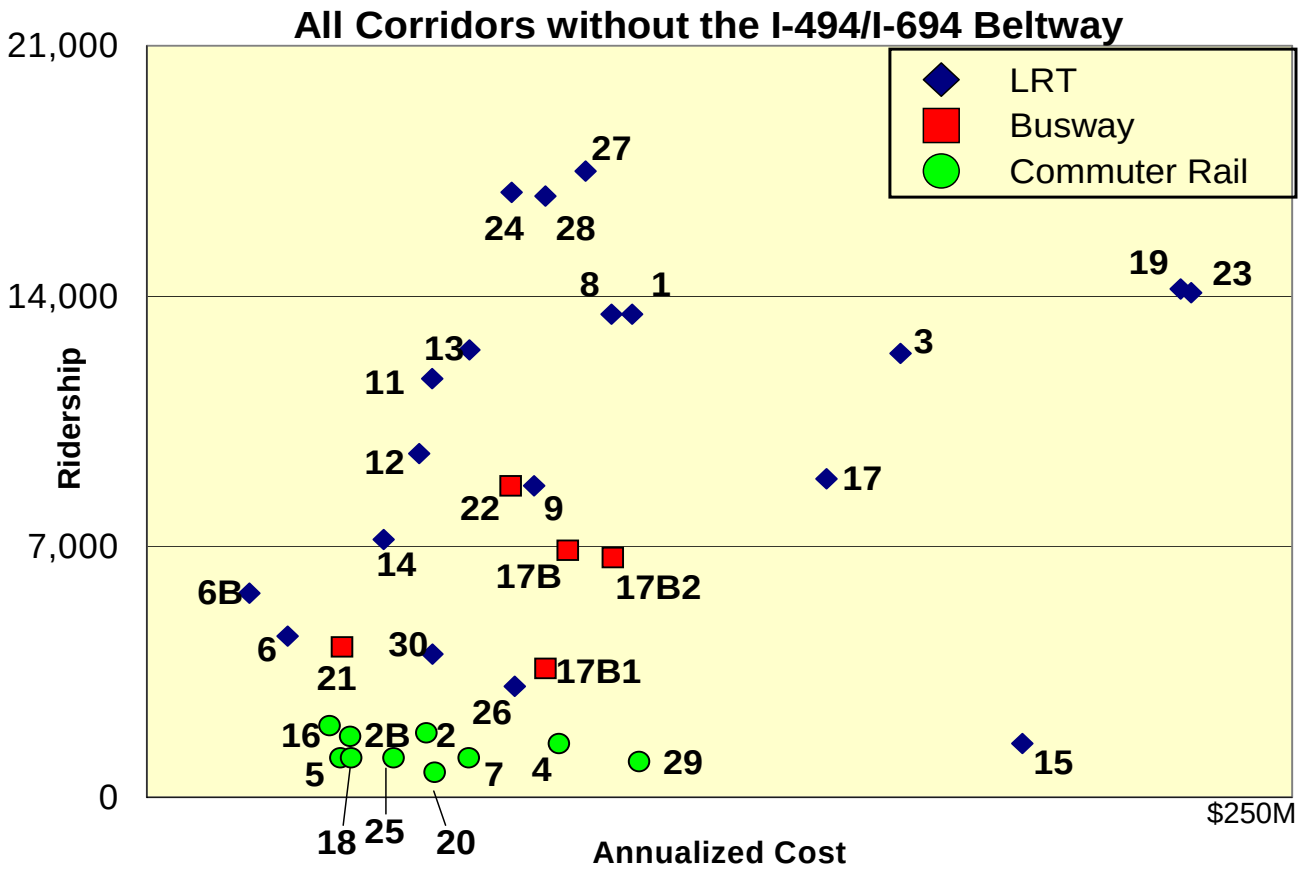
The results of this effort were then reviewed and confirmed by two national experts on transitway selection and funding.

Three corridors were modeled a second time with different alternatives. These include:

- #2 Bethel-Cambridge Commuter Rail was truncated at the Anoka County border.
- #6 Midtown was modeled again truncating the line at Hiawatha and assuming Southwest LRT was constructed.
- #17 I-94 East Corridor was run with an alternative (17B) as a busway instead of LRT, which substantially reduced its costs. The new route also continued through St. Paul to Minneapolis (the original route ended in downtown St. Paul). This corridor was further modified as two separate runs, one as "17A" for St. Paul-destined service and "17B" for Minneapolis-destined service.

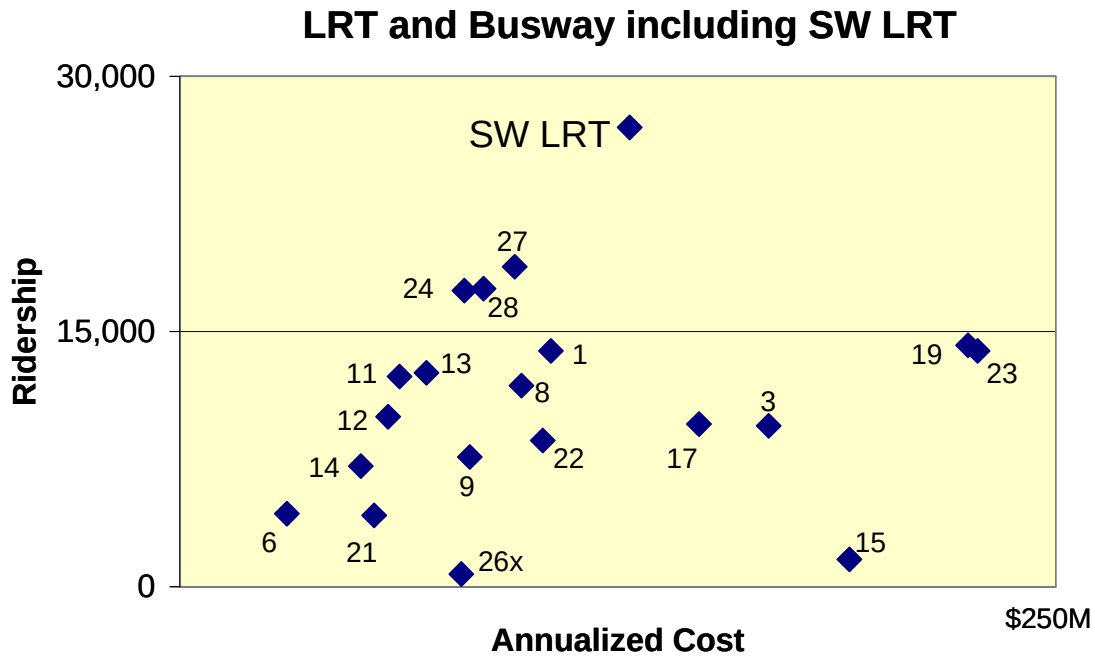
Corridor Rating Results

The results of the corridor ridership modeling and cost analysis are shown below:

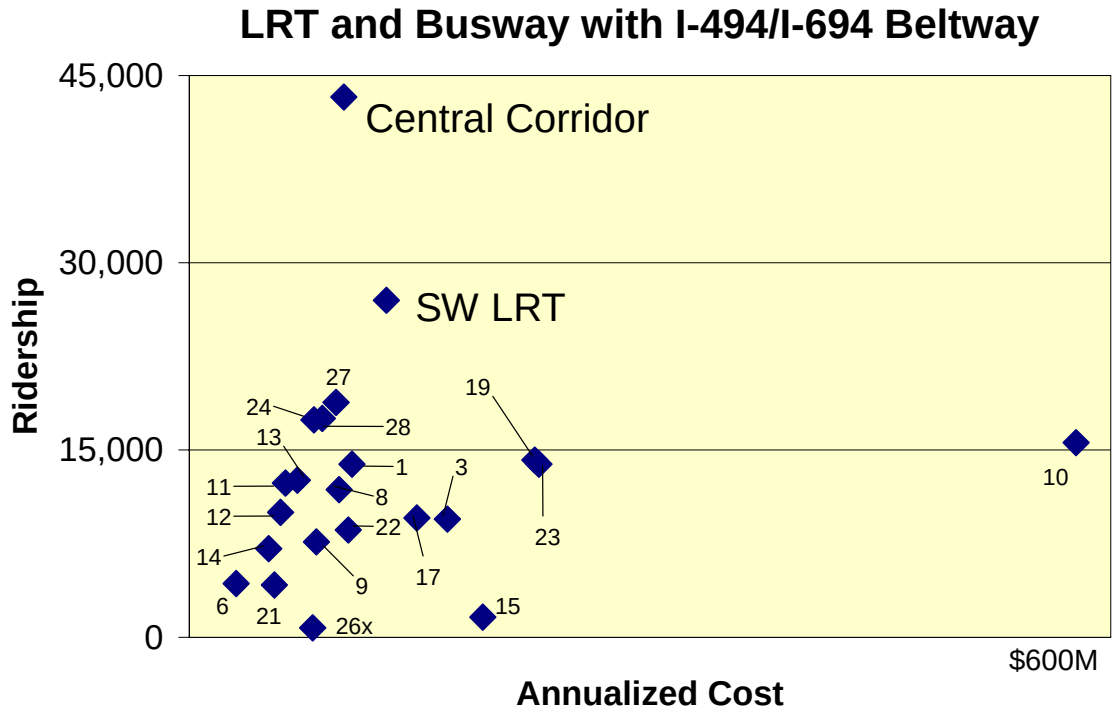


1 Central Avenue LRT
2 Bethel-Cambridge CR
2B Bethel-Cambridge Truncated
3 I-394 LRT
4 Dakota Rail CR
5 Delano CR
6 Midtown/29th St LRT
6B Midtown Truncated & after Southwest LRT built
7 Norwood YA CR
8 Victoria LRT
9 I-494 Southwest LRT
10 I-494/I-694 Beltway LRT
11 Riverview to MOA LRT
12 Riverview - Hiawatha LRT
13 Snelling & Ford Pkwy LRT
14 Rush Line LRT
15 CSAH 42 LRT
16 Union Pacific Spur LRT
17 I-94 East LRT to St. Paul
17B I-94 East Busway Wdbury to Minneapolis (via DT St Paul)
17B1 I-94 E Woodbury to St Paul
17B2 I-94 E Woodbury to Mpls
18 I-94 East CR
19 Hwy 36 LRT
20 Wisconsin Central CR
21 Between Downtowns CR
22 NE Diagonal BRT
23 I-35W to Forest Lake LRT
24 Nicollet Ave LRT
25 Monticello CR
26 Southwest LRT Extension
27 Bottineau LRT: Highway
28 Bottineau LRT: Rail ROW
29 Rush Line CR

To show how this analysis compares with other recent, more in-depth studies, all of the corridors modeled as LRT and busway were graphed, and the results from the recent Southwest LRT study were added.



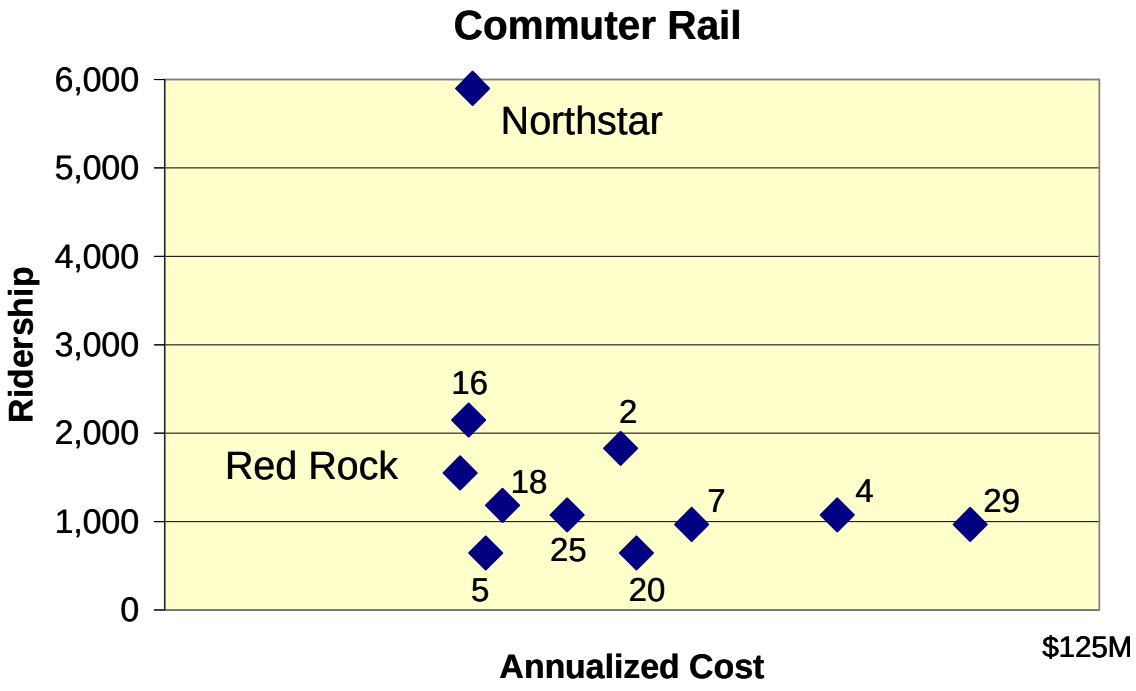
Central Corridor and the I-494/I-694 Beltway LRT option were also added to the graph to show their standing relative to other corridors.



A similar process was followed with the commuter rail analysis. The results of the cost estimation and corridor ridership modeling for commuter rail corridors were compiled and compared with the results from the Northstar Commuter Rail and Red Rock Alternatives Analysis studies.

It should be noted that the Northstar and Red Rock cost estimates include the estimated costs of easements to access the rail lines, while the costs for other corridors did not. However, the detailed study done for Northstar and Red Rock corridors yielded track improvement costs that were relatively low on these two corridors, compared with the higher, more conservative unit-cost estimates applied to other corridors analyzed in this study.

This study recognizes the differences in these methodologies, but overall results are generally comparable. Ridership on the corridors analyzed is substantially lower than Northstar, regardless of cost.



Corridor Screening Results and Additional Considerations

Projected ridership and annualized cost are the primary factors in determining transit corridor potential. A number of additional considerations influence the readiness, cost, and impacts of transitway implementation. These include right-of-way considerations and potential transitway impacts on the road system, environment, land use, and other factors.

The following table shows the results for each corridor for cost and potential ridership, and additional considerations in transitway implementation.

Corridor Screening Study Results

	Transit Corridor/Description	Mode Studied	Projected Ridership	Costs	Considerations
1	Central Avenue	LRT	Medium	Medium	Would require taking lanes on Central Avenue.
2	Bethel-Cambridge Rail	CR	Low	Medium	Passenger rail from Duluth may fund upgrades, reducing cost for commuter rail; uncertain if or when passenger rail will commence.
2B	Bethel-Cambridge Rail	CR	Low	Low	Alternative with line truncated at the Anoka border; costs were reduced from the main alternative.
3	I-394	LRT	Medium	High	Would require additional ROW, reconstruction of the roadway and reconstruction of interchanges. Development in close proximity to existing highway ROW.
4	Dakota Rail Line	CR	Low	High	Portion of alignment on operating railroad.
5	Delano Commuter Rail	CR	Low	Medium	Operating railroad.
6	Midtown/29th St	LRT	Low	Low	Southwest LRT alignment has not yet been determined but may use part of this corridor.
6B	Midtown/29th St	LRT	Low	Low	Alternative with line truncated at Hiawatha LRT and assumed Southwest LRT was complete.
7	Norwood YA - TC&W Rail	CR	Low	Medium	Operating railroad.
8	Victoria Corridor	LRT	Medium	Medium	Corridor follows Southwest LRT alignment for much of route.
9	I-494 Southwest Quadrant	LRT	Low	Medium	Would require taking lanes on American Boulevard.
10	I-494/I-694 Beltway LRT	LRT	Medium	Very High	May require reconstruction or relocation of roadway, reconstruction of interchanges and purchase of ROW. River crossings at the Mississippi and Minnesota Rivers.
11	Riverview Corridor - to MOA	LRT	Medium	Low	Would require taking lanes on West 7th. Highway 5 Bridge may not support rail. May not be able to widen Ft. Snelling tunnel.
12	Riverview Corridor - to Hiawatha	LRT	Medium	Low	If built on streets, would require taking lanes on West 7th, Ford Parkway, and 46th Street. River crossing at Ford Bridge. Grade issues on Ford Plant Spur. Alignment close to residential structures.
13	Snelling Ave & Ford Pkwy	LRT	Medium	Low	Would require taking lanes on Snelling Avenue and Ford Parkway. River crossing at Ford Parkway.
14	Rush Line LRT Corridor	LRT	Low	Low	If built on streets, would require taking lanes on East 7th. ROW runs close to residential structures.
15	CSAH 42	LRT	Low	High	May require additional ROW and reconstruction of interchanges.

16	Union Pacific Spur	CR	Low	Medium	Would require filling a two-mile gap in rail connection. Corridor would have to be reconnected to downtown St. Paul. Alignment includes multiple operating railroads.
17	I-94 East- along highway	LRT	Medium	High	May require reconstruction, relocation of roadway, reconstruction of interchanges and purchase of additional ROW. River crossing at St Croix. Wisconsin cost- sharing would have to be resolved.
17B	I-94 East- along highway	Busway	Low	Medium	Alternative considered assuming busway and not LRT.
17B1	I-94 East- along highway	Busway	Low	Medium	Alternative assuming busway to downtown St Paul.
17B2	I-94 East- along highway	Busway	Low	Medium	Alternative assuming busway to downtown Minneapolis.
18	I-94 East- Commuter Rail	CR	Low	Low	River crossing at St Croix. Operating railroad. Wisconsin cost-sharing would have to be resolved.
19	Hwy 36	LRT	Medium	High	May require additional ROW and reconstruction of roadway and interchanges. Wisconsin cost-sharing would have to be resolved.
20	Wisconsin Central	CR	Low	Medium	Alignment includes multiple operating railroads.
21	BNSF Between Downtowns	Busway	Low	Low	Operating railroad with no plan for sale/abandonment.
22	NE Diagonal	Busway	Medium	Medium	Rail line currently in active use. Potential federal 4F issues with bike trail. ROW close to residential structures east of Lexington. Limited ROW in downtown White Bear Lake.
23	I-35W to Forest Lake	LRT	Medium	High	Will require purchase of additional ROW, reconstruction or relocation of the roadway, and reconstruction of interchanges.
24	Nicollet Ave	LRT	High	Medium	Would require taking lanes on Nicollet Avenue. Kmart extends across Nicollet.
25	Monticello Commuter Rail	CR	Low	Medium	Uses same rail corridor as Bottineau; only light rail **or** commuter rail could be accommodated. Operating Railroad.
26	Southwest LRT Extension	LRT	Low	Medium	Intersections/interchanges would have to be rebuilt on Hwy 212.
27	Bottineau: Rail ROW	LRT	High	Medium	Operating Railroad. BNSF ROW needed.
28	Bottineau: Highway	LRT	High	Medium	Would require taking lanes on Bottineau Boulevard/ Broadway/other streets.
29	Rush Line Corridor	CR	Low	High	Multiple operating railroads. Rail would have to be rebuilt on abandoned ROW.

Corridor Analysis Conclusions

This study makes the following conclusions as a result of the corridor analysis process. The map on the following page displays the potential corridors for consideration in the Council's *2030 Transportation Policy Plan*.

Complete/In Implementation

The following transitways are complete or are in the process of being completed: Hiawatha LRT, I-35W BRT, Cedar BRT, I-394 HOT Lane, Northstar Commuter Rail, and Central Corridor LRT.

In Development

Two corridors had sufficiently high ridership, available right-of-way, and satisfactory costs that showed potential for transitway implementation. The Southwest and Bottineau Transitways should continue advanced study towards implementation. Development will include alternatives analysis, draft environmental impact statements, final environmental impact statements, preliminary engineering, final design, and any other studies that lead to implementation.

Study for Mode/Alignment

The following corridors should be studied to determine the most appropriate transit mode and alignment: I-35W North, Central Avenue/TH65, TH 36/NE, I-94 East, and Rush Line Corridor.

Study Bus Rapid Transit on Arterial Streets

Some arterial transit corridors screened for LRT showed promising ridership results, but high cost and limited right-of-way restrict rail implementation. Still, high transit demand on these corridors may warrant improved bus service to emulate LRT. The following corridors should be studied for bus rapid transit: Nicollet Avenue, Chicago Avenue, I-494/American Boulevard, Broadway Avenue, Snelling Avenue, West 7th Street, East 7th Street, & Robert Street. Bus rapid transit is further described in Appendix C.

Future Studies

Commuter Rail Studies

The current ridership analysis indicates that no commuter rail corridor other than Northstar would have enough ridership to meet a threshold for intensive investments. This modeling is hampered by the lack of data about travel patterns of commuter-rail customers because the region currently does not have an operating commuter rail. Once Northstar Commuter Rail opens in 2009, it will be possible to use observed data on the demand for commuter rail for modeling in the region. Because of this, the region should look again at demand for commuter rail after Northstar is operational.

The *2030 Transportation Policy Plan* adopted in 2004 identifies the Red Rock Corridor as a tier two transitway on dedicated right-of-way. Because an alternatives analysis was completed in 2007, this corridor was not included in the corridor screening. The results of the alternatives analysis were compared to other modeled corridors. The alternatives analysis concluded bus service should be increased in the corridor to build a ridership base prior to implementing commuter rail. This approach may apply to other corridors in this study.

If improvements are made on any railroad corridors to accommodate increased intercity passenger rail in the region, these improvements may lower the construction cost of commuter rail lines on those corridors.

Midtown Corridor

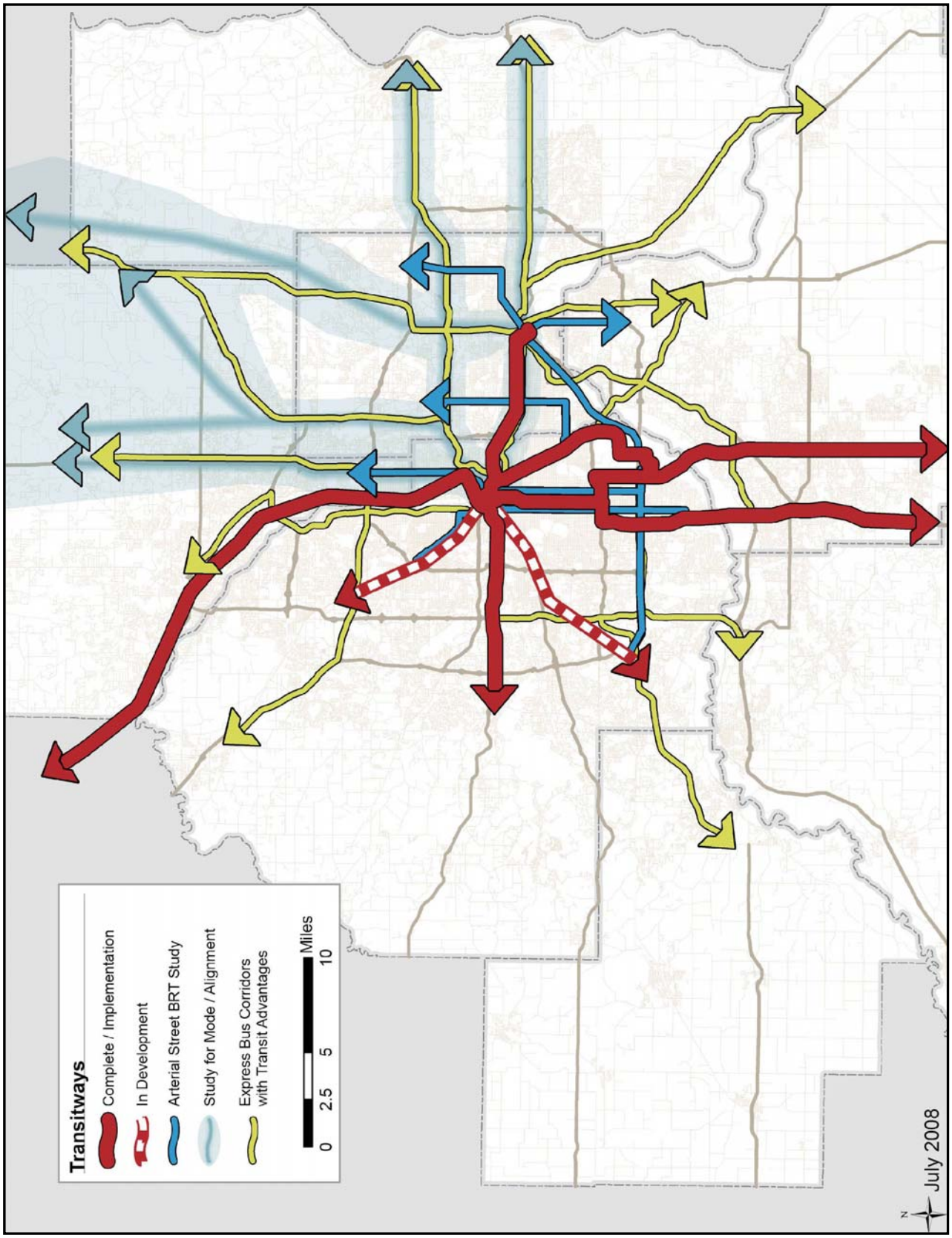
Midtown Corridor shows promise as a connection between Hiawatha LRT and Southwest Transitway. However, it is not yet clear which Southwest alignment will be selected. This corridor should be examined after Southwest is completed to see if a connection between Hiawatha and Southwest would be warranted.

Land-Use Corridor Planning

Some corridors have land uses that currently do not support intensive transit investments. It is possible that these corridors could develop in more transit-friendly ways if transit-supportive land-use policies were enacted. These plans need to be at the local rather than regional level. Communities along potential transit corridors should convene to examine what local land-use and development policy changes could foster transitway development in the future.

Completed Corridors and Corridors in Development or Under Study

The *2030 Transit Master Study* recommends the transitways shown below for study or implementation. These corridors may be incorporated into the update of the *2030 Transportation Policy Plan*.



Factors that Influence Transit Success

Many of the corridors analyzed in this study do not have sufficient ridership potential today or in the next two decades to justify intensive transit capital investments. However, the region's population is expected to grow by nearly one million people between 2000 and 2030. With careful planning, some of that growth could be concentrated along these corridors, increasing their feasibility for such investments in the future.

In analyzing transit corridors, seven major factors strongly influence how successful and effective a transit investment could be. These factors are further described in Appendix A.

Population. High levels of transit ridership depend on a large number of people living within a corridor. Without a critical number of people, ridership will not be high enough to justify intensive transit investments.

Population Density. Population density is also related to transit success. If people are scattered too far apart, it is difficult to get enough people on transit to justify intensive investments.

Employment: Number of jobs. Most transit trips take people to or from work. If there are not enough jobs along a corridor, transit ridership will not support intense investment.

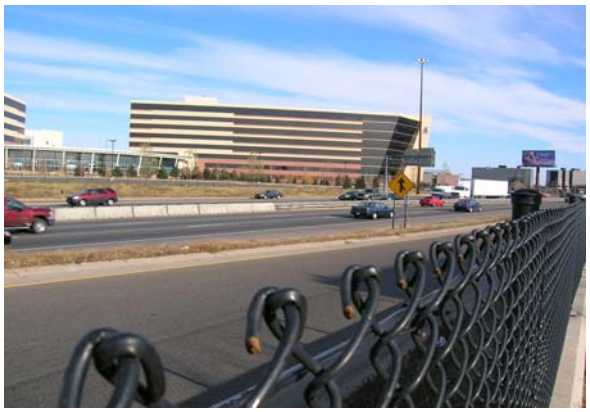
Clustering of jobs. It is not enough to have a large number of jobs within a corridor; they must also be clustered together so it is possible to walk to a large number of jobs at each node.

St. Paul: Clustered buildings, sidewalks and narrow streets facilitate walking to and from transit.

Employment center commuter sheds. Some corridors serve a single transit market, such as downtown Minneapolis or downtown St. Paul. But some corridors split their market share between two or more destinations. Despite the total number of potential transit users, the split market cannot be served as effectively by a single transit investment. The Rush Line Corridor is an example where commuters going to the central cities split almost evenly between St Paul and Minneapolis.

Economic incentives to use transit. Downtown Minneapolis, the University of Minnesota and downtown St. Paul are good transit markets in part because people have to pay for parking in addition to the cost of operating their automobile. This provides an increased economic incentive to use transit. However, this incentive does not exist throughout the rest of the region.

Fine-grain land-use patterns. In a downtown, many large towers cluster together in a small number of blocks. Walking between buildings and to transit is easy. Jobs locations are also convenient and walkable from housing, retail, personal services, and cultural and entertainment venues. In suburban



Richfield-Bloomington I-494: Highways are difficult for pedestrians to cross to transit facilities.

locations, there are large office towers but they are often surrounded by large surface parking lots, low-density retail, landscaping and large open spaces. The result is that the buildings with high concentrations of employment are a large distance from one another and from bus stops and potential transit stations. This makes serving suburban job concentrations with transit more of a challenge.

Strategies for Strengthening Transit Corridor Potential

Given the factors that influence the success of transit, communities can employ a variety of strategies to help strengthen the potential of transportation corridors for major transit investments. A few key strategies are summarized below. For a detailed discussion, refer to the Council's *Guide to Transit Oriented Development,* found on the Council's website, www.metrocouncil.org.

Intensify Population Density where it Makes Sense

One size does not fit all – communities have different opportunities, needs and aspirations. Population intensification makes sense **in nodes** along transportation corridors, especially along existing and potential transit corridors. Proven approaches in the Twin Cites include:

- *Promote housing choices with a range of prices.* Cities can choose to promote and plan for land uses and building types with a variety of housing and transportation choices.
- *Adopt land development policies that encourage more density*. These can include density bonuses, lot-size reductions, setback reductions and allowing accessory units.
- *Allow for structured and underground parking,* which supports higher-density housing development.

Intensify Employment Clusters with Transit- and Pedestrian Infrastructure

The success of transit, over the long term, depends on increasing the job intensity (numbers and concentration) in job centers throughout the region, and designing pedestrian-oriented transit connections. This region has eight major job centers but few have integrated, walkable environments clustered around transit. The following recommendations can shape infill and redevelopment to improve transit feasibility, and are generally most appropriate for local units of government. To improve transit corridor potential, cities may adopt land-use policies that:

- Encourage clustering of large employment centers into nodal concentrations, rather than dispersing them several blocks apart.
- Create connected streets, sidewalks and bicycle paths both within employment nodes and from employment nodes to surrounding residential areas.
- Encourage structured parking to reduce distances between buildings. This structured parking needs to enhance rather than distract from the pedestrian experience.
- Vertical or horizontal mixes of uses in the same development can support transit use by clustering trips to be within convenient walking distance for pedestrians.

Cities can promote this kind of development through transit overlay zones, density bonuses, and policies and actions to design streets that are safe, accessible and convenient for all users.

Study Land Use Now to Realize Transit-Supportive Development Through 2030

Historically, it takes at least seven to ten years to plan and implement a major transit investment. During these intervening years, cities can implement land-use policies to encourage development that supports future transit investments.

Land-use corridor studies can inform land-use policy actions. These studies should be corridor-wide and can include factors described above and in Appendix A of this report. As communities plan for these investments, community planning and involvement is critical. Mixed-use and

redevelopment projects take time and are facilitated by partnerships and a shared vision. Public participation efforts can include a corridor-wide visioning effort, design charrettes, task forces, and neighborhood and individual meetings. The aim is to develop goals, objectives and a vision for the area, which guide corridor development and its evolution.

Next Steps

The results of this study will be utilized in the update of the *2030 Transportation Policy Plan* (TPP) in 2008. That plan will apply reasonably expected financial resources to determine timing of transit investment implementation. Adoption of the updated TPP is expected by the end of the year.