



SOUTHWEST
transitway

green means go.

Southwest LRT

Technical Memorandum No. 6

RIDERSHIP FORECASTING METHODOLGY AND RESULTS

PRELIMINARY
FOR REVIEW ONLY

September 9, 2009



Table of Contents

| | | |
|------------|--|-----------|
| 1.0 | INTRODUCTION | 1 |
| 2.0 | OVERVIEW OF THE RIDERSHIP PROCESS | 1 |
| 2.1 | MODEL STEPS..... | 1 |
| 2.1.1 | Trip Generation | 2 |
| 2.1.2 | Trip Distribution | 2 |
| 2.1.3 | Mode Choice | 2 |
| 2.1.4 | Trip Assignment | 2 |
| 3.0 | ALTERNATIVES MODELED | 4 |
| 3.1 | BASELINE ALTERNATIVE | 4 |
| 3.2 | BUILD ALTERNATIVES..... | 4 |
| 3.2.1 | LRT 1A | 4 |
| 3.2.2 | LRT 3A | 4 |
| 3.2.3 | LRT 3C-1 (Nicollet Mall)..... | 4 |
| 3.2.4 | LRT 3C-2 (11th/12th Street) | 5 |
| 4.0 | MAJOR ASSUMPTIONS | 8 |
| 4.1 | DEMOGRAPHIC FORECAST ASSUMPTIONS | 8 |
| 4.2 | TRAVEL TIME MODIFICATIONS | 8 |
| 4.3 | INTERLINING ASSUMPTIONS | 9 |
| 5.0 | RIDERSHIP RESULTS | 9 |
| 5.1 | SYSTEM-WIDE IMPACTS..... | 10 |
| 5.2 | PROJECT BOARDINGS..... | 13 |
| 5.3 | SYSTEM PRODUCTIVITY..... | 13 |
| 5.4 | LRT STATION VOLUMES | 13 |
| 5.5 | REVERSE COMMUTE RIDERSHIP | 16 |
| 6.0 | TRAVEL TIME SAVINGS (USER BENEFITS) | 16 |
| 7.0 | CONCLUSIONS | 17 |

List of Figures

| | |
|---|----|
| Figure 1 Four Step Modeling Process | 3 |
| Figure 2 Baseline Alternative | 6 |
| Figure 3 - Build Alternatives | 7 |
| Figure 4 Forecast of New Transit Trips..... | 11 |
| Figure 5 Forecast of System-wide Linked Transit Trips | 12 |
| Figure 6 Forecast of System-wide Transit Boardings..... | 12 |
| Figure 7 Forecast of Daily Boardings for LRT 1A | 14 |
| Figure 8 Forecast of Daily Boardings for LRT 3A | 14 |
| Figure 9 Forecast of Daily Boardings for LRT 3C-1 (Nicollet Mall)..... | 15 |
| Figure 10 Forecast of Daily Boardings for LRT 3C-2 (11 th /12 th Street)..... | 15 |
| Figure 11 Forecast of Reverse Commute Trips..... | 16 |

List of Tables

| | |
|--|----|
| Table 1 Light Rail Run Times (in minutes)..... | 9 |
| Table 2 Travel Model Results | 10 |
| Table 3 System Productivity..... | 13 |

1.0 INTRODUCTION

The purpose of this technical memorandum is to describe the travel demand forecasting process and assumptions used for the Southwest LRT Locally Preferred Alternative (LPA) evaluation process. As documented below, the process and procedures used to estimate travel demand in the Southwest Corridor are consistent with the methods used for other transit and highway corridor studies in the Twin Cities. The purpose of the ridership forecasting is to assist in the determining which LRT alternative best meets the Purpose and Need for the proposed Southwest LRT.

2.0 OVERVIEW OF THE RIDERSHIP PROCESS

The transit analysis and ridership forecasts for each transit alternative were developed using the Metropolitan Council's regional travel demand model set. The model set and its components are of the same type as those used in most large urban areas in North America. The model uses what is known as the standard four-step planning process of trip generation, trip distribution, mode choice and traffic/transit assignment. The structure of the model and the process of applying them to transportation studies are consistent with the method endorsed by the Federal Transit Administration (FTA) and the Federal Highway Administration (FHWA).

The forecast year for the model is 2030. The primary inputs used in the model are the Study Area population, employment, and household socioeconomic characteristics, parking costs, transit fares, automobile operating costs, tolls, and highway and transit levels of service. The model set simulates travel on the entire transit and highway system within the Twin Cities metropolitan area. As such, it contains all of the existing and planned rail and bus lines. The model contains service frequency (i.e. how often trains and buses arrive at any given transit stop), routing, travel time and fares for all of these lines. In the highway system, all express highways and principle arterial roadways and many minor arterial and local roadways are included.

Results from the computer model provide detailed information relating to transit ridership demand. Estimates of passenger boardings on all of the existing and proposed transit lines can be obtained from the model output. The model also generates a number of statistics that can be used to evaluate the performance of a transportation system at several levels of geographic detail.

In the current effort, the evaluation of the Baseline alternative and Build alternatives were made by comparing such statistics as the daily linked transit trips, transit boardings on different transit sub modes (such as local bus, express bus and light rail), daily passenger miles and passenger hours of travel, station boardings on the rail line, and travel time savings experienced by the transit users.

The following section provides a brief description of the four-step modeling process.

2.1 Model Steps

Figure 1 provides a schematic description of the four-step process. All calculations in the travel model are performed at a finite unit of geography known as the Transportation Analysis Zone (TAZ). In the Twin Cities travel model, there are 1,201 such zones that make up the entire metropolitan area.

2.1.1 Trip Generation

The first step in the model set is a trip generation model. A projection of the forecast year population is translated, using trip generation rates¹, to estimates of number of daily trips that would be made from all the TAZs comprising the Twin Cities metropolitan area-- i.e., trip "origins", which do not have specified destinations. Similarly, projections of employment and development in all the TAZs are translated, again using trip generation rates, into estimates of number of daily trips that would be made to these zones from all places in the metropolitan area-- i.e. trips "attractions", which do not have specified origins. Population, employment, household characteristics, and car ownership data are required to run this model. The data are developed by the Metropolitan Council using inputs from the communities in the region.

2.1.2 Trip Distribution

The second model is a trip distribution model. It is used to link the trip origins of all TAZ zones with the trip attractions in the Central Business District (CBD) and the rest of the zones of the entire metro area. The result is a forecast of total daily trips made between all possible combinations of zones in the metro area, irrespective of travel mode. The output of this model is a trip table which determines the total demand for transportation in the entire region.

2.1.3 Mode Choice

The third model in the model set is a mode choice model that predicts how many of the daily trips would use transit versus an automobile for the entire trip. In making this forecast, the model considers the travel times and costs of each mode (most of which are derived from a computerized highway and transit network) and certain characteristics of the travelers (whose numbers are estimated in the trip distribution step), such as the number of automobiles available to their households.

2.1.4 Trip Assignment

In the final modeling step, transit trip assignment, the transit trips that are forecast using the mode choice model are assigned to specific transit lines represented in the network. The output of this final step is an estimation of the forecast year daily transit trips that would be made from the Twin Cities region on all transit lines, such as the local bus, express bus, private carriers and the light rail lines. The output of the assignment model provides future estimates of rail and bus boardings at all stations throughout the Metro Transit system.

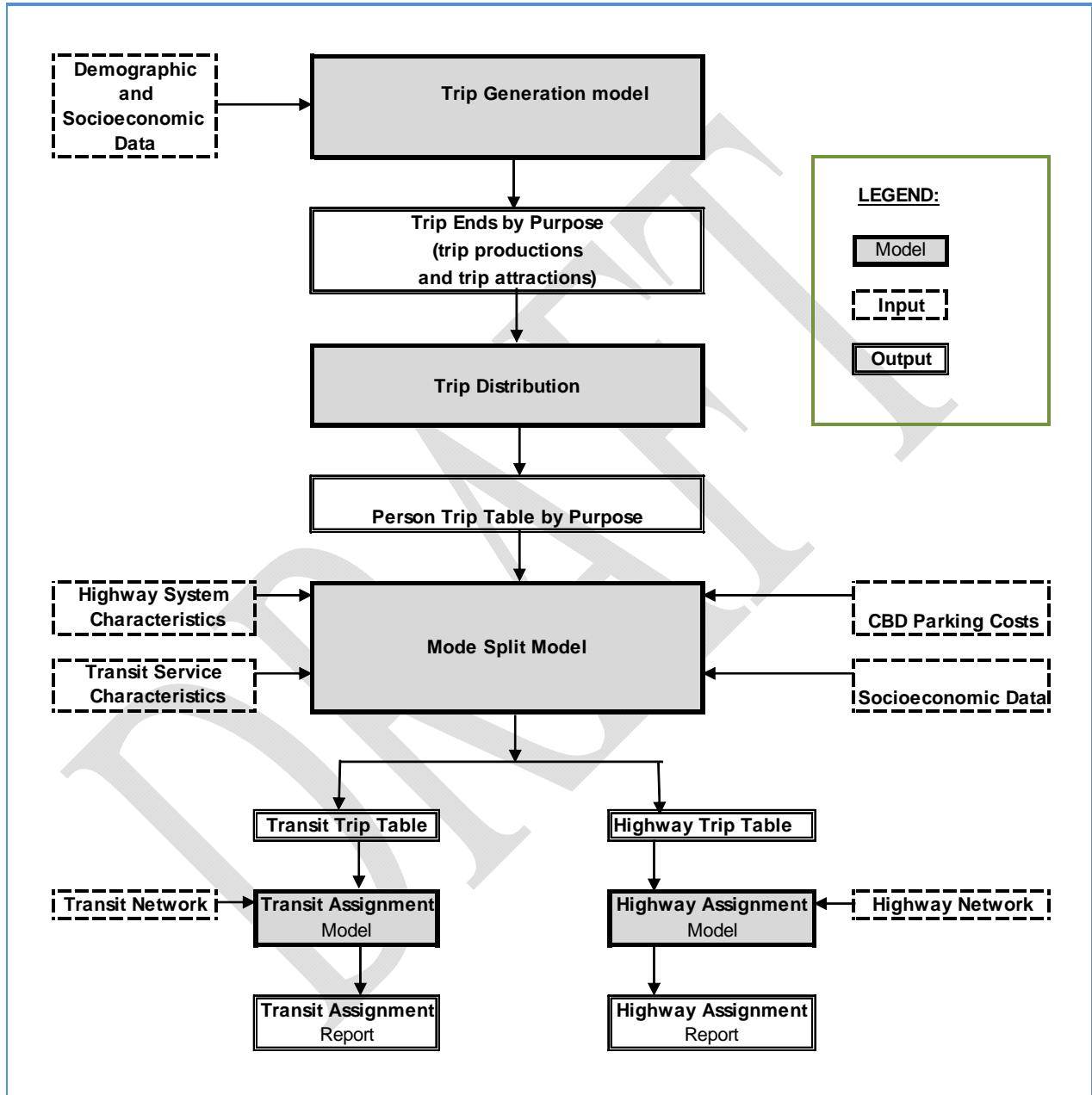
In the computerized network portion of the model set, each transit line in the system is represented according to its assumed future year scheduled frequency, travel time, fare, and routing. The highway component of the network model represents all interstate highways, major and minor arterials, and most local roads. Speeds and travel times on these roadways represent forecast year congested peak period conditions.

In the travel model, passenger boardings at transit stations are estimated by three modes of access: walk access, drive access and transfer from other transit services. The drive access portion of the boardings is transformed into estimates of peak parked cars by applying a series of factors to them. First, drive access trips are factored down to transform people into vehicles

¹ These are sub models which link household and socio-economic characteristics to number of trips made by the household.

using an average auto occupancy. Next, daily park-and-ride vehicles are factored down to account for turnover i.e. the number of vehicles using a given parking space during the course of a day. These calculations yield a forecast of the number of vehicles that would be parked at a given station at the peak time of day.

Figure 1 Four Step Modeling Process



Source: HDR Inc.

3.0 ALTERNATIVES MODELED

For the benefit of the reader, the transit service plan associated with the Baseline and the Build alternatives are restated briefly in this section to facilitate easy interpretation of ridership impacts. A detailed description of the alternatives is provided in the *LPA Technical Memorandum 2 Description of the Alternatives*.

3.1 Baseline Alternative

The Enhanced Bus Alternative includes two new express bus routes providing bi-directional service between Eden Prairie and downtown Minneapolis, with stops in Minnetonka, Hopkins, and St. Louis Park. The alternative also includes minor modifications to the existing express bus service along with increased service frequencies and restructured local service to provide access to stops along the new express routes. The new limited-stop routes are referred to as Limited Stop Route "A" and Limited Stop Route "B," and are represented along with the existing primary service the Southwest Express Bus Routes using I-394 and I-35W from Eden Prairie to downtown Minneapolis in Figure 2.

3.2 Build Alternatives

The build alternatives consist of providing high capacity light rail service along four different alignments. Presented below is a brief description of these alternatives.

3.2.1 LRT 1A

LRT 1A travels between TH 5 in Eden Prairie and downtown Minneapolis, providing service to Eden Prairie, Minnetonka, Edina, Hopkins, St. Louis Park, and Minneapolis.

This alternative would operate from downtown Minneapolis to Eden Prairie (TH 5) via an extension of the Hiawatha LRT tracks on 5th Street, past the downtown Minneapolis Intermodal Station to Royalston Avenue, to the Kenilworth Corridor through Minneapolis and the Hennepin County Regional Railroad Authority (HCRRA) property through St. Louis Park, Hopkins, Minnetonka and Eden Prairie terminating at TH 5 and the HCRRA's property.

3.2.2 LRT 3A

LRT 3A travels between Mitchell Road in Eden Prairie and downtown Minneapolis, providing service to Eden Prairie, Minnetonka, Hopkins, Edina, St. Louis Park, and Minneapolis.

This alternative would operate from downtown Minneapolis to Eden Prairie (Mitchell Road/TH 5) via an extension of the Hiawatha LRT tracks on 5th Street, past the downtown Minneapolis Intermodal Station to Royalston Avenue, to the Kenilworth Corridor through Minneapolis and the HCRRA property through St. Louis Park and Hopkins to a new right-of-way through the Opus/Golden Triangle areas, along Technology Drive and TH5 terminating at Mitchell Road.

3.2.3 LRT 3C-1 (Nicollet Mall)

LRT 3C-1 travels between Mitchell Road in Eden Prairie and downtown Minneapolis, providing service to Eden Prairie, Minnetonka, Hopkins, Edina, St. Louis Park, and Minneapolis.

This alternative would operate between downtown Minneapolis to Eden Prairie (Mitchell Road/TH 5) via Nicollet Mall to Nicollet Avenue (tunnel from Franklin Avenue to 28th Street), the Midtown corridor through Minneapolis, the HCRRA property in St. Louis Park and Hopkins, to new right-of-way through the Opus/Golden Triangle areas, along Technology Drive and TH 5 terminating at Mitchell Road.

3.2.4 LRT 3C-2 (11th/12th Street)

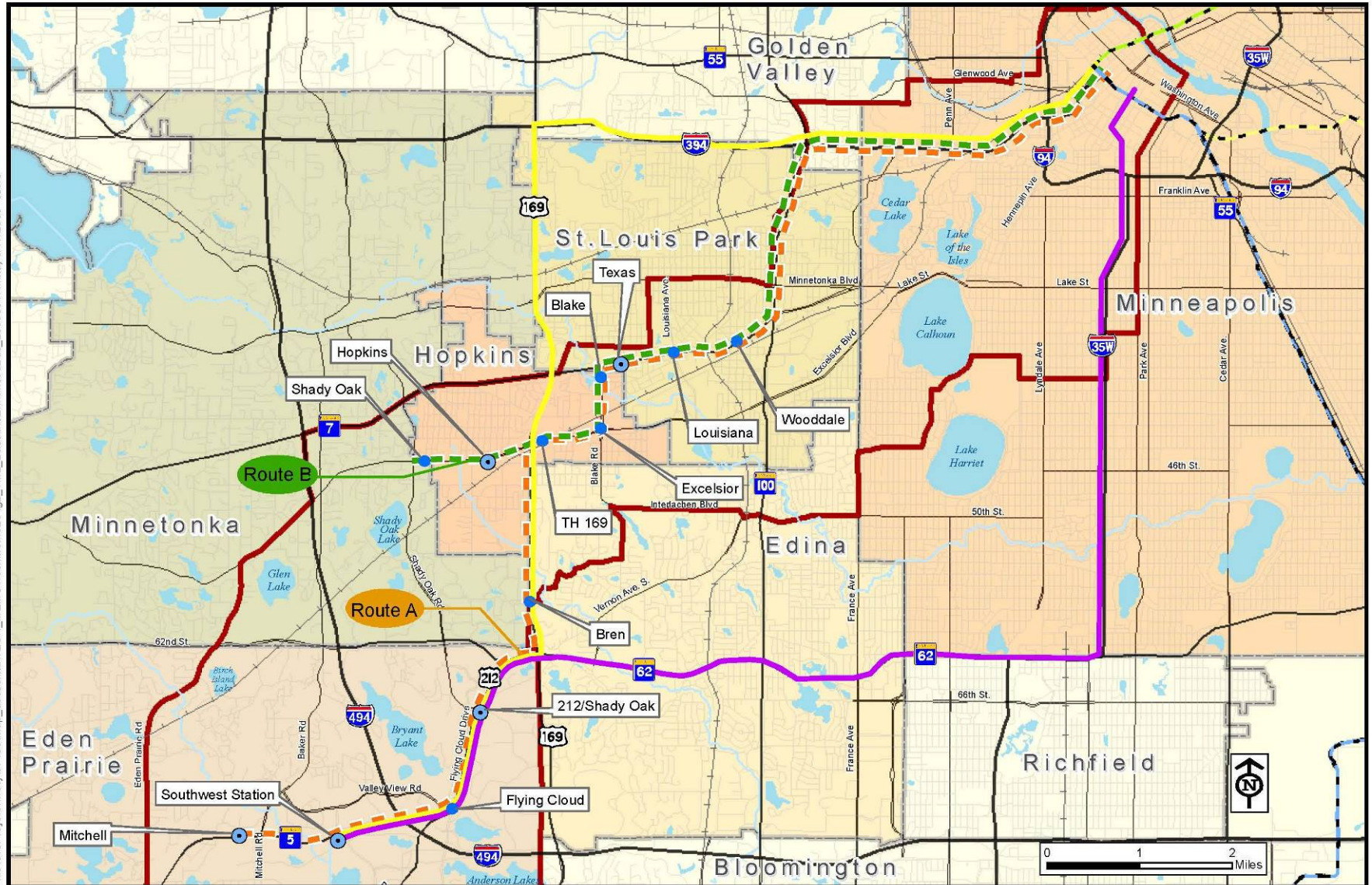
LRT 3C-2 (11th/12th Street) travels between Mitchell Road in Eden Prairie and downtown Minneapolis, providing service to Eden Prairie, Minnetonka, Hopkins, Edina, St. Louis Park, and Minneapolis.

LRT 3C-2 (11th/12th Street) would operate on the same alignment as LRT 3C-1 (Nicollet Mall) between the West Lake Station in Minneapolis and Eden Prairie. At the Midtown Corridor in the vicinity of Nicollet Avenue, the alignment would travel either under Nicollet Avenue, Blaisdell Avenue, or 1st Avenue in a tunnel between the Midtown Corridor and Franklin Avenue. Generally, north of Franklin Avenue, it would operate on-street to the vicinity of 11th and 12th Streets where it would turn west onto 11th Street operating as a one-way pair between Nicollet Mall and Royalston Avenue. At Royalston, the alternative would use the same routing as the LRT 1A and LRT 3A alternatives.

Figure 3 shows the alignments of all the Build alternatives. In the Baseline as well as build alternatives, the frequency of transit service was assumed to be 7.5 minutes in the peak period and 10 minutes in the off-peak period.

Figure 2 Baseline Alternative

Baseline Alternative: Enhanced Bus Alternative

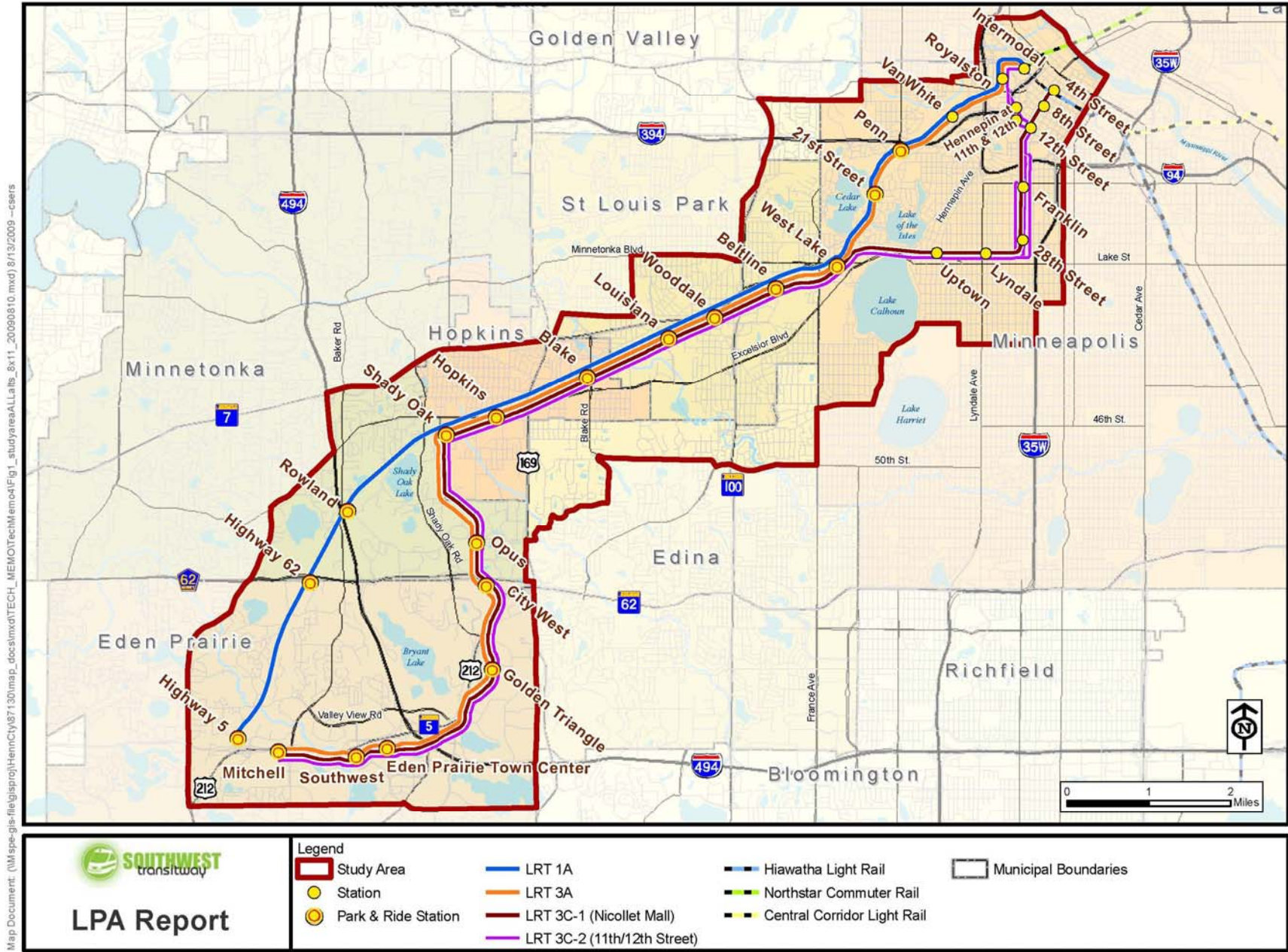


Map Document: (\\npspe-gis-file-c:\sproj\henn\city\87130\map_docs\mxd\TECH_MEMO\TechMemo2\Fig2_TM2_BaselineEnhancedBus_20090817.mxd) 8/17/2009 - csefers

| | | |
|--------------------------|--|---|
| <p>LPA Report</p> | Legend | |
| | <ul style="list-style-type: none"> Study Area ● Bus Stop Location ⊙ Bus Stop with Park & Ride | <ul style="list-style-type: none"> Route A Limited Stop (New) Route B Limited Stop (New) SouthWest Express Bus via I-394 (Existing) SouthWest Express Bus via I-35W (Existing) |

Figure 3 - Build Alternatives

Southwest Transitway Study Area



Map Document: (N:\spe-gis-file\gisproj\HennCity\87130\map_docs\mxd\TECH_MEMO\TechMem\emod\Fig1_studyarea\LL\alts_6x11_20090810.mxd) 8/13/2009 - cseis



| Legend | | | |
|--|---------------------|--|-----------------------------|
| | Study Area | | LRT 1A |
| | Station | | LRT 3A |
| | Park & Ride Station | | LRT 3C-1 (Nicollet Mall) |
| | | | LRT 3C-2 (11th/12th Street) |
| | | | Hiawatha Light Rail |
| | | | Northstar Commuter Rail |
| | | | Central Corridor Light Rail |
| | | | Municipal Boundaries |

4.0 MAJOR ASSUMPTIONS

4.1 Demographic Forecast Assumptions

The intent of producing a refined set of ridership forecasting estimates for the LPA selection process was to ensure that the most recent demographic forecast by the local units of government affected by the proposed project was used. Under the Metropolitan Land Planning Act (MPLA), local municipalities are required to update their local comprehensive plans at least every ten years. All local governments in the Twin Cities region were required to update their local comprehensive plans by December of 2008. Part of that process included the allocation of planned growth to transportation analysis zone or TAZs, which is then used as an input to the ridership forecasting model. The intent was to use the most recent growth projections by the partner cities to ensure that the impact of their planned growth was reflected in the ridership forecast. A point of clarification is that local units of government may submit periodic amendments to their comprehensive plans and may reallocate growth within their TAZs to reflect the comprehensive plan amendments.

The data used during the Southwest Transitway AA process was more recent than projections generated in 1998 for year 2030. They were based on the demographic and land use forecasts developed by Metropolitan Council in 2005 as part of its *2030 Regional Development Framework* study and subsequently revised in 2006 for some selected communities prior to applying it for the AA.

In the past year, the population and employment forecasts for a few communities in the region have been updated by the Metropolitan Council using development plans submitted to them. In June 2009, the Metropolitan Council prepared a demographic data file based on all plans submitted and acted upon by the Metropolitan Council as of May 1, 2009. The current ridership forecasts utilize the updated demographic projections dated May 1, 2009.

4.2 Travel Time Modifications

The travel times for some of the LRT alternatives were modified slightly from the Southwest Transitway AA to more accurately reflect the expected travel time for the routes. The LRT 3C-1 alternative's travel time was increased by 0.9 minutes by recommendation of Metro Transit staff to reflect the slower running time conditions on Nicollet Mall than were assumed during the Southwest Transitway AA. In addition, the travel times for the LRT 3A, LRT 3C-1 (Nicollet Mall), and LRT 3C-2 (11th/12th Street) alternatives were increased by 0.9 minutes to account for some maximum speed limitations that will exist due to a number of horizontal and vertical curves associated with the route. With these minor modifications the travel times used to generate ridership forecasts for the LPA evaluation are shown in Table 1. It should be noted that the light rail vehicles are assumed to travel at a maximum speed of 55 mph, have a station dwell time ranging from 20 to 40 seconds, and that in the suburban area the line has signal preemption at at-grade intersections. These assumptions will be modified as appropriate as more detailed engineering is conducted for the LPA.

Table 1 Light Rail Run Times (in minutes)

| Segment | LRT 1A | LRT 3A | LRT 3C-1 (Nicollet Mall) | 3C-2 (11 th /12 th Street) |
|--|--------|--------|-----------------------------|---|
| South end of the line to Shady Oak Station | 7.4 | 12.9 | 12.9 | 12.9 |
| Shady Oak Station to West Lake Station | 10.7 | 10.7 | 10.7 | 10.7 |

| | | | | |
|-------------------------------|-----|------|------|------|
| West Lake Station to Downtown | 7.9 | 7.9 | 15.9 | 17.2 |
| End to end travel time | 26 | 31.5 | 39.5 | 40.8 |

Source: HDR Inc.

4.3 Interlining Assumptions

The Southwest Transitway Alternatives Analysis (AA) ridership forecasts assumed that the LRT 1A, LRT 2A, LRT 3A and LRT 4A alternatives would be interlined or through-routed with the Hiawatha LRT line providing for operating efficiencies and a one-seat ride for southwest passengers destined for the Minneapolis-St. Paul Airport and/or the Mall of America. At the time the ridership forecasting was being conducted for the Southwest Transitway AA, the Central Corridor LRT project was in the AA/DEIS phase of project development. The project is now about to enter Final Design and based upon a review of trip making patterns it was decided that if the Southwest LRT line interlined with the Central Corridor LRT line operating from downtown Minneapolis to downtown St. Paul through the University of Minnesota campus it would provide better passenger benefits than interlining with the Hiawatha LRT line. It is noted here that ultimately the final decision on which LRT line the Southwest LRT line will interline with will be decided in the future by Metro Transit who will own and operate the system. For the purpose of refining the ridership forecasts developed during the Southwest Transitway AA to reflect changes since 2006, LRT alternatives 1A, 3A and the new 3C-2 are assumed to interline with the Central Corridor LRT. The geometry of the LRT 3C-1 alignment does not permit any interlining option.

All of the other network assumptions such as station access, transit fares, transfer connections and feeder bus integration were identical to those used in the Southwest Transitway AA.

5.0 RIDERSHIP RESULTS

Table 2 presents a summary of some important travel demand statistics obtained from the travel forecasting model. According to the socioeconomic data file provided by Metropolitan Council staff, the Twin Cities metropolitan area is expected to have 3.72 million residents and 2.14 million jobs in the Twin Cities metropolitan area by 2030. Using this input data, the ridership forecasting model estimates that there would be approximately 16.6 million trips in the region on a typical weekday. The transit share for the whole region is projected at two percent, but is significantly higher for home based work trips destined for downtown Minneapolis at approximately 53 percent.

5.1 System-wide Impacts

The transit trips projected for each of the modeled alternatives were estimated in terms of linked and unlinked passenger trips. A linked passenger trip includes segments of travel from point-of-origin to point-of-final-destination as a single trip, regardless of transfers or intermediate stops. As such, the number of linked passenger trips provides an estimate of the number of people using the transit system. In contrast, an unlinked passenger trip counts each segment of an overall trip as a separate unlinked trip. Unlinked passenger trips represent the activity experienced by each route segment and travel mode. It includes all transfers made in the system. In presenting the analysis of transit patronage, both linked and unlinked passenger trips are reported to provide a comprehensive assessment of each LRT alternative.

As seen from the Table 2, under the Baseline alternative, it is projected there would be 333,844 linked trips on the transit system. The Baseline includes all the future transit and highway projects in the Metropolitan Council's *2030 Transportation Policy Plan* plus the two new limited stop bus services along with a number of service modifications on existing routes in the Study Area.

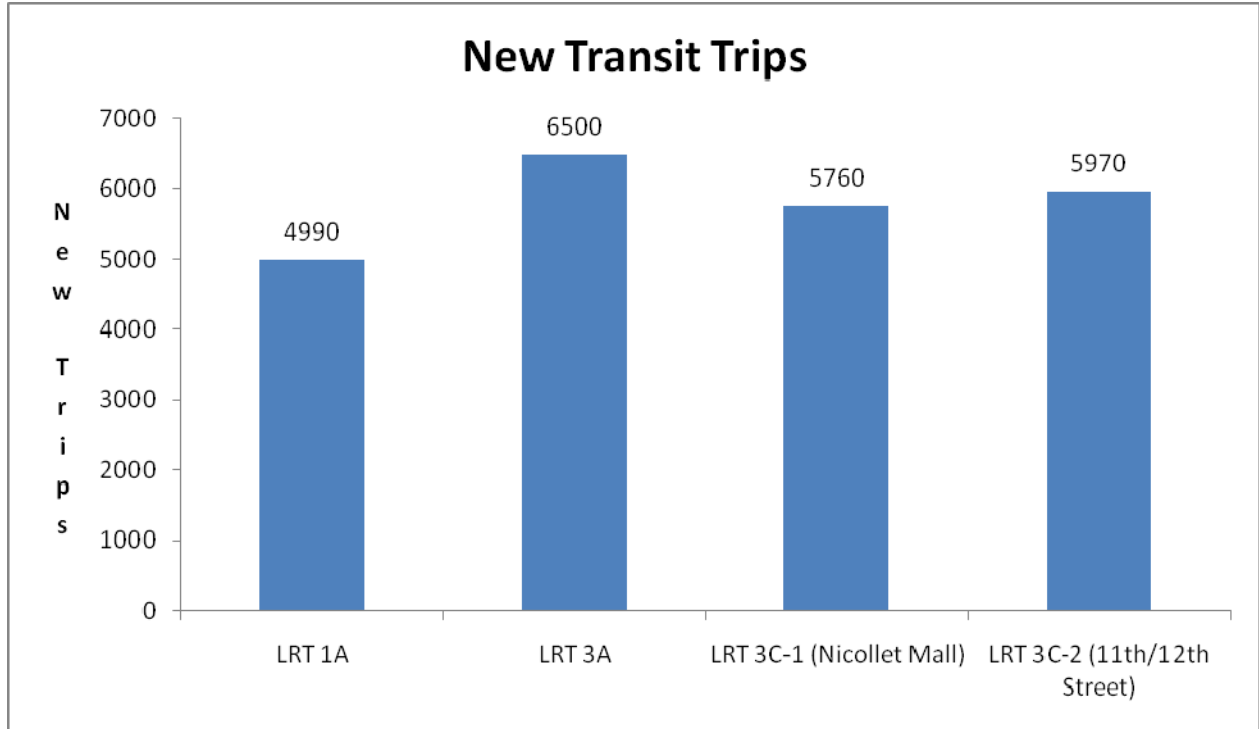
Under the Build alternatives, the Baseline service is replaced by a much faster light rail service. As a result, the transit usage in the corridor would increase. For LRT 1A, the system-wide linked transit trips are projected to increase by almost 5,000 trips a day when compared to the Baseline. The system-wide increase in linked transit trips would be accompanied by a similar decrease in auto trips, since the total number of person trips in the entire system is held constant. The reduction in auto trips is referred to as "new transit trips" since they are the result of some population switching from auto to transit mode for the first time. Figure 4 shows the magnitude of "new trips" generated by each of the LRT alternative. Most of the new trips would be generated within the study corridor and therefore, most of the auto trip reduction would be seen in the study corridor. As seen, LRT 3A is projected to generate the highest number of new transit trips.

Table 2 Travel Model Results

| | TSM/Baseline | Build Alternative LRT 1A | Build Alternative LRT 3A | Build Alternative LRT 3C-1 (Nicollet Mall) | Build Alternative LRT 3C-2 (11 th /12 th Street) |
|---|--------------|--------------------------------|--------------------------------|--|--|
| Applying MetroCouncil's updated demographic forecasts dated May 1, 2009 | | | | | |
| DEMOGRAPHIC DATA | | | | | |
| Regional Population | 3,720,049 | 3,720,049 | 3,720,049 | 3,720,049 | 3,720,049 |
| Regional Employment | 2,147,746 | 2,147,746 | 2,147,746 | 2,147,746 | 2,147,746 |
| Total Trips in the Person Trip Table | 16,618,569 | 16,618,569 | 16,618,569 | 16,618,569 | 16,618,569 |
| SYSTEM-WIDE LINKED TRANSIT TRIPS | | | | | |
| Bus (Bus Only) | 286,894 | 272,439 | 271,657 | 272,306 | 271,164 |
| Rail (Rail only, Bus & Rail) | 46,949 | 66,391 | 68,693 | 67,299 | 68,647 |
| Total Linked Transit Trips | 333,844 | 338,830 | 340,349 | 339,605 | 339,810 |
| Regional Transit Mode Share | 2.01% | 2.04% | 2.05% | 2.04% | 2.04% |
| Minneapolis CBD Transit Share (Work Trips) | 53.30% | 53.80% | 53.80% | 53.70% | 53.80% |
| New Transit Trips | NA | 4,987 | 6,506 | 5,761 | 5,967 |
| PROJECT BOARDINGS | | | | | |
| Southwest LRT Boardings | 13,000 | 24,850 | 27,550 | 24,550 | 27,500 |
| Reverse Commute Ridership | | 5,650 | 7,000 | 7,000 | 7,200 |
| User Benefits | | 4,995 | 6,412 | 5,657 | 5,993 |

Source: HDR Inc.

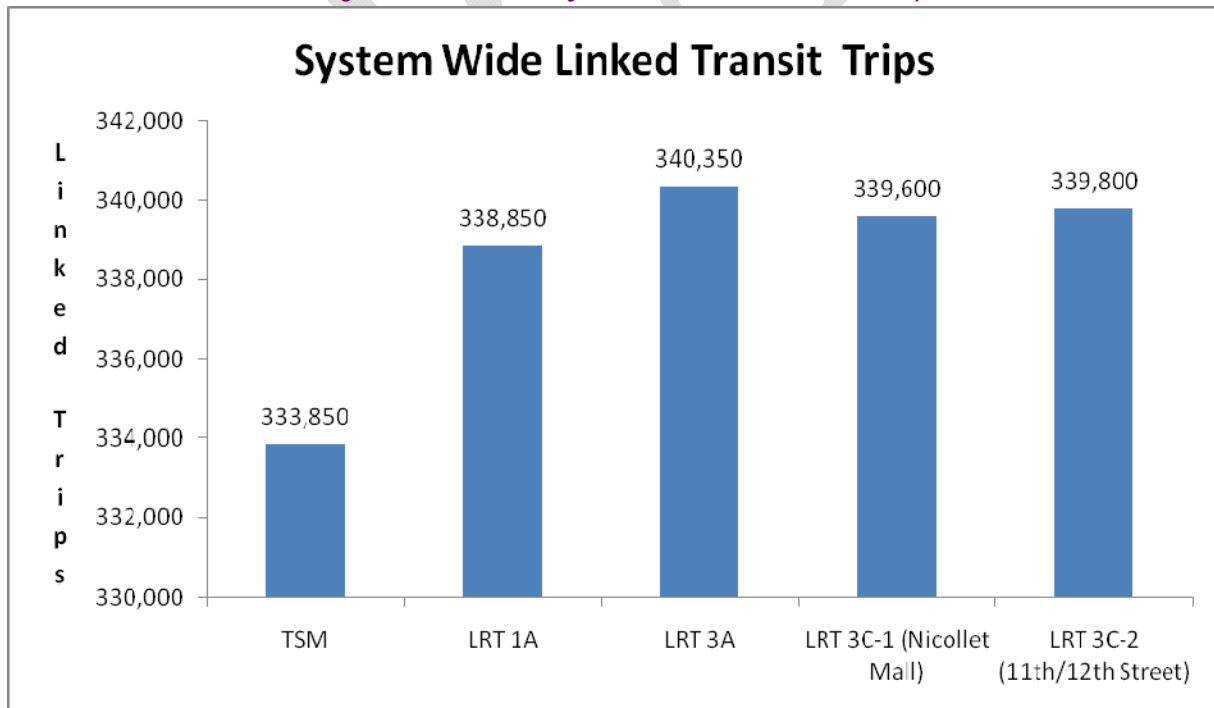
Figure 4 Forecast of New Transit Trips



Source: HDR Inc.

Figure 5 presents the projections of system-wide transit trips for all of the LRT alternatives. As seen, the model results indicate the LRT alternatives traversing the Golden Triangle alignment would in general result in higher system-wide transit usage than the LRT alternative using the HCRRA alignment (LRT 1A).

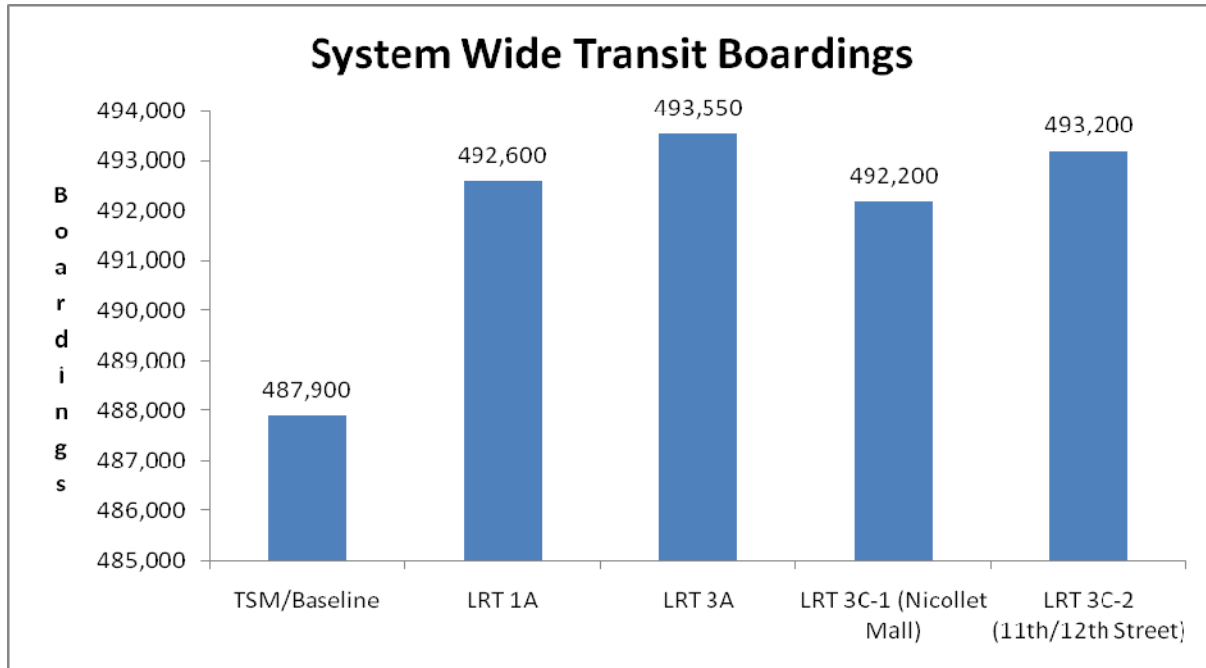
Figure 5 Forecast of System-wide Linked Transit Trips



Source: HDR Inc.

In terms of unlinked trips, the Baseline alternative would carry about 488,000 trips (see Figure 6) in the entire system. Under the Build alternatives, the unlinked transit trips would increase for LRT 1A, LRT 3A, LRT 3C-1 (Nicollet Mall) and LRT 3C-2 (11th/12th Street) as the light rail attracts more riders; some of whom would transfer to other transit services in the system to reach their final destination.

Figure 6 Forecast of System-wide Transit Boardings



Source: HDR Inc.

5.2 Project Boardings

As shown in Table 2, the Baseline alternative is projected to carry 13,000 trips per day on its two new limited stop bus routes in the forecast year. In the Build alternatives LRT 1A, LRT 3A, LRT 3C-1 (Nicollet Mall) and LRT 3C-2 (11th/12th Street), the Baseline bus service is replaced by a high-capacity light rail service. The model forecasts the daily ridership for LRT 1A and LRT 3C-1 (Nicollet Mall) would be approximately 24,850 and 24,550 trips respectively. Alternatives LRT 3A and LRT 3C-2 (11th/12th Street) are projected to carry about 27,550 and 27,500 trips respectively. These boardings include all trips that have either an origin or a destination along the stations on the Southwest LRT alignment. In the case of interlined alternatives (LRT 1A, LRT 3A, and LRT 3C-2 (11th/12th Street), the ridership also included the trips that would board on the Central Corridor LRT and alight on the Southwest Corridor LRT and vice versa.

5.3 System Productivity

The total passenger miles and passenger hours of travel would increase in all the Build alternatives when compared to the Baseline alternative. The increase in passenger miles is projected to be between 40,000 and 67,600 depending on the alternative (Table 3). Likewise, the increase in passenger hours would be between 1,400 and 2,800, the greatest increase being for LRT 3C -2 (11th/12th Street).

Table 3 System Productivity

| Alternative | Passenger Miles | Passenger Hours | Increase in Passenger miles over baseline | Increase in Passenger hours over baseline |
|--|-----------------|-----------------|---|---|
| TSM | 2,507,239 | 127,734 | 0 | 0 |
| LRT 1A | 2,547,426 | 129,148 | 40,187 | 1,414 |
| LRT 3A | 2,570,575 | 129,921 | 63,336 | 2,187 |
| LRT 3C-1 (Nicollet Mall) | 2,555,634 | 129,569 | 48,395 | 1,835 |
| LRT 3C-2 (11 th /12 th Street) | 2,574,839 | 130,528 | 67,600 | 2,794 |

Source: HDR Inc.

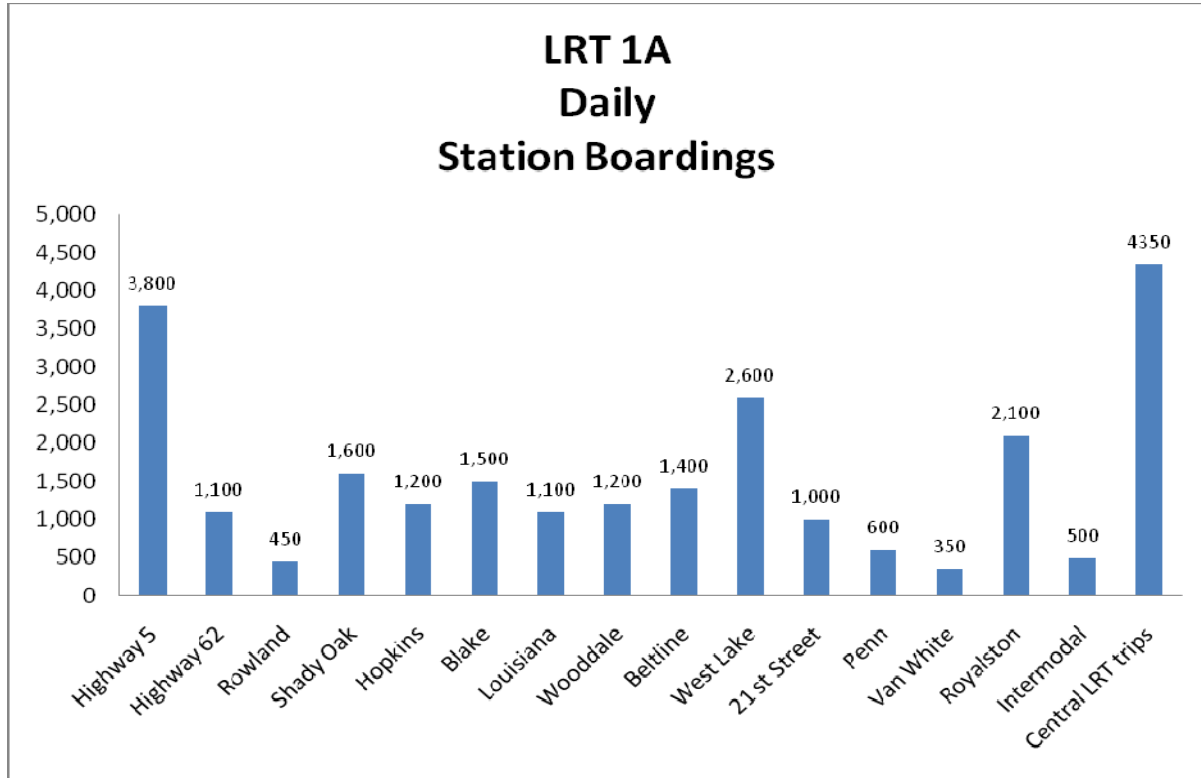
5.4 LRT Station Volumes

Presented in Figure 7 through Figure 10 are the estimated 2030 Light Rail boardings at each LRT station along the proposed alignment for each LRT alternative. As seen in Figure 7, 11 of the 15 stations on LRT 1A are projected to have a daily ridership of in excess of 1,000 boardings. Royalston, West Lake, Shady Oak, and Highway 5 stations are among the stations in LRT 1A that have high ridership.

For LRT 3A, 13 out of 18 stations are projected to serve more than 1,000 boardings per day. Mitchell, Eden Prairie Town Center, and West Lake would be among those carrying 2,000 or more boardings a day (Figure 8).

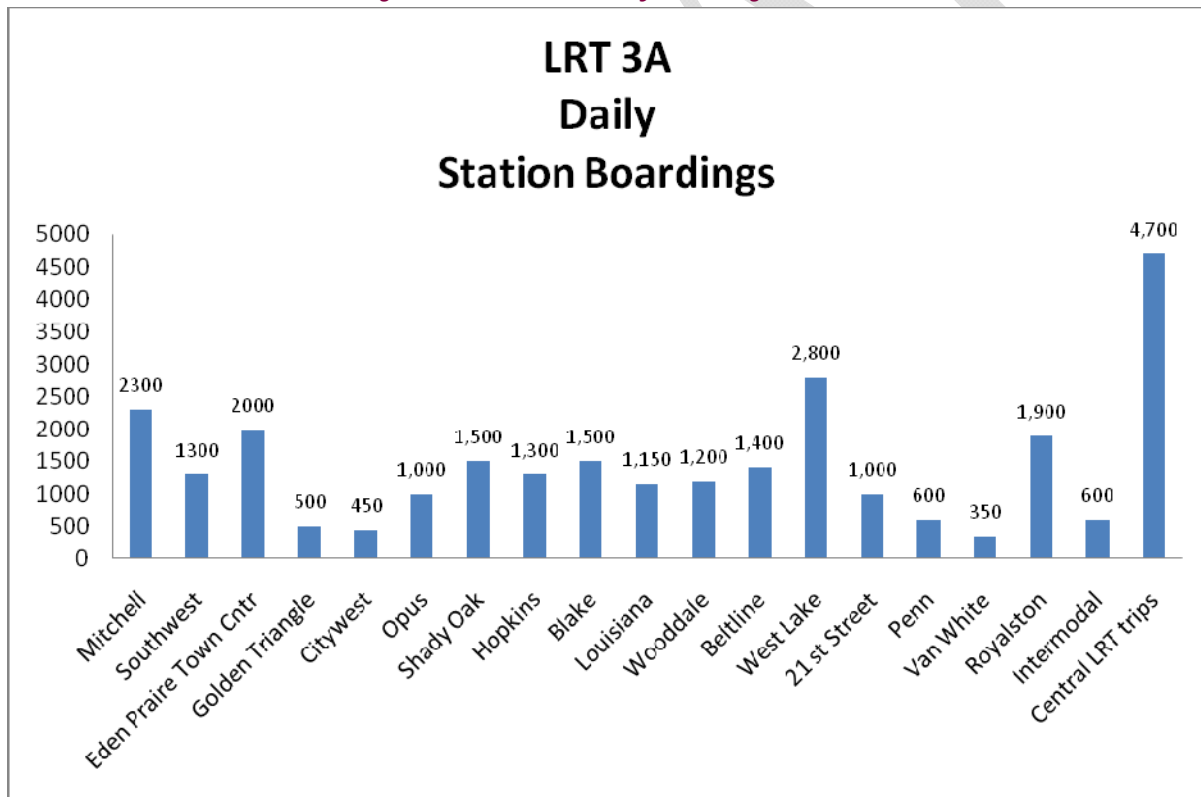
For LRT 3C-1 (Nicollet Mall) 16 out of 20 stations are projected to carry 1,000 or more boardings and LRT 3C-2 (11th/12th Street) has 15 out of 21 stations projected to carry 1,000 or more boardings. Mitchell, Eden Prairie Town Center and West Lake would be among those carrying 1,500 or more boardings a day (Figure 9 and Figure 10).

Figure 7 Forecast of Daily Boardings for LRT 1A



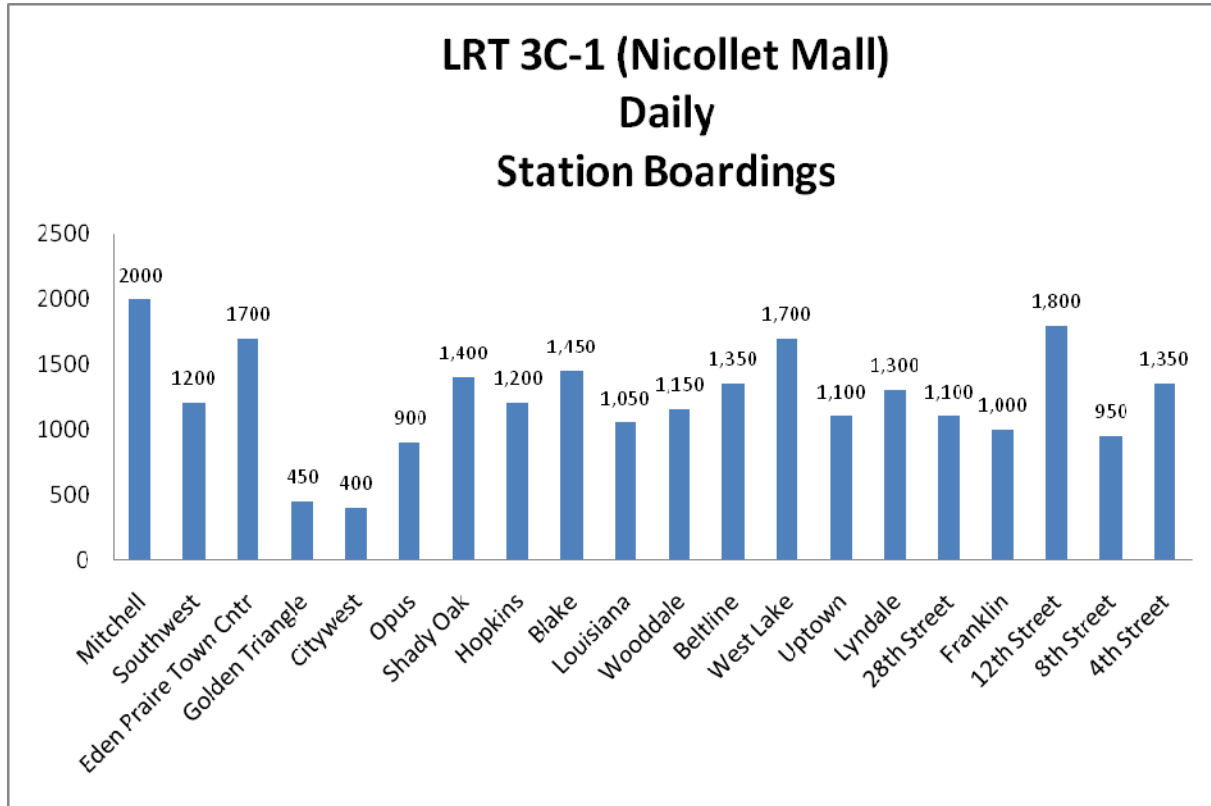
Note: Central LRT boardings that alight on Southwest LRT not shown
 Source: HDR Inc.

Figure 8 Forecast of Daily Boardings for LRT 3A



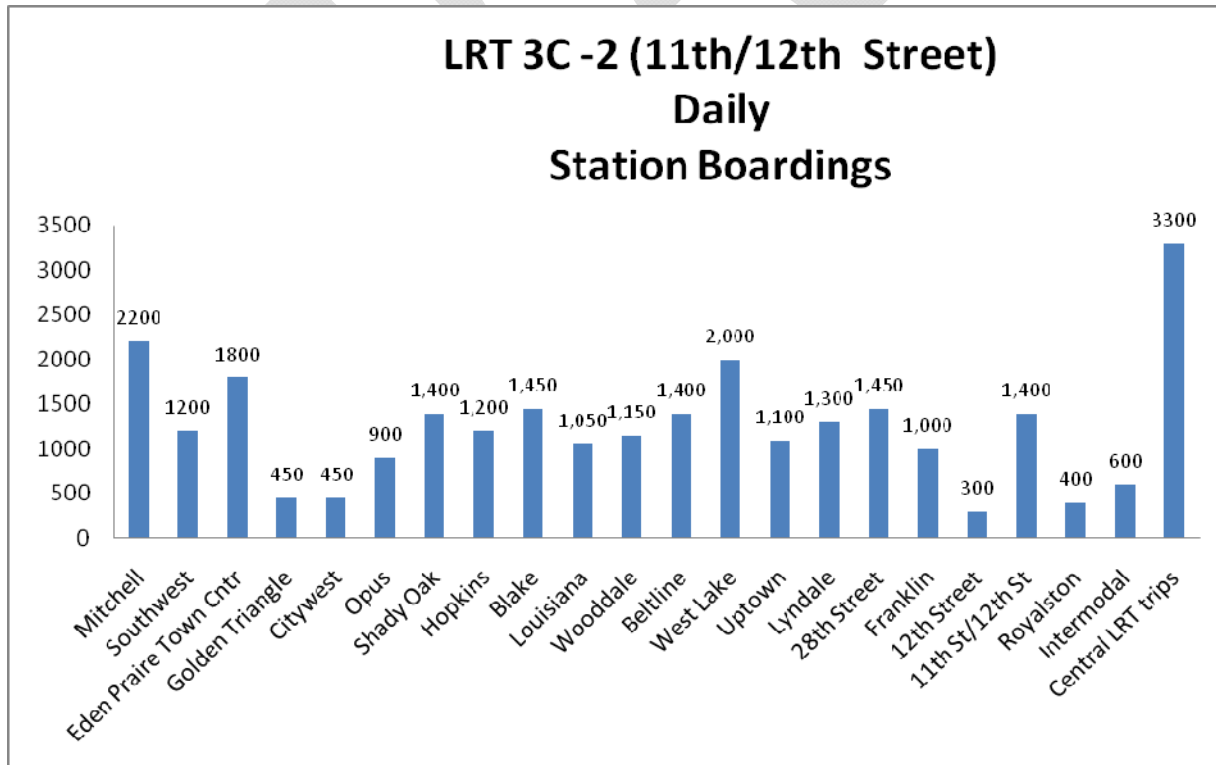
Note: Central LRT boardings that alight on Southwest LRT not shown
 Source: HDR Inc.

Figure 9 Forecast of Daily Boardings for LRT 3C-1 (Nicollet Mall)



Source: HDR Inc.

Figure 10 Forecast of Daily Boardings for LRT 3C-2 (11th/12th Street)



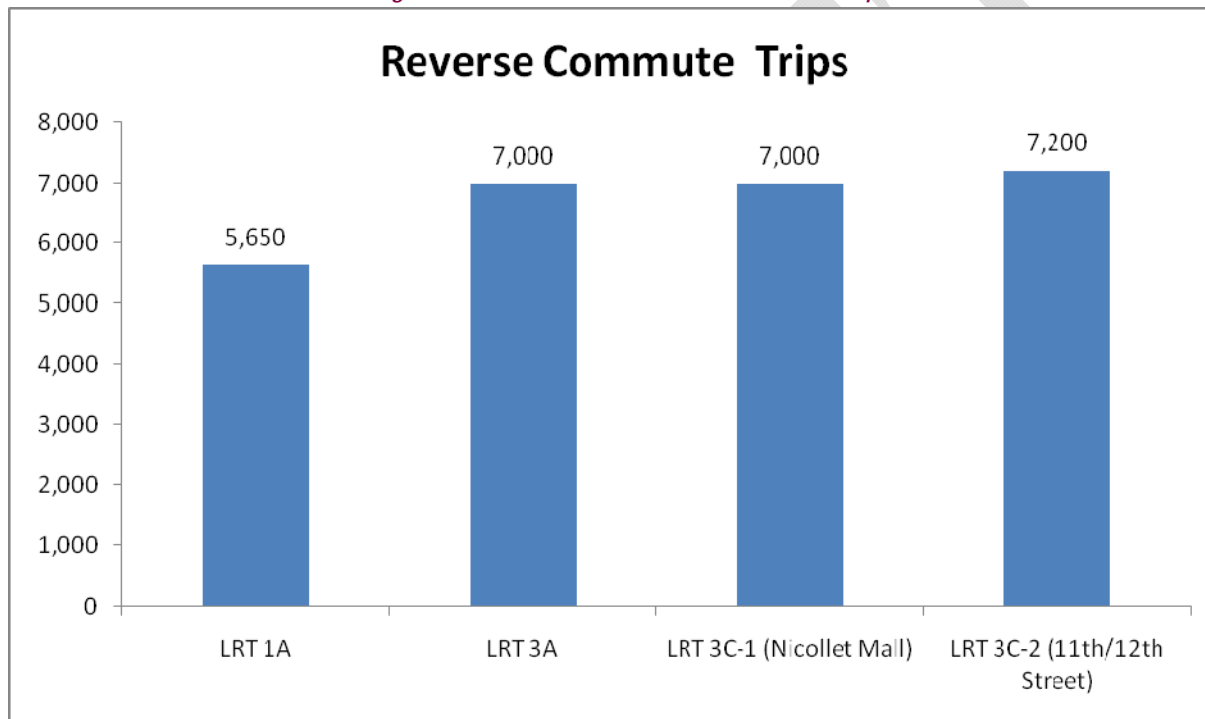
Note: Central LRT boardings that alight on Southwest LRT not shown

Source: HDR Inc.

5.5 Reverse Commute Ridership

In terms of their ability to serve reverse commute trips, LRT 3A, LRT 3C-1 (Nicollet Mall) and LRT 3C-2 (11th/12th Street) are projected to serve more reverse commute trips than LRT 1A. This result would be expected since the LRT alignments including Segment 3 directly serve the current and planned employment centers in Minnetonka and Eden Prairie. There appears to be an equivalent number of reverse commute trips using any of the three Minneapolis alternatives. Again this demonstrates the strong ability of a Southwest LRT line to provide a competitive travel choice to serve reverse commute travel. As shown in Figure 11, LRT 3A, LRT 3C-1 (Nicollet Mall), and LRT 3C-2 (11th/12th Street) are all projected to serve approximately 7,000 reverse commute trips a day while the LRT 1A alternative is projected to serve approximately 5,700 reverse commute trips per day. For purposes of this analysis, reverse commute is defined as an AM peak period work trip boarding at a Southwest LRT station in Minneapolis and alighting at a Southwest LRT station outside of Minneapolis. One major reason why LRT 3A, LRT 3C-1 (Nicollet Mall), and LRT 3C-2 (11th/12th Street) carry higher reverse commute trips is because of the high concentration of employment opportunities available around the Golden Triangle, Opus, and Eden Prairie Town Center stations.

Figure 11 Forecast of Reverse Commute Trips



Source: HDR Inc.

6.0 TRAVEL TIME SAVINGS (USER BENEFITS)

The results of the travel demand model can be used to illustrate the extent to which different geographic areas in the region benefit from the LRT project. These benefits are usually known as the overall travel time savings (also called User Benefits) and are estimated using a software called SUMMIT program, developed by the Federal Transit Administration (FTA). Using the travel model results, the SUMMIT program compares the performance of the Build alternatives to the Baseline alternative and estimates the overall time and cost savings. To make the comparison easier, all cost savings are converted to equivalent time savings.

The SUMMIT model results indicate about 50 to 60 percent of all the benefits in all the LRT alternatives would be attributable to work trips that occur in the peak periods. This indicates the

LRT alternatives provide competitive travel times in comparison to the highway alternatives during peak commute period. The distribution of user benefits by geographic area in general, appears reasonable. For example, in LRT 1A, about 43 percent of the daily user benefits are attributable to trips attracted to districts located in downtown Minneapolis, south and east Minneapolis. About 20 percent of benefits are attributable to trips attracted to St. Louis Park. The results also indicate 62 percent of the benefits generated in LRT 1A are attributable to trips produced in communities along the LRT alignment.

In LRT 3A, about 18 percent of the benefits are due to trips attracted to Eden Prairie and about 40 percent to Minneapolis downtown, south and east Minneapolis area. Also, about 32 percent of the user benefits would be from trips attracted to St. Louis Park and Minnetonka. Similar to LRT 1A, about 66 percent of the benefits generated in LRT 3A are attributable to trips produced in communities along the LRT alignment.

In LRT 3C-1 (Nicollet Mall), about 33 percent of the benefits are due to trips attracted to Eden Prairie, Bloomington, Richfield, and Minnetonka while about 42 percent are attracted to Minneapolis downtown, south and east Minneapolis area. About 18 percent of the user benefits would be from trips attracted to Saint Louis Park. In this alternative, about 70 percent of the benefits generated are attributable to trips produced in communities along the LRT alignment.

In LRT 3C-2 (11th/12th Street), the distribution of benefits would be approximately similar to LRT 3C-1 (Nicollet Mall). In general, the areas receiving most of the benefits from the project are the same areas that have been identified as having a strong transportation need in the “Purpose and Need” section of Chapter 1 of the *Southwest Transitway AA*.

7.0 CONCLUSIONS

The ridership analysis indicates all the Build alternatives would generate approximately the same level of transit ridership, about 24,850 to 27,550 boardings a day. More than 50 percent of the projected riders would use the rail service for work related trips. Most of the trips would be destined to downtown Minneapolis but there would also be some reverse commute trips in the order of about 5,000 for LRT 1A and about 7,000 for LRT 3A, LRT 3C-1 (Nicollet Mall) and LRT 3C-2 (11th/12th Street). Among all the three LRT alternatives that serve the Golden Triangle area, LRT 3A is the only one that offers much faster travel time between the West Lake Street Station and downtown Minneapolis. The difference in travel time in that section between LRT 3A and other two LRT alternatives LRT 3C-1 (Nicollet Mall) and LRT 3C-2 (11th/12th Street) is almost eight to nine minutes. A faster travel time is the main reason why LRT 3A generates the highest user benefits among all the other LRT alternatives.

The analysis results indicate that, in general for all LRT alternatives, the areas receiving most of the benefits from the project are the same areas that have been identified as having a strong transportation need in the “Purpose and Need” section of Chapter 1 of the *Southwest Transitway AA*.