6.4 REGIONAL TRAVEL DEMAND SUMMARY

This section presents the estimated regional travel demand characteristics for year 2000 existing conditions and year 2020 future conditions for each alternative under consideration. This includes estimates of total transit trip demand, automobile trip demand, the vehicle miles of travel and transit travel times between key locations in the corridor. The estimates represent results for both the Central Corridor and Twin Cities region. The analysis used the Twin Cities Metropolitan Council's travel demand model.

6.4.1 Total Daily Transit Boardings

Table 6.4-1: 2020 Forecast Daily Transit Ridership, presents the 2020 forecast daily ridership for the Central Corridor by transit route and alternative. The LRT Alternative would yield 11,100 additional riders per day, a 33 percent increase over the Baseline Alternative. The Busway/BRT Alternative would yield 9,900 additional transit riders per day, a 30 percent increase over the Baseline alternative. The estimated number of new transit riders diverted from automobile use would be 3,800 and 3,100 for the LRT and Busway/BRT Alternatives, respectively. These increases are equivalent to an 11 percent (LRT) and 9 percent (BRT) increase over Baseline Alternative.

Table 6.4-1: 2020 Forecast Daily Transit Ridership

Transit Mode	Existing	Baseline	LRT	BRT
Route 16 (or equivalent)	15,900	19,500	2,500	3,700
Route 50	3,300	4,800	N/A	N/A
94 B/C/D (or equivalent)	4,600	6,900	2,700	6,600
134/191/194	1,600	2,500	1,500	2,100
LRT Alternative	N/A	N/A	38,100	N/A
BRT Alternative	N/A	N/A	N/A	31,200
Total Corridor Riders	**25,400**	**33,700**	**44,800**	**43,600**
Estimated New Transit Riders (diverted from autos)			**3,800**	**3,100**

Notes:
BRT forecast constrained by available capacity for six-minute peak frequency.
Assumes six-minute peak/off-peak BRT frequency.
Assumes 7.5/10-minute peak/off-peak LRT frequency.

Table 6.4-2: Regional Daily Transit Ridership, presents the 2020 forecast daily ridership for the Twin Cities region. Both the LRT and BRT Alternatives would result in about a one percent increase in daily transit trips in the region.

Table 6.4-2: Regional Daily Transit Ridership

Alternative	Year	Person Trips (linked trips)		Transit Boardings (unlinked trips)	
		Total Daily Transit Trips	Change from Baseline	Total Daily Transit Trips	Percent Transfers
Existing Condition	2000	209,500	N/A	268,000	27.9%
Baseline Alternative	2020	294,700	N/A	382,000	29.6%
LRT Alternative	2020	298,500	3,800	390,300	30.8%
BRT Alternative	2020	297,800	3,100	386,200	29.7%

Source: Existing boardings from Metro Transit and Mn/DOT 2001 Transit Report (for non-Metro Transit systems).
Twin Cities regional travel demand forecasting model (SRF Consulting Group, Inc. analysis).

Table 6.4-3: 2020 Forecast Transit Person (Linked) Trips, presents the details of the 2020 forecast transit trips by alternative and in production-attraction format. It is provided is supporting data for Tables 6.4-1 and 6.4-2. In summary for the region, the LRT Alternative would result in 1,100 additional home-based work trips and the BRT Alternative would result in 200 additional home-based work trips. Within the Central Corridor, the BRT Alternative would result in more additional home-based work trips (400) than LRT Alternative (250) when compared to the Baseline Alternative.

Table 6.4-3: 2020 Forecast Transit Person (Linked) Trips

HOME-BASED WORK TRIPS												
	Attracted to:											
Produced from:	**Downtown Minneapolis or Downtown St. Paul**			**Central Corridor**			**Remainder of Region**			**Total**		
	Baseline	**LRT**	**BRT**	**Baseline**	**LRT**	**BRT**	**Baseline**	**LRT**	**BRT**	**Baseline**	**LRT**	**BRT**
Downtown Minneapolis or Downtown St. Paul	1,450	1,575	1,450	475	550	500	1,475	1,450	1,475	3,400	3,575	3,425
Difference from Baseline	-	*125*	-	-	*75*	*25*	-	*(25)*	-	-	*175*	*25*
Central Corridor	5,850	6,825	5,825	1,275	1,350	1,275	1,775	1,825	1,825	8,900	10,000	8,925
Difference from Baseline	-	*975*	*(25)*	-	*75*	-	-	*50*	*50*	-	*1,100*	*25*
Remainder of Region	121,350	120,575	121,400	7,400	7,775	7,450	28,550	28,775	28,600	157,300	157,125	157,450
Difference from Baseline	-	*(775)*	*50*	-	*375*	*50*	-	*225*	*50*	-	*(175)*	*150*
Total	**128,650**	**128,975**	**128,675**	**4,000**	**4,250**	**4,400**	**10,075**	**10,100**	**10,425**	**169,600**	**170,700**	**169,800**
Difference from Baseline	**-**	***325***	***25***	**-**	***250***	***400***	**-**	***25***	***350***	**-**	***1,100***	***200***
TOTAL TRIPS												
	Attracted to:											
Produced from:	**Downtown Minneapolis or Downtown St. Paul**			**Central Corridor**			**Remainder of Region**			**Total**		
	Baseline	**LRT**	**BRT**	**Baseline**	**LRT**	**BRT**	**Baseline**	**LRT**	**BRT**	**Baseline**	**LRT**	**BRT**
Downtown Minneapolis or Downtown St. Paul	6,550	7,200	7,375	4,000	4,250	4,400	10,075	10,100	10,425	20,625	21,550	22,200
Difference from Baseline	-	*650*	*825*	-	*250*	*400*	-	*25*	*350*	-	*925*	*1,575*
Central Corridor	11,000	12,125	11,375	5,225	5,525	5,500	4,575	4,725	4,950	20,800	22,375	21,825
Difference from Baseline	-	*1,125*	*375*	-	*300*	*275*	-	*150*	*375*	-	*1,575*	*1,025*
Remainder of Region	154,075	153,500	154,400	33,425	34,875	33,450	65,775	66,200	65,975	253,275	254,575	253,825
Difference from Baseline	-	*(575)*	*325*	-	*1,450*	*25*	-	*425*	*200*	-	*1,300*	*550*
Total	**171,625**	**172,825**	**173,150**	**42,650**	**44,650**	**43,350**	**80,425**	**81,025**	**81,350**	**294,700**	**298,500**	**297,850**
Difference from Baseline	**-**	***1,200***	***1,525***	**-**	***2,000***	***700***	**-**	***600***	***925***	**-**	***3,800***	***3,150****

* Rounded off to 3,100 in Tables 6.4-1 and 6.4-2.

6.4.2 Total Daily Automobile Person Trips

Table 6.4-4: 2000 Estimated Automobile Person Trips, presents the estimated number of automobile trips for the corridor and region. Currently, there are approximately 493,200 trips in the corridor and 8.9 million for the entire region. Trips on the corridor represent 5.5 percent of all trips in the region.

Table 6.4-4: 2000 Estimated Automobile Person Trips

HBW TRIPS				
	Attracted to:			
Produced from:	**Downtown Minneapolis or Downtown St. Paul**	**Central Corridor**	**Remainder of Region**	**Total**
Downtown Minneapolis or Downtown St. Paul	5,700	1,100	6,700	13,500
Percent of Total	0.3%	0.1%	0.4%	0.7%
Central Corridor	5,200	9,200	20,000	34,400
Percent of Total	0.3%	0.5%	1.1%	1.9%
Remainder of Region	152,200	70,300	1,573,100	1,795,600
Percent of Total	8.3%	3.8%	85.3%	97.4%
Total	163,100	80,600	1,599,800	1,843,500
Percent of Total	8.8%	4.4%	86.8%	100.0%
TOTAL TRIPS				
	Attracted to:			
Produced from:	**Downtown Minneapolis or Downtown St. Paul**	**Central Corridor**	**Remainder of Region**	**Total**
Downtown Minneapolis or Downtown St. Paul	46,600	17,800	95,500	159,900
Percent of Total	0.5%	0.2%	1.1%	1.8%
Central Corridor	24,400	146,200	137,200	307,800
Percent of Total	0.3%	1.6%	1.5%	3.5%
Remainder of Region	296,500	329,200	7,811,400	8,437,100
Percent of Total	3.3%	3.7%	87.7%	94.7%
Total	367,500	493,200	8,044,100	8,904,800
Percent of Total	4.1%	5.5%	90.3%	100.0%

Table 6.4-5: 2020 Forecast Automobile Person Trips, presents the 2020 forecast person trips by automobile for both the corridor and region. The total change in trips that would result from the LRT and BRT at the bottom of the table represents persons who transferred from auto to transit. Similarly, for the corridor and entire region, the LRT Alternative corresponds with a higher reduction in automobile trips than the BRT Alternative. In year 2020, automobile trips in the corridor would decrease from 5.5 percent of region trips to 5.1 percent under all three alternatives.

6.4.3 Total Daily Vehicle Miles of Travel

Table 6.4-6: Forecast Daily Vehicle Miles of Travel, presents the daily vehicle miles of travel for the Central Corridor. Both the LRT and BRT Alternatives would result in minimal changes in the Baseline VMT.

6.4.4 Travel Times

Table 6.4-7: Existing and 2020 Peak Hour Travel Times, presents the estimated peak hour travel times for the alternatives between different points along the corridor. This information uses the bus and rail operating plans. The numbers in bold text denote travel time comparisons between the alternatives. For example, travel time between the two downtowns on the Route 16 would take 64 minutes under Baseline conditions, 35 minutes if the trip were taken in the LRT and 42

minutes on the BRT. Similarly, this same trip would take 73 minutes if taken on the Route 16 with either the LRT or BRT Alternative in place.

In general, the LRT Alternative would result in shorter travel times compared to both the Baseline and BRT Alternatives.

Table 6.4-5: 2020 Forecast Automobile Person Trips

HBW TRIPS												
	Attracted to:											
Produced from:	**Downtown Minneapolis or Downtown St. Paul**			**Central Corridor**			**Remainder of Region**			**Total**		
	Baseline	**LRT**	**BRT**	**Baseline**	**LRT**	**BRT**	**Baseline**	**LRT**	**BRT**	**Baseline**	**LRT**	**BRT**
Downtown Minneapolis or Downtown St. Paul	5,250	5,125	5,250	1,025	950	1,000	6,325	6,350	6,325	12,600	12,425	12,575
Difference from Baseline	-	*(125)*	-	-	*(75)*	*(25)*	-	*25*	-	-	*(175)*	*(25)*
Central Corridor	3,750	2,775	3,775	9,225	9,150	9,225	19,825	19,775	19,775	32,800	31,700	32,775
Difference from Baseline	-	*(975)*	*25*	-	*(75)*	-	-	*(50)*	*(50)*	-	*(1,100)*	*(25)*
Remainder of Region	103,950	104,725	103,900	69,700	69,325	69,650	1,569,550	1,569,325	1,569,500	1,743,200	1,743,375	1,743,050
Difference from Baseline	-	*775*	*(50)*	-	*(375)*	*(50)*	-	*(225)*	*(50)*	-	*175*	*(150)*
Total	**112,950**	**112,625**	**112,925**	**4,000**	**4,250**	**4,400**	**10,075**	**10,100**	**10,425**	**1,788,600**	**1,787,500**	**1,788,400**
Difference from Baseline	-	*(325)*	*(25)*	-	*250*	*400*	-	*25*	*350*	-	*(1,100)*	*(200)*
TOTAL TRIPS												
	Attracted to:											
Produced from:	**Downtown Minneapolis or Downtown St. Paul**			**Central Corridor**			**Remainder of Region**			**Total**		
	Baseline	**LRT**	**BRT**	**Baseline**	**LRT**	**BRT**	**Baseline**	**LRT**	**BRT**	**Baseline**	**LRT**	**BRT**
Downtown Minneapolis or Downtown St. Paul	58,050	57,400	57,225	22,600	22,350	22,200	126,125	126,100	125,775	206,775	205,850	205,200
Difference from Baseline	-	*(650)*	*(825)*	-	*(250)*	*(400)*	-	*(25)*	*(350)*	-	*(925)*	*(1,575)*
Central Corridor	27,600	26,475	27,225	159,875	159,575	159,600	155,525	155,375	155,150	343,000	341,425	341,975
Difference from Baseline	-	*(1,125)*	*(375)*	-	*(300)*	*(275)*	-	*(150)*	*(375)*	-	*(1,575)*	*(1,025)*
Remainder of Region	337,425	338,000	337,100	361,575	360,125	361,550	9,368,625	9,368,200	9,368,425	10,067,625	10,066,325	10,067,075
Difference from Baseline	-	*575*	*(325)*	-	*(1,450)*	*(25)*	-	*(425)*	*(200)*	-	*(1,300)*	*(550)*
Total	423,075	421,875	421,550	544,050	542,050	543,350	9,650,275	9,649,675	9,649,350	10,617,400	10,613,600	10,614,250
Difference from Baseline	-	*(1,200)*	*(1,525)*	-	*(2,000)*	*(700)*	-	*(600)*	*(925)*	-	*(3,800)*	*(3,150)*

Table 6.4-6: Forecast Daily Vehicle Miles of Travel

Alternative	Year	Total Daily VMT	Change from Baseline
Existing Condition	2000	17,315,100	N/A
Baseline	2020	23,815,800	N/A
LRT Alternative	2020	23,813,600	2,200
BRT Alternative	2020	23,814,600	1,200

Table 6.4-7: Existing and 2020 Peak Hour Travel Times (1)

		Existing	2020 Forecast		
			Baseline	LRT[3/]	BRT[3/]
Downtown St. Paul and Downtown Minneapolis	Route 16	55	**64**	73	73
	Route 50	39	49	N/A	N/A
	Route 94 B/D	26/35	31/41	31/NA	31/NA
	BRT	N/A	N/A	N/A	**42**
	LRT	N/A	N/A	**35**	N/A
Downtown St. Paul and University of Minnesota (East Bank)	Route 16	43	**49**	51	51
	Route 50	32	39	N/A	N/A
	Route 94 B[1/]	34	N/A	N/A	N/A
	BRT	N/A	N/A	N/A	**32**
	LRT	N/A	N/A	**28**	N/A
Downtown St. Paul and Snelling Avenue	Route 16	25	**28**	28	28
	Route 50	21	23	N/A	N/A
	Route 94 B	19	22	N/A	22
	BRT	N/A	N/A	N/A	**18**
	LRT	N/A	N/A	**14**	N/A
Snelling Avenue and University of Minnesota	Route 16	18	**21**	23	23
	Route 50	13	16	N/A	N/A
	Route 94 B[2/]	15	N/A	N/A	N/A
	BRT	N/A	N/A	N/A	**14**
	LRT	N/A	N/A	**14**	N/A
Snelling Avenue and Downtown Minneapolis	Route 16	30	**36**	45	45
	Route 50	20	26	N/A	N/A
	Route 94 B	16	19	19	19
	BRT	N/A	N/A	N/A	**24**
	LRT	N/A	N/A	**21**	N/A
University of Minnesota (East Bank) and Downtown Minneapolis	Route 16	12	**15**	22	22
	Route 50	7	10	N/A	N/A
	Route 94 B	N/A	N/A	N/A	N/A
	BRT	N/A	N/A	N/A	**10**
	LRT	N/A	N/A	**7**	N/A

Notes:
[1/] Includes only "in-vehicle time" and, where appropriate, transfer time.
[2/] Westbound only (via Huron Station on I-94)
[3/] Route 16 for BRT and LRT via University Ave./4th Street.

6.5 PARKING

This section summarizes the existing parking conditions in the Study Area based on a review of previous studies and surveys, for five specific areas of the corridor:

- Downtown Minneapolis
- University of Minnesota (along Washington Avenue)
- University Avenue (from Washington Avenue to Rice Street)
- State Capitol
- Downtown St. Paul

6.5.1 Existing Parking

A review of existing parking conditions in the areas identified above is presented as follows.

DOWNTOWN MINNEAPOLIS

There are over 63,000 parking spaces available in downtown Minneapolis. Over 90 percent of these spaces are off-street parking. The aggregate peak parking utilization is over 90 percent. A detailed analysis of existing parking supply and demand is included in the *2000 Downtown Minneapolis Transportation Study.*

UNIVERSITY OF MINNESOTA

There are over 13,000 spaces in the East Bank campus. On-street parking spaces are limited on Washington Avenue. Available on-street spaces are predominantly short-term spaces located east of Harvard Street, serving pedestrian-oriented retail development along Washington Avenue. As in downtown Minneapolis, demand for both on-street and off-street parking is over 90 percent in the East Bank campus. Detailed inventory of parking supply and demand in the area is included in a technical memorandum dated April 2002 and shown on Figure 6.5-1: University of Minnesota Campus - Parking Capacity.

UNIVERSITY AVENUE

There are an estimated 1,500 parking spaces along University Avenue. Commercial establishments along the corridor rely on this parking. There are off-street spaces available in some areas; e.g. near Snelling Avenue where strip malls and big box retail development are located. Windshield surveys and examination of aerial photographs suggest that approximately 40 percent of on-street spaces are currently used. Detailed inventory of parking supply and demand along University Avenue is included in a memorandum dated December 26, 2001.

STATE CAPITOL

There are over 50 on-street parking spaces along University Avenue, Robert Street and Columbus Street in the State Capitol area. There are also several parking structures in the area. Based on aerial photography taken in 2000, the estimated parking utilization of on-street spaces is 60 percent. (No data are available for parking structures in the area.)

DOWNTOWN ST. PAUL

There are nearly 30,000 parking spaces in downtown St. Paul. Over 90 percent of these spaces are off-street parking. Similar to downtown Minneapolis, the aggregate peak parking utilization on weekdays is over 90 percent (full utilization). Detailed inventory of parking supply and demand in the area is included in the *1998 Downtown St. Paul Parking Model Update.* Since that report was completed, development in the downtown area has reduced available parking.

6.5.2 Impacts Related to Parking

The parking impacts would be associated with the build alternatives and include the removal of on-street parking spaces, particularly at proposed station areas.

BASELINE ALTERNATIVE

Parking impacts of the Hiawatha LRT system in downtown Minneapolis are documented in that EIS. Other transportation improvements included in the Baseline Alternative have relatively minor impacts on parking when compared to the Hiawatha LRT.

UNIVERSITY AVENUE LRT ALTERNATIVE

Impacts to parking related to the LRT Alternative are as follows:

- Downtown Minneapolis – No additional impacts are anticipated.
- University of Minnesota – During construction of the tunnel, there would be no on-street parking on Washington Avenue and access to parking lots and structures from Washington Avenue could be limited.
- University Avenue – Between Washington Avenue and Rice Street, approximately 660 on-street parking spaces would be removed.
- State Capitol – Approximately 28 on-street parking spaces would be removed.
- Downtown St. Paul – Approximately 121 on-street parking spaces would be eliminated. Additionally, 10 driveways to/from parking structures and lots could be affected (closed or right-in/right-out access only).

UNIVERSITY AVENUE BUSWAY/BRT ALTERNATIVE

Impacts to parking related to the Busway/BRT Alternative are as follows:

- Downtown Minneapolis – No additional impacts are anticipated. The alternative would run on existing streets.
- University of Minnesota – No additional impacts are anticipated. The alternative would run on existing streets.
- University Avenue – Similar to LRT, approximately 660 on-street parking spaces would be removed.
- State Capitol – No additional impacts are anticipated. The alternative would run on existing streets.
- Downtown St. Paul – No additional impacts are anticipated. The alternative would run on existing streets.

6.5.3 Mitigation Measures Related to Parking

Both LRT and Busway/BRT Alternatives would eliminate on-street parking along University Avenue. Existing surveys of parking utilization along the corridor indicate that there would remain sufficient parking supply even with the alternatives in place. On individual blocks, there could be a resulting deficit to address in details in later phases (e.g. PE). Mitigation for the loss of parking in both the LRT and BRT Alternatives may include creation of small off-street parking facilities proximate to retail businesses.

6.6 RAILROAD FACILITIES AND SERVICES

This section reviews the existing railroad facilities and services and assesses the impacts associated with the alternatives.

6.6.1 Existing and Future Railroad Facilities and Services

Although much of the railroad trackage used in previous years to route passenger trains in and through the Twin Cities area has been abandoned and removed, three discernable alignments can still be identified linking downtown Minneapolis and downtown St. Paul. These routes are comprised of track segments currently owned and operated by the Burlington Northern Santa Fe (BNSF) and Canadian Pacific (CP) Railways and the Minnesota Commercial Railway (MC).

For purposes of this section, the three existing Central Corridor rail alignments have been named according to the railroad segments in which they are predominately located. They include the BNSF St. Paul Subdivision, the BNSF Midway Subdivision, and the CP Merriam Park Subdivision.

BNSF ST. PAUL SUBDIVISION

The BNSF St. Paul Subdivision, the northernmost of the three, was originally part of the Northern Pacific Railway (a BNSF predecessor). It runs through the northern part of the City of St. Paul just south of the State Fairgrounds and north of the Bandana Square/Energy Park district, then continues east to the vicinity of Maryland Avenue and Jackson Street, where it turns south toward downtown St. Paul and the St. Paul Union Depot. For many years, the Northern Pacific avoided using this line for passenger service, instead running its passenger trains over what is now the BNSF Midway Subdivision.

BNSF MIDWAY SUBDIVISION

The BNSF Midway Subdivision is located south of the St. Paul Subdivision, and generally less than a mile north of University Avenue. As it runs east through St. Paul, it passes through primarily railroad-related industrial areas, crosses under Interstate 35E (I-35E), and turns south toward downtown St. Paul and the Union Depot. Compared to the St. Paul Subdivision, the Midway Subdivision provides a slightly shorter connection between downtown Minneapolis and downtown St. Paul. This alignment was originally a part of the Great Northern Railway, and for many years was the route used by both Northern Pacific and Great Northern passenger trains between the St. Paul Union Depot and the Hennepin Avenue Station in downtown Minneapolis. Other railroads also have used this route, including the Chicago and Northwestern, the Chicago Great Western, and the Burlington.

CP MERRIAM PARK SUBDIVISION

The CP Merriam Park Subdivision route has a distinct orientation, cutting diagonally across the City of St. Paul on a northwest-to-southeast alignment. Commuter trains on this route would use the BNSF Midway Subdivision to St. Anthony Junction, then follow the MC tracks south across University Avenue and I-94 to Merriam Park Junction, then continue south and east through St. Paul to the flatlands along the Mississippi River, and terminate at Union Depot in downtown St. Paul. Originally, most of this route was part of the Milwaukee Road mainline. At that time, Milwaukee Road passenger trains from St. Paul to Minneapolis continued west at Merriam Park Junction, crossing the Mississippi River into Minneapolis on the 27th Street Bridge, and continuing downtown to the historic depot at Washington and 3rd Avenues. Trains operated by Rock Island and Soo Line also have used these tracks in the past. Presently, AMTRAK's

once-a-day *Empire Builder* between Chicago and the Pacific Coast uses this proposed commuter rail route as it passes through the Twin Cities, and the AMTRAK Midway Station is located on the MC tracks just north of the University Avenue overpass.

All three of the Central Corridor rail routes share a common alignment between downtown Minneapolis and St. Anthony Junction in the Midway area. The line originates on the existing BNSF tracks at North 5th Street, northwest of downtown Minneapolis. From that point the line runs northeast across the Mississippi River at Nicollet Island and continues into Northeast Minneapolis, the same route proposed for the Northstar Corridor commuter rail trains. At Minneapolis Junction, the Central Corridor route splits from the Northstar Corridor route, running east on the BNSF Midway Subdivision to St. Anthony Junction. The three Central Corridor routes diverge at St. Anthony Junction as described above, with the BNSF St. Paul Subdivision route heading north, the BNSF Midway Subdivision route continuing east, and the CP Merriam Park Subdivision route turning south.

AMTRAK/HIGH SPEED RAIL

Currently, AMTRAK service through the Twin Cities consists of one daily train in each direction between Chicago and the Pacific Northwest. This train, the *Empire Builder*, provides daily service to the Midway AMTRAK station in St. Paul. It is scheduled to depart from Midway Station at 8:00 AM in the eastbound direction (toward Chicago) and 11:15 PM in the westbound direction (toward the Pacific Northwest). The *Empire Builder* trains pass through St. Paul along the CP Merriam Park route, and connect to the BNSF mainline tracks at St. Anthony Junction. The City of St. Paul and others have been promoting the idea of relocating the AMTRAK station from the Midway area to St. Paul Union Depot. The proposed relocation is under consideration, but no detailed plan for the new station has been released.

In addition to AMTRAK passenger service, the Midwest Regional Rail Initiative (MRRI) is actively studying a network of high-speed inter-city passenger trains, including a route that would connect the Twin Cities, Madison, and Chicago. The MRRI concept would use fast conventional trains, rather than "high speed" trains of the European or Japanese variety, operating at up to 110 mph using new and upgraded infrastructure on existing railroad alignments. Current plans for the Twin Cities high-speed rail terminus calls for six arrivals and six departures daily. According to preliminary studies of the proposed high-speed rail network, the recommended location for the Twin Cities terminal and passenger station is at the St. Paul Union Depot.

PASSENGER STATIONS

Traditional downtown Minneapolis railroad stations and station sites are no longer available for passenger service. New downtown Minneapolis and Northeast Minneapolis commuter rail stations are being developed as part of the Northstar Corridor commuter rail service, in place of stations that are no longer available. A large downtown Minneapolis rail station was located on the Mississippi River at Hennepin Avenue, and was served by Great Northern and Northern Pacific trains, those of some other railroads, and later by AMTRAK until 1978. That station has since been demolished, and all of the station and approach tracks, including those on the Stone Arch Bridge, have been removed. The Milwaukee Road Depot still exists as a redevelopment site, but its tracks also have been abandoned and removed, and the approach track right-of-way has been given over to other uses, including the Hiawatha LRT line.

To replace these former stations, the Northstar Corridor has proposed a new downtown Minneapolis passenger rail station to be located where an extended Hiawatha LRT system,

running on 5th Street, would pass above the proposed commuter rail tracks. The station location corresponds roughly to the segment of North 5th Street between 3rd Avenue North and 5th Avenue North.

The Northeast Minneapolis Mulitmodal Station would be located near the intersection of Central Avenue and Northeast 7th Street, and would be configured to accommodate passenger transfers between Northstar trains and Red Rock/Central Corridor commuter trains. Initial construction of this station is proposed as part of the Northstar Corridor commuter rail service.

Use of the historic St. Paul Union Depot for commuter rail service has been assumed in previous analyses, including the 1998 Mn/DOT *Phase II Commuter Rail Feasibility Study* and the *Red Rock Corridor Commuter Rail Feasibility Study*. It is anticipated that Union Depot would require a major renovation to restore passenger rail service, but the renovation costs potentially could be shared with other proposed projects (e.g., AMTRAK inter-city service and high-speed rail). The redevelopment of Union Depot or another downtown St. Paul site for rail transit is the subject of a current study by Ramsey County.

6.6.2 Light Rail Transit (LRT)/Bus Rapid Transit (BRT) Railroad Interface

The stations that have been identified for proposed commuter rail services in the Twin Cities area, Northstar in downtown Minneapolis and Union Depot in downtown St. Paul, would both be well-served by the build alternatives in the Central Corridor.

With respect to LRT, the site of the proposed downtown Minneapolis commuter rail station was chosen specifically because it facilitates a transfer between Northstar commuter trains and the LRT station which would be used jointly by the Hiawatha and Central Corridor LRT lines. In downtown St. Paul, all proposals for railroad passenger service contemplate utilizing the Union Depot. To this end, the Central Corridor LRT would pass in front of the Union Depot with a station adjacent to the Depot's entrance. If the Depot is not the preferred railroad passenger site, this assumption would be revisited.

The alignment selected for the BRT Alternative passes within blocks of the proposed commuter rail stations in both downtown St. Paul and downtown Minneapolis. While not as proximate to the stations as the LRT Alternative, the proposed BRT stops are within a reasonable walking distance of both commuter rail stations.

Other than the interface of the LRT and BRT Alternatives with the downtown commuter rail stations, neither build alternative would impact the operation of freight, commuter or intercity railroad service in the Central Corridor Study Area.

6.7 PEDESTRIAN AND BICYCLE ENVIRONMENT

6.7.1 Existing Conditions

The Central Corridor, the urban core of the Twin Cities, provides significant opportunities for pedestrians and bicyclists. The existing facilities throughout the corridor can be characterized by the following amenities: an extensive sidewalk network, on- and off-road bicycle lanes, pedestrian and bicycle trails, and bicycle lockers and racks. Typically, the environment for pedestrian and bicycle use is determined by the type of development pattern it is adjacent to, including the size

of the sidewalks, number of traffic lanes, streetscape, and other predominant characteristics in the surrounding areas. In addition to these facilities, Metro Transit has added bicycle racks to selected bus routes within the corridor to encourage more bicycle commuters to use transit.

As part of the *Smart Growth Initiative* program in the Twin Cities, pedestrian and bicycling facilities have become a focal point in recent land development and transportation network projects. More emphasis has been placed on creating development patterns that are transit-friendly in neighborhood developments and creating more efficient access to goods and services by alternative modes of transportation.

This section reviews the existing and future of pedestrian and bicycle facilities in the Central Corridor, segmented by the characteristics of the surrounding land use and pedestrian environment. The segments, as described below, include downtown Minneapolis, the University of Minnesota East Bank campus, University Avenue, and downtown St. Paul.

DOWNTOWN MINNEAPOLIS

The Minneapolis CBD, one of the highest traffic generators in the Twin Cities, is the host to nearly 140,000 employees daily[1]. This activity center has a substantial amount of pedestrian-oriented amenities that promote walking and bicycling (Figure 6.7-1: Downtown Minneapolis - Existing Pedestrian/Bike Facilities). The core district has established wide sidewalks and high quality streetscapes that are favorable for pedestrians. Connections to the office district from parking facilities have been established through the skyway system and planned signal timing, which supplies pedestrian flow on the street level. The Nicollet Mall, a major retail activity center in the core of downtown, is a transit-only parkway and pedestrian-oriented mall. This parkway is lined with large sidewalks, carefully detailed streetscapes, numerous plaza-oriented establishments, and lined with appealing street/skyway retail stores. In addition, blocks in the downtown area have a limited number of mid-block access points and curb cuts, which minimize conflicts between pedestrians and automobiles. Pedestrian crosswalks are clearly marked, some with special paving materials, and walk signals are provided for pedestrians throughout the downtown.

The extensive bicycling network in the downtown area provides a variety of facilities, especially for commuter-oriented bicyclists. The foundation of the bicycle network in downtown is designated bicycle lanes that are provided on many of the one-way street pairs. These lanes, which operate within the flow of traffic, are relatively safe due to the slower speeds of vehicles in the downtown area and the increased visibility of bikers on the street. The streets with designated bicycle lanes include:

North-South Streets	**East-West Streets**
• Marquette Avenue	• Tenth Street South
• Second Avenue South	• Ninth Street South
• Portland Avenue	• Fifth Street South
• Park Avenue	• Fourth Street South

Another north-south two-way bicycle lane is provided on Hennepin Avenue near the Warehouse District. This bicycle lane separates the northbound automobile traffic from the southbound transit-only lane. In addition to these on-street facilities, numerous bicycle racks and bicycle

[1] Source: Twin Cities Metropolitan Council, March 2000.

lockers are placed throughout the downtown, as shown on Figure 6.7-1. Bicycle Lockers, which provide shelter and security for bicycles and create an attractive amenity for commuters on bicycles. In general, the core of the downtown functions well as a pedestrian activity center, even though it is a major automobile destination.

UNIVERSITY OF MINNESOTA EAST BANK CAMPUS

The pedestrian environment on the East Bank campus of the University of Minnesota is adequate. Similar to many campuses around the country, the campus core functions as a pedestrian mall. The University permits only a limited number of vehicles on campus, typically for designated faculty and staff members to park on campus. The minimal amount of vehicular traffic reduces the number of potential conflicts between automobiles and pedestrians. Washington Avenue acts as a barrier to the campus, as it divides the campus and Fairview Hospital area into two separate entities because of the high volumes of traffic. Painted crosswalks, walk signals, and pedestrian bridges do exist, though the volumes of traffic on Washington Avenue create a safety hazard for crossing pedestrians and bicyclists. Mid-block pedestrian crossings often occur, inhibiting the safe flow of traffic and pedestrians through the area. The existing sidewalks on Washington Avenue are adequate, but the focus on the flow of automobiles is obvious. Tunnel and skyway system connections are utilized, especially during times of inclement weather.

Bicycle facilities are provided at a variety of locations on campus and near the hospital complex, as shown on Figure 6.7-2: University of Minnesota - Existing Pedestrian/Bicycle Facilities. Bicycle racks are provided throughout campus and are also available on some of the buses that serve the campus, including Metro Transit's Route 6 and many of the University of Minnesota circulator routes. Additionally, both on- and off-street bicycle lanes are provided at selected areas of campus, with most of the off-street bicycle lanes located near the Mississippi River. The bicycle trails along the river, known as the River Road Parkways, function as recreational trails in the regional park system. On-street bicycle lanes are provided throughout campus on Harvard Street and Union Street, in addition to the roadways closed to vehicular traffic. A pedestrian bridge has been added to the existing pedestrian network, connecting the east and west banks of campus. Only the Northrup Mall green space in the center of campus restricts riding bicycles, notably called the "dismount area." Bicycles are allowed, as long as they are walked through the area.

Pedestrian tunnels, located below the campus, connect many of the major buildings on campus. These tunnels function similar to the downtown skywalk systems in downtown Minneapolis and downtown St. Paul, but are located below-grade level. These tunnels also connect to the Fairview Hospital to the south of campus, which offers a safety benefit from potential vehicle-pedestrian conflicts on Washington Avenue.

UNIVERSITY AVENUE

University Avenue, which operates parallel to I-94, supplies a minimal amount of pedestrian and bicycle facilities. This corridor serves a high volume of traffic at moderate speeds (speed limit is 35 mph), which can create an environment that would be perceived as unsafe for bicycle and pedestrian crossings. In addition, no designated on-street bicycle facilities are provided on this roadway. This route does have an extensive sidewalk network on both sides of University Avenue, which serves many of the adjacent commercial land uses along the corridor. A high amount of curb cuts and accesses points are provided throughout the corridor, which creates a higher potential for conflicts between vehicles and pedestrians.

In the Prospect Park area, just east of the University of Minnesota campus, University Avenue is lined with a high number of private driveways serving adjacent residences and commercial uses. On-street parking is provided in this area, creating an environment that is not favorable to on-street bicycling. In addition, land uses and businesses in this area typically function around drive-up traffic. The TH 280 area, a major north-south access point to the regional highway network functions around the automobile. To the east of this area is the Southeast Minneapolis Industrial area (SEMI), which has retail and service industries with large functional sidewalks, basing their business on walk-up traffic. Many of these businesses do not have extensive parking lots and depend on walk-up traffic for business.

The Snelling Avenue area, the next main activity center for pedestrians and bicycles, is one of the highest volume intersections in the Twin Cities. Between Fairview Avenue and Dale Street, traffic volumes on both University Avenue and many of the main north-south arterials (Snelling Avenue, Lexington Parkway, and Dale Street) have created considerable amounts of traffic congestion. These problems not only affect vehicular traffic, but also create an environment that is not attractive to bicyclists and pedestrians. On the north side of this area, adjacent land uses serve only a minimal amount of walk-up type business. On the south side of University Avenue, big box retail and strip mall land uses are set back from the roadway network and are separated from the pedestrian network by large parking lots. In addition, there are a high number of access points on University Avenue, which can create a high number of vehicle-pedestrian conflicts. Overall, this type of development does not balance the basic activities of pedestrians and bicycles with vehicular traffic.

DOWNTOWN ST. PAUL

Downtown St. Paul, similar to downtown Minneapolis, is a high-density office core and one of the highest activity centers in the Twin Cities Metropolitan Area. This area not only serves large corporations and businesses, but is also home to regional landmarks, a popular theater district, major sporting and concert venues, regional hospitals, and residential areas. Overall, the St. Paul CBD is a major destination point for many vehicle, transit, bicycle, and pedestrian trips.

The northern edge of downtown is a government district that includes the State Capitol and many other State Government buildings. This area includes a network of wide sidewalks and pedestrian amenities, including a pedestrian tunnel to the Capitol Building that serve the employees and visitors that frequent the area. In addition, a downtown circulator trolley and many Metro Transit bus routes serve this area, which has created a demand for pedestrian connections. Cedar Street, 6th Street, and 5th Street in the core of the office district also have high volumes of transit patrons, as these are the main roadways served by Metro Transit's bus services. These streets have wide sidewalks, sheltered bus stations, and a limited number of mid-block curb cuts or access points, which typically encourage a safe and efficient environment for pedestrians. Even though pedestrian-oriented facilities are provided, there is a minimal number of walk-up retail shops on the street level of the office buildings.

The downtown St. Paul area does have an extensive skywalk system, which serves multiple retail, service, and restaurant businesses. In addition, the skywalk system connects many of the main downtown buildings, creating an environment that has minimal potential conflicts between vehicles and pedestrians. The number of mid-block access points and curb cuts are also limited, creating a safer environment for pedestrian traffic on the street level. The pedestrian tunnel system, especially near the State Capitol area, also provides shelter from inclement weather, limits the conflicts with auto traffic, and provides additional connections to the buildings in downtown St. Paul.

A minimal number of on-street bicycle facilities are designated in the downtown area, though it is a priority in the *Saint Paul Bikeway Plan* to establish downtown bicycle routes and increase the availability of bicycle parking. Bicycle lockers are less visible in downtown St. Paul, in comparison to many of the other areas within the corridor. High-density urban areas with high volumes of traffic, as found in downtown St. Paul, are typically not conducive for bicycle commuters, unless designated bicycle lanes are implemented.

6.7.2 Impacts

Potential impacts to the pedestrian and bicycle environment were assessed by estimating the level of intervention required to maintain or enhance pedestrian and bicycle access for users of the potential LRT or BRT system, while preserving a safe environment. In addition, the anticipated direct physical impacts of the alignment to the existing pedestrian and bicycle facilities were estimated. The potential impacts are evaluated at three levels: low, moderate, and high impacts.

BASELINE ALTERNATIVE

The Baseline Alternative is not expected to have any negative impacts on the pedestrian or bicycle environment in the Study Area.

UNIVERSITY AVENUE LRT ALTERNATIVE

The LRT and BRT Alternatives would have much of the same potential impacts and these would be expected to be moderate.

In downtown Minneapolis, the LRT would be combined with the Hiawatha LRT, operating with one and one-quarter minute frequencies during the peak hour. Essentially Fifth Street becomes a transit parkway, because there would be only one lane of automobile traffic and constant service provided by the LRT and feeder buses. Due to the decrease in the number of traffic lanes provided, the number of automobile-pedestrian conflicts is expected to be reduced. In addition, the block between Third Avenue and Fourth Avenue in front of City Hall would be a pedestrian only plaza, closing the street to all automobile traffic.

In the University of Minnesota campus, the LRT is proposed to operate in a tunnel underneath campus. No impacts are expected on the street level, though one pedestrian tunnel under Washington Avenue would have to be replaced due to the construction of the LRT tunnel.

Both the LRT and BRT Alternatives would operate in the median. An additional number of pedestrian crossings are expected to occur because of the LRT system, creating a need for improved crossings to create a safe environment for the pedestrians and vehicular traffic. Connections to the station sites would also need to be enhanced. In downtown St. Paul, no sidewalks or crossings are expected to be taken due to the LRT system. Two roadway closures are proposed in downtown at the station sites for Cedar Street between 5th and 4th Streets and on 4th Street between Robert Street and Minnesota Street. This would enhance the pedestrian connections to the LRT system. Overall, no physical pedestrian or bicycle amenities existing today, including the pedestrian tunnels, would be removed.

UNIVERSITY AVENUE BUSWAY/BRT ALTERNATIVE

The BRT Alternative is expected to have moderate impacts to the pedestrian and bicycle network. The frequency of buses on the corridor would increase the number of potential conflicts between

pedestrians and vehicles throughout the corridor. Overall, formal pedestrian crossings may have to be developed throughout the corridor, replacing the existing roadway crossings. In addition, at proposed station sites, improved pedestrian connections from the surrounding areas and bus access points would need to be implemented. Station platforms would be designed to minimize disruptions to the pedestrian circulation in the area, especially for adjacent properties.

In downtown Minneapolis, the BRT would be operating within the mix of vehicular traffic similar to the existing bus system. The increased frequency of buses may have an impact, but the safety hazards would not be substantially different than those posed by the existing automobile traffic. A limited number of impacts would be expected in the University of Minnesota area, as the BRT would still be operating within the mix of vehicular traffic on Washington Avenue. No crossings or facilities would be taken, but it is projected that many of the pedestrian and bicycle facilities would be improved to create more efficient connections to the BRT alignment, especially at station locations.

The University Avenue corridor, between the University of Minnesota campus and downtown St. Paul, is expected to have minimal impacts to the pedestrian and bicycle network. The City of St. Paul's bicycle plans designate parallel streets for bicycle lanes. It does not call for bicycle lanes on University Avenue. Connections to the center platform stations would have to be enhanced because of the increased number of crossings projected at those locations. No crossings are expected to be taken. In downtown St. Paul, the Busway/BRT Alternative would be operating in the vehicular mix of traffic, like the buses operating in the existing conditions. As noted for downtown Minneapolis, the potential safety hazards projected are no worse than those caused by the existing automobile traffic.

6.7.3 Potential Mitigation

Enhancing the pedestrian and bicycle environment is one of the main objectives established by the Twin Cities Metropolitan Council. Much of the station area planning, as detailed in Section 5.2: Station Area Impact Assessment, details the planning process utilized to create more efficient pedestrian connections to the station areas. Factors that would encourage walking and bicycling include safety, reasonable distance to station areas and pleasant surroundings. To enhance the pedestrian environment within the Central Corridor, the following factors may be effective mitigation measures:

- Bicycle lanes
- Bicycle storage facilities
- Street amenities (i.e., landscape, shade, shelter)
- Demarcated crosswalks
- Signage and lighting
- Continuous sidewalks

Coordination with community-wide bicycle and pedestrian planning efforts of other organizations would be undertaken as the station area planning process proceeds.

6.8 UTILITIES

This section provides general information on existing public and private utilities and identifies potential effects that may result from the proposed project. Only major utility companies that service the Study Area were contacted. The intent of this section is not to identify every utility providing service in the Study Area but to address those that may be impacted by the proposed project.

6.8.1 Existing Utilities

The location and general distribution of existing major utilities within the Study Area are described below.

EXISTING WATER SERVICE

The City of Minneapolis Water Works provides water, and owns and maintains water distribution service from the Minneapolis Multimodal Station to Emerald Street Southeast, near the proposed Westgate Station. According to City of Minneapolis engineering drawings, last revised on February 14, 2001, the publicly owned watermains along the proposed project typically range in size from 6 to 20-inches in diameter. However, a 46-inch watermain crosses the alignment near the proposed West Bank Station between Nineteenth Avenue South and Twentieth Avenue South. Service to buildings is privately owned and ranges from three-quarters to 8-inches in diameter. According to City of Minneapolis personnel, depending on the diameter, watermains in Minneapolis can be buried up to 7.5-feet below ground surface (bgs) to reduce the possibility of freezing.

St. Paul Regional Water Services provides water, and owns and maintains distribution service along the proposed project area from Emerald Street Southeast to the east end of the proposed project. Engineering drawings, revised between January 1997 and August 2000, were provided by St. Paul Regional Water Services personnel. These drawings depict publicly-owned watermains typically ranging from 4 to 36-inches in diameter along this portion of the proposed project. Service to buildings is privately owned and range between 3 and 8-inches in diameter.

There are no water treatment plants, pump stations or water storage facilities located along the proposed corridor.

EXISTING SANITARY AND STORM SEWER SERVICE

The City of Minneapolis Department of Public Works owns and maintains sanitary and storm sewer service lines from the Minneapolis Multimodal Station to Emerald Street Southeast. According to engineering drawings provided by the City of Minneapolis and last revised May 1997; sanitary and storm sewers parallel and intersect the proposed alignment numerous times. These sewers range from 8-inches to 14-feet in diameter and vary in depth.

The City of St. Paul Department of Public Works also owns and maintains sanitary and storm sewer service along the proposed project area from the Westgate Station to the east end of the proposed project. Engineering drawings provided by the City of St. Paul, depict the location and size of the sanitary and storm sewers, which range from 8-inches to 13-feet in diameter and vary in depth.

In Minneapolis and St. Paul, wastewater treatment facilities are owned and operated by the Twin Cities Metropolitan Council; however, none are located within the proposed project area.

EXISTING LONG DISTANCE COMMUNICATION SERVICE

Qwest Communications International, Inc. (Qwest) provides the majority of long distance and local communication service to all exchanges within the proposed project area. Engineering drawings obtained from Qwest identify communication service lines along the proposed project area. The service lines are primarily located underground and they parallel and intersect the proposed project numerous times.

EXISTING ELECTRIC AND GAS LINES

Reliant Energy Minnegasco, a division of Reliant Energy Resources Incorporated, provides natural gas service along the proposed project area within the Minneapolis City limits. Drawings were provided by Reliant Energy Minnegasco personnel on January 8, 2002. These drawings identify Reliant Energy Minnegasco subsurface gas transmission lines that parallel and intersect the proposed project. The lines range in size from 2 to 24-inches in diameter and vary in pressure from 10 to 175-pounds.

Xcel Energy provides gas service along the proposed project within the St. Paul City limits. Drawings were provided by LRT personnel with Xcel Energy on January 11, 2002. The drawings identify Xcel Energy's subsurface gas transmission lines that parallel and intersect the proposed project. The lines range in size from 5/8 to 16-inches in diameter.

Xcel Energy provides electrical service within the proposed project area. Drawings provided by Xcel Energy personnel on January 11, 2002 identify the electric transmission lines that intersect and parallel the proposed project. East of the proposed Rice Street Station the lines are typically buried; west of the Rice Street Station the lines are typically overhead. No electrical substations were identified in the drawings.

EXISTING PIPELINES

According to information provided by the Office of Pipeline Safety, no major hazardous liquid or petroleum product pipelines are located along the proposed project. The only major natural gas pipeline designed for pressure of more than 275 pounds per square inch is a Minnegasco natural gas line that intersects the proposed project between Cedar and Nineteenth Avenues South.

ADDITIONAL EXISTING UTILITIES

District Energy St. Paul, Inc. and its affiliate District Cooling St. Paul, Inc. maintain heating and cooling distribution systems in downtown St. Paul. Hot water pipelines parallel and intersect portions of the proposed project on University Avenue, Cedar Street, and 4th Street. Chilled water pipelines parallel and intersect the proposed alignment at Cedar Street and 4th Street. Pipelines for both distribution systems are shallow. Chilled water pipelines are typically 30-inches in diameter and are buried 4-feet bgs. Hot water pipelines are typically buried 6-feet bgs. Meetings have been held with District Energy and a list of issues has been developed for consideration in the next phase of LRT design.

A pedestrian tunnel system is located in the Capitol area near downtown St. Paul. This system is addressed in Section 6.7: Pedestrian and Bicycle Environment.

6.8.2 Utility Impacts

The proposed project assumes the Hiawatha LRT analysis identified utility impacts to the area west of the Downtown East/Metrodome Station. Therefore, the following addresses only the potential utility impacts from the Downtown East/Metrodome Station to the River Park Plaza Stop.

BASELINE ALTERNATIVE

The Baseline Alternative is not expected to impact utilities with the exception of manholes, valves, vaults, hydrants, etc., because it utilizes the existing network and only involves minor traffic engineering work rather than large roadway capacity expansions.

The majority of small-scale improvements included in the Baseline Alternative have already been completed. Only the rebuilding of a torn down garage in the Snelling Avenue area and the construction of a noise wall near the interchange of I-94 and Victoria Street remain to be completed.

UNIVERSITY AVENUE LRT ALTERNATIVE

The potential impact to utility lines largely depends on whether the proposed project tunnels or bridges at the utility intersection and the depth of the utility. In general underground utilities that parallel the proposed LRT Alternative for some distance may need to be relocated. Manholes, valves, vaults, hydrants, etc. located within the proposed construction area would generally be relocated or access restricted. All overhead or subsurface utility crossings would be relocated where physical conflicts occur. In addition, construction of station facilities, traction power supply systems, as well as civil construction (roads, sidewalks, walls, traffic signals, etc.) would have site specific impacts. Major potential utility impacts are identified below.

Potential Impacts to Water Service

The proposed LRT Alternative has the potential to impact a 46-inch subsurface watermain that crosses the proposed project near the West Bank Station between Nineteenth Avenue South and Twentieth Avenue South. This line may need to be relocated because a depressed platform is proposed at this location and given the diameter, this watermain may only be 3-feet bgs surface.

Potential Impacts to Sanitary and Storm Sewer Service

The proposed LRT Alternative is suspected to impact a 96-inch sanitary sewer that intersects the proposed LRT Alternative at Oak Street near the proposed Stadium Village Station. This line would need to be relocated during construction of a proposed tunnel.

Storm sewers would be impacted throughout the proposed LRT Alternative during street reconstruction. Catch basins and manholes may have to be adjusted or relocated. Drainage from proposed bridge and tunnel structures, station platforms and parking facilities would be introduced to the existing storm sewer systems.

Potential Impacts to Long Distance Telephone Lines

The proposed LRT Alternative is not expected to impact Qwest long distance transmission cables.

Potential Impacts to Electric and Gas Lines

The proposed LRT Alternative has the potential to impact Reliant Energy Minnegasco natural gas transmission lines. The lines transmit natural gas at approximately 175-pounds of pressure through 24-inch diameter lines. These transmission lines intersect the proposed project at Nineteenth Avenue South and Oak Street Southeast.

The proposed LRT Alternative is not suspected to significantly impact Xcel Energy natural gas and electric transmission lines.

Potential Impacts to Additional Utilities

The proposed LRT Alternative is not expected to substantially impact shallow district heating and cooling distribution systems, which service 75 percent of the downtown St. Paul area. The proposed LRT Alternative is not to extend more than 2-feet below the ground surface where these lines are installed.

Impacts to the pedestrian tunnel system located in the capitol area are addressed in Section 6.7: Pedestrian and Bicycle Environment.

In conclusion, the impacts to existing utilities for the proposed LRT Alternative would likely occur at subsurface construction. Until complete information such as exact alternative, clearances, elevations, existing utilities and depth requirements, it cannot be determined which lines may need to be relocated or the location of the replacement lines.

UNIVERSITY AVENUE BUSWAY/BRT ALTERNATIVE

The BRT Alternative is not expected to impact utilities between the Downtown East /Metrodome Station and Bedford Street (just west of the Westgate Station) with the exception of manholes, valves, vaults, and hydrants located near stations and stops.

The proposed BRT Alternative would operate in the median between Bedford Street and just east of the Rice Street Station. Construction would involve pavement reconstruction. Potential impacts to manholes, valves, vaults or hydrants in this area only exist near the planned reconstruction of a railroad bridge along University Avenue, east of Transfer Road.

The proposed BRT Alternative is not expected to impact utilities east of the Rice Street Station with the exception of manholes, valves, vaults, and hydrants located near stations and stops.

6.9 EFFECTS DUE TO CONSTRUCTION

The construction phase of the proposed University Avenue LRT Alternative or the University Avenue Busway/BRT Alternative would include constructing tracks, stations, structures, maintenance facility and/or other facilities that would result in the generation of various construction-related effects. These potential construction effects are described in this section.

6.9.1 Construction Noise

Construction noise varies greatly depending on the construction activity being performed and its proximity to the noise receptor. This variance is due to numerous factors including the process being implemented and the type and condition of the equipment used. Generally, construction noise levels are governed by the noisiest piece of equipment. The engine, usually diesel, is the dominant source of noise. The level of noise produced increases with engine speed or by defective or inadequate muffling.

There are a few instances where the actual construction process generates noise. These include the use of impact type tools and equipment for activities such as pile driving, boring, pavement breaking, pavement milling, and structural bolting.

In summary, construction noise at a given construction location depends on the magnitude of noise being generated during each construction phase, the duration of the noise, and the distance from the construction activities.

6.9.2 Construction Vibration

The most significant vibration-generating construction activities are blasting and pile driving. The use of blasting is not currently foreseen but is not precluded for the proposed build alternatives. Pile driving is envisioned to be used selectively for the project.

Other construction activities that could generate potentially intrusive vibration on the proposed project include:

- Tracked vehicles (such as bulldozers and roadheaders)
- Jackhammers
- Vibratory compactors

6.9.3 Access and Distribution of Traffic

The disruption of automobile and truck traffic may be expected to occur during the proposed construction of either the LRT or BRT Alternatives. The successful completion of either of these build alternatives would depend in part on effective coordination of road closures and traffic detours with local governments. It also depends on maintaining convenient access to businesses during construction. Involvement of businesses along the corridor will be important. To achieve effective construction-related traffic management during construction, contractors would be required to submit a traffic management plan as a contractual requirement. The traffic management plan would be required from the contractor prior to the contractor commencing construction on the site. It is not uncommon for the traffic management plans to be reviewed for concurrence by local authorities.

6.9.4 Excavations, Fill Material, Debris and Spoil

The construction of either the proposed LRT or BRT Alternatives would require demolition, clearing, grading, excavation, and tunneling activities and provision of fill materials. All of these activities would result in the generation of debris and spoil. It is anticipated that much of the spoil generated from grading, excavation, and tunneling activities would be used as fill material at various sites along the proposed alignment, including station areas, to bring the existing grades to the proposed final grades. The fill material obtained from these site sources may not fulfill the total project fill material requirement. Additional fill material would have to be obtained from off-site borrow sources. An analysis of the cut and fill requirements and availability for the proposed project has not been performed in this phase. This analysis will be performed in future phases of the proposed project to determine the requirements for off-site acquisition or disposal of soils.

Debris and excess spoil material generated during the construction of either the proposed LRT or BRT Alternatives would be disposed off-site. The disposal of unsuitable or excess material, trash, debris and spoil would be governed by local and/or state regulations concerning disposal of such items.

The hauling of material to be disposed off-site would be performed in accordance with all applicable local and/or state permitting requirements. It is the intent that the short-term construction impacts to neighborhoods and adjacent properties from excavation activities, fill materials, debris and spoil would be minimal. The project site and any disposal areas would be left clean upon completion of the proposed transit project.

6.9.5 Construction Staging Areas

The construction schedule for the proposed transit project has not been finalized. However, it is recognized that several staging areas would be required for storage of equipment and materials used for construction.

For the proposed LRT Alternative, items such as running rail, special trackwork and other long-lead procurement items as well as bridge and tunnel construction access areas would fall into this requirement. Preliminary staging areas for construction of the proposed LRT tunnel through the

East Bank campus of the University of Minnesota have been identified and indicated in the Draft EIS Plan Set. These areas will require further review and areas at other sites will need to be identified prior to the construction phase of the project or identified by construction contractors and approved prior to the start of construction.

For the proposed Busway/BRT Alternative, construction items are those commonly found in roadway reconstruction projects (e.g. traffic signals, concrete forms). These items are not expected to require long lead times or storage for construction staging above what is typical for roadway reconstruction projects.

For either of the proposed transit alternatives, stormwater pollution prevention plans would be developed for construction areas in accordance with state and local regulations to minimize the potential for stormwater runoff during construction.

6.10 ENVIRONMENTAL JUSTICE

This section explains how Environmental Justice concerns have been addressed in the evaluation of alternatives for the Central Corridor Draft EIS. This section also identifies how areas protected under the Environmental Justice Executive Order 12898 were defined and the extent to which areas of minority and low-income populations would be affected by the alternatives under evaluation in this Draft EIS. The issues discussed in this section pertain to the transportation factors analyzed in Chapter 6.0: Transportation Impact Analysis, including effects related to neighborhood traffic associated with stations and access to transit. Additional analysis regarding social, environmental and economic issues can found in Chapters 3.0, 4.0 and 5.0.

The details regarding the legal and regulatory requirements of Environmental Justice and the definitions of minority and low-income populations were provided in Section 3.9 and are summarized below.

6.10.1 Legal and Regulatory Requirements

Presidential Executive Order 12898 *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (February 11, 1994) requires that federal agencies consider and address disproportionate adverse environmental effects of proposed federal projects on minority and low-income communities.

The intent of the Department of Transportation Final Order on Environmental Justice [DOT Order 5610.2, "Environmental Justice" (April 15, 1997)] is to integrate the goals of Executive Order 12898 into DOT operations.

Between June 1997 and March 1998, the Minnesota Department of Transportation's Committee on Environmental Justice met and was charged with developing guidance to implement Executive Order 12898. The Committee on Environmental Justice produced *Mn/DOT's Environmental Justice Draft Guidance*, dated August 5, 1998. Methodology outlined in the guidance document was used to evaluate the proposed corridor for environmental justice.

To meet both the requirements of NEPA and Executive Order 12898, this section addresses the characteristics of the affected communities, potential effects on minority and low-income communities and potential mitigation measures.

6.10.2 Community Characteristics

Race and Ethnic composition and income characteristics within the impact assessment area have been identified in accordance with definitions established by the United States Department of Transportation (USDOT) and the United States Environmental Protection Agency (EPA) guidance on Environmental Justice.

MINORITY POPULATIONS

As shown in Figure 3.9-1: Minority Population, census blocks that exceed the thresholds defined in Section 3.9 is shaded light and dark purple. Census blocks within a half mile radius of the alignments will be evaluated in this section for disproportionately high and adverse effects. The largest concentration of minorities, adjacent to the corridor alignment, is located north and south of University Avenue between Lexington Parkway and Interstate 35E in the Thomas-Dale and Summit-University neighborhoods in St. Paul. Neighborhood boundaries are shown in Figure 3.1-1: Designated Neighborhoods.

LOW-INCOME POPULATIONS

As shown in Figure 3.9-1 census block groups that exceed the thresholds defined in Section 3.9 are shaded light and dark purple. Census block groups within half mile radius of the alignments will be evaluated in this section for disproportionately high and adverse effects. Populations below the poverty level are adjacent to the corridor alignments for the entire length of the corridor with the exception of the University of Minnesota East Bank campus.

6.10.3 Environmental Justice Analysis for Transportation Factors

Roadway Operations

Traffic impacts with transit operations can be defined in a number of ways including: a) the threshold level of the grade crossing, b) the LOS of the roadway segment, c) the LOS of the entire intersection, d) the LOS of individual movements within an intersection, and e) the relation between the queue length and the storage length of an intersection movement.

The following guidelines are applied when conducting the traffic analysis and identifying the need to consider roadway improvements or mitigation measures:

- All grade crossings reported at threshold Level 3 should be mitigated, and transit grade crossings at Level 4 should be grade-separated.
- All roadway segments and intersections operating at a LOS E or F as a result of background traffic or site-generated traffic would be considered for potential roadway improvement or mitigation measures, respectively.
- Not all intersection movements expected to be at a LOS E or F require roadway improvements or mitigation measures.
- Intersections or specific movements at an intersection that warrant consideration for mitigation due to the increased traffic volumes from a development would only be applied to return the intersection or specific movement back to the existing (background) traffic conditions.

BASELINE ALTERNATIVE

The Baseline Alternative would introduce no new grade crossings and there would be no disproportionate impact borne by minority and low-income populations.

In general, LOS A through D is typically considered acceptable in the Twin Cities Metropolitan Areas for intersections and roadway segments. Metropolitan areas consider a LOS E or F to be unacceptable, as this indicates that the roadway reached or exceeded its capacity, resulting extended travel delays and substantial congestion. As shown in Table 6.10-1: Baseline PM Peak Hour Intersection LOS Analysis by Minority and Low-Income Population Area, seven intersections are expected to operate below LOS D. Of the seven intersections, five of those intersections are located within minority and low-income population areas.

Table 6.10-1: Baseline PM Peak Hour Intersection LOS Analysis by Minority and Low-Income Population Area

Map Ref No.	Intersection	Existing LOS	Baseline LOS	Minority Population Area	Low-Income Population Area
1	Hennepin Avenue/Fifth Street South	B	E	No	No
2	Marquette Avenue/Fifth Street South	B	E	No	No
10	Raymond Avenue/University Avenue	E	F	Yes	Yes
18	Lexington Parkway/University Avenue	D	E	Yes	Yes
20	Dale Street/University Avenue	D	F	Yes	Yes
21	Marion Street/University Avenue	C	E	Yes	Yes
22	Rice Street/University Avenue	D	F	Yes	Yes
Total Intersections			**7**	**5**	**5**

Intersection movements that are expected to operate below LOS D are identified in Table 6.10-2: Baseline PM Peak Hour Movements at LOS E and F by Minority and Low-Income Population Area. Of the five intersection movements, all five intersections are located within minority and low-income population areas.

Table 6.10-2: Baseline PM Peak Hour Movements at LOS E and F by Minority and Low-Income Population Area

Intersection	Movement	Movement LOS	Minority Population Area	Low-Income Population Area
Fairview Avenue/University Avenue	North Approach LT and South Approach LT	F	Yes	Yes
Aldine Street/University Avenue	North Approach LT and South Approach RT	E	Yes	Yes
Snelling Avenue/University Avenue	North, East and South Approach LT	F	Yes	Yes
Lexington Parkway/University Avenue	South Approach TH North, East and South Approach LT, and West Approach All	E F	Yes	Yes
Victoria Street/University Avenue	North Approach All and South Approach LT	E	Yes	Yes
Total Intersections		**5**	**5**	**5**

Note: LT= Left Turn movement; RT= Right Turn movement; TH= Through movement; All= All Movements for the approach

Parking

Parking impacts of the Hiawatha LRT system in downtown Minneapolis are documented in that EIS. Other transportation improvements included in the Baseline Alternative have relatively minor impacts on parking when compared to the Hiawatha LRT. Since the Baseline Alternative would have minor impacts on parking, adverse effects would not be borne disproportionately to minority or low-income populations.

Pedestrian and Bicycle Environment

The Baseline Alternative is not expected to have any negative impacts on the pedestrian or bicycle environment in the Study Area. Enhancements to the bus shelters on University Avenue may have positive influence on the pedestrian-oriented activities. Since the Baseline Alternative would have no negative impacts on the pedestrian and bicycle environment, adverse effects would not be borne disproportionately to minority or low-income populations.

UNIVERSITY AVENUE LRT ALTERNATIVE

Roadway Operations

The LRT analysis resulted in four locations that reach a threshold Level 3, which has been defined as LRT being possible with increased train and vehicular delays or extensive improvements made to the crossing. All grade crossings reported at threshold Level 3 should be mitigated. Three of the four locations would affect minority or low-income population areas, as shown in Table 6.10-3: LRT Grade Separation Analysis Results by Minority and Low-Income Population Area.

Table 6.10-3: LRT Grade Separation Analysis Results by Minority and Low-Income Population Area

Map Ref No.	Roadway	From	To	LRT Threshold Number[1/]	Minority Population Area	Low-Income Population Area
1	Hennepin Avenue	Sixth Street S	Fourth Street S	3	Yes	Yes
3	Fifth Avenue S	Sixth Street S	Fourth Street S	3	No	No
8	Cromwell Avenue	Territorial Rd	Franklin Avenue	3	Yes	Yes
14	Snelling Avenue	Thomas Avenue	Shields Avenue	3	Yes	Yes
Total Intersections				**4**	**3**	**3**

[1/] Threshold number is based on the transit vehicle exposure to traffic

In general, LOS A through D is typically considered acceptable in the Twin Cities Metropolitan Areas for intersections and roadway segments. Metropolitan areas consider a LOS E or F to be unacceptable, as this indicates that the roadway reached or exceeded its capacity, resulting extended travel delays and substantial congestion. As shown in Table 6.10-4: PM Peak Hour Intersection LOS Analysis by Minority and Low-Income Population Area, 17 intersections are expected to operate below LOS D. Of the 17 intersections, 14 of those intersections are located within minority population areas and 15 intersections are located within low-income population areas.

The LRT roadway segment analysis produced five segments that are expected to operate below LOS D. All five roadway segments would impact minority population areas. Four the five roadway segments would impact low-income population areas, as shown in Table 6.10-5: Year 2020 LRT Roadway Segment LOS Results by Minority and Low-Income Population Area.

Table 6.10-4: PM Peak Hour Intersection LOS Analysis by Minority and Low-Income Population Area

Map Ref No.	Intersection	Existing LOS	LRT LOS	Minority Population Area	Low-Income Population Area
1	Hennepin Avenue/Fifth Street South	B	E	No	No
6	Malcolm Avenue/University Avenue	B	E [2/]	Yes	Yes
7	Hwy 280 SB (Eustis Avenue)/University Avenue	D	F [3/]	No	Yes
10	Raymond Avenue/University Avenue	E	F	Yes	Yes
11	Fairview Avenue/University Avenue	B	E	Yes	Yes
12	Aldine Street/University Avenue	B	F [3/]	Yes	Yes
13	Fry Street/University Avenue	A	E [3/]	Yes	Yes
14	Snelling Avenue/University Avenue	C	E [1/]	Yes	Yes
17	Hamline Avenue/University Avenue	C	E [3/]	Yes	Yes
18	Lexington Parkway/University Avenue	D	F [1/]	Yes	Yes
20	Dale Street/University Avenue	D	F	Yes	Yes
21	Marion Street/University Avenue	C	F [3/]	Yes	Yes
22	Rice Street/University Avenue	D	F [1/]	Yes	Yes
23	Constitution Avenue/University Avenue	B	F [3/]	Yes	Yes
24	Robert Street/University Avenue	B	F [4/]	Yes	Yes
27	7th Street/Cedar Street	B	F [4/]	Yes	Yes
29	5th Street/Cedar Street	B	F [4/]	No	Yes
Total Intersections			**17**	**14**	**15**

[1/] These intersections have a significant impact on the operations of the adjacent intersection. Mitigation measures at these intersections may result in considerable improvements to the adjacent intersections.
[2/] No exclusive left-turn lanes were provided, thus split phase timing was required for the Build condition.
[3/] Intersection impacted by poor operations and queuing at adjacent intersection potentially resulting in improved LOS reported due to the inability of vehicles to access the intersection.
[4/] Intersection operations reduced due to turn movements across LRT tracks.

Table 6.10-5: Year 2020 LRT Roadway Segment LOS Results by Minority and Low-Income Population Area

Map Ref.	Facility	Segment	LRT LOS	Minority Population Area	Low-Income Population Area
A	Fifth Street[1/]	Third Avenue North to Park Avenue	F	Yes	No
C	Washington Avenue Bridge	Cedar Avenue to Pleasant Street Ramps	F	Yes	Yes
I	University Avenue	Dale Street to Rice Street	E	Yes	Yes
J	University Avenue	Rice Street to Robert Street	F	Yes	Yes
M	Cedar Street	11th Street to 4th Street	E	Yes	Yes
Total Roadway Segments			**5**	**5**	**4**

[1/] Fifth Street in downtown Minneapolis will only provide one travel lane due to the implementation of the Hiawatha LRT system.

Intersection movements that are expected to operate below LOS D are identified in Table 6.10-6: LRT PM Peak Hour Intersection Movements at LOS E and F by Minority and Low-Income Population Area. Of the 23 intersection movements, 18 of those intersections are located within minority population areas and 21 intersections are located within low-income population areas.

Table 6.10-6: LRT PM Peak Hour Intersection Movements at LOS E and F by Minority and Low-Income Population Area

Intersection	Movement	Movement LOS	Minority Population Area	Low-Income Population Area
Hennepin Avenue/Fifth Street	South Approach LT and TH East Approach TH	E F	No	No
Marquette Avenue/Fifth Street [a]	East Approach TH	E	No	No
Malcolm Avenue/University Avenue	West Approach TH and North Approach LT East Approach TH	E F	Yes	Yes
Eustis Street/University Avenue	North Approach LT and TH West Approach TH and RT	E F	No	Yes
Cromwell Avenue/University Avenue	West Approach LT	F	Yes	Yes
Raymond Avenue/University Avenue	West Approach LT East Approach TH and RT, and North Approach LT	E F	Yes	Yes
Fairview Avenue/University Avenue	West Approach TH and RT North, East, South and West Approach LT, and South Approach RT	E F	Yes	Yes
Aldine Street/University Avenue	West Approach TH	F	Yes	Yes
Fry Street/University Avenue	West Approach TH and RT	F	Yes	Yes
Snelling Avenue/University Avenue	North Approach LT, East Approach TH and RT, South Approach LT East Approach LT and West Approach All	E F	Yes	Yes
Pascal Street/University Avenue	North Approach TH and South Approach LT	E	Yes	Yes
Albert Street/University Avenue [a]	South Approach RT	F	Yes	Yes
Hamline Avenue/University Avenue	North Approach TH, South Approach All, and West Approach TH and RT North, East and West Approach LT	E F	Yes	Yes
Lexington Parkway/University Avenue	North Approach RT, East Approach TH and RT, and South Approach All North Approach LT and TH, East Approach LT, and West Approach All	E F	Yes	Yes
Victoria Street/University Avenue	South Approach LT and TH	E	Yes	Yes
Dale Street/University Avenue	East Approach LT West, South and North Approach All	E F	Yes	Yes
Marion Street/University Avenue	East Approach LT and South Approach RT West Approach All, South Approach LT and TH, and North Approach LT	E F	Yes	Yes
Rice Street/University Avenue	West Approach LT and TH, South and North Approach All	F	Yes	Yes
Constitution Avenue/University Avenue	East Approach TH and RT, and North Approach LT	F	Yes	Yes
Robert Street/University Avenue	East Approach TH and South Approach All	F	Yes	Yes
11th Street/Cedar Street	West Approach TH and North Approach LT	E	No	Yes
7th Street/Cedar Street	North Approach All	F	Yes	Yes
5th Street/Cedar Street	North Approach LT	F	No	Yes
Total Intersections		**23**	**18**	**21**

Note: LT = Left Turn movement; RT = Right Turn movement; TH = Through movement; All = All Movements for the approach

[a] The east approach right-turn movement was assumed to be restricted for the Build condition.

Traffic impacts associated with the University Avenue LRT Alternative would potentially have high and adverse affects on minority and low-income populations if no improvement or mitigation is applied. Potential adverse impacts would occur more frequently in minority and low-income population areas than in non-minority or non-low-income population areas and therefore would be borne disproportionately to minority and low-income populations.

Parking

The loss of 660 on-street parking spaces on University Avenue between Washington Avenue and Rice Street would have the potential to impact minority and low-income populations even though more parking remains than is currently utilized.

Pedestrian and Bicycle Environment

The University Avenue LRT Alternative is expected to have moderate impacts on the pedestrian and bicycle environment in the Study Area. On University Avenue, an additional number of pedestrian crossings are expected to occur because the LRT system produces a need for improved crossings to create a safe environment for the pedestrians and vehicular traffic. Connection to the station sites would also need to be enhanced. Impacts to the pedestrian and bicycle environment would have the potential to impact minority and low-income populations. Increased pedestrian activity tends to improve pedestrian comfort.

Effects Due to Construction

The construction phase of the proposed University Avenue LRT Alternative or the University Avenue Busway/BRT Alternative would include constructing tracks, stations, structures, maintenance facility and/or other facilities that would result in the generation of various construction-related effects, such as noise, vibration, access and distribution of traffic; excavations, fill material, debris and spoils; and construction staging areas.

Both minority and low-income populations would be adversely affected due to the number of minority and low-income populations within the corridor. Construction-related impacts would be short-term and temporary.

UNIVERSITY AVENUE BUSWAY/BRT ALTERNATIVE

Roadway Operations

The BRT analysis resulted in eight locations attaining a threshold Level 3, due to the increased number of crossings with a 4-minute headway. BRT is expected to be feasible for these crossings, as long as increased delays are acceptable or vast improvements are made to the area. All grade crossings reported at threshold Level 3 should be mitigated. Of the eight locations, seven locations would affect minority population areas and seven would affect low-income population areas, as shown in Table 6.10-7: BRT Grade Separation Analysis Results by Minority and Low-Income Population Area.

In general, LOS A through D is typically considered acceptable in the Twin Cities Metropolitan Areas for intersections and roadway segments. Metropolitan areas consider a LOS E or F to be unacceptable, as this indicates that the roadway reached or exceeded its capacity, resulting extended travel delays and substantial congestion. As shown in Table 6.10-8: BRT PM Peak Hour Intersection LOS Analysis by Minority and Low-Income Population Area, 14 intersections are expected to operate below LOS D. Of the 14 intersections, 11 of those intersections are located within minority population areas and 12 intersections are located within low-income population areas.

Table 6.10-7: BRT Grade Separation Analysis Results by Minority and Low-Income Population Area

Map Ref No.	Roadway	From	To	BRT Threshold Number[1/]	Minority Population Area	Low-Income Population Area
1	Hennepin Avenue	Sixth Street S	Fourth Street S	3	Yes	Yes
3	Fifth Avenue S	Sixth Street S	Fourth Street S	3	Yes	No
8	Cromwell Avenue	Territorial Road	Franklin Avenue	3	Yes	Yes
10	Raymond Avenue	Territorial Road	Wabash Avenue	3	Yes	Yes
14	Snelling Avenue	Thomas Avenue	Shields Avenue	3	Yes	Yes
18	Lexington Parkway	Thomas Avenue	St. Anthony Avenue	3	Yes	Yes
20	Dale Street	Thomas Avenue	St. Anthony Avenue	3	Yes	Yes
25	12th Street E	St. Peter Street	Jackson Street	3	No	Yes
Total Segments				**8**	**7**	**7**

[1/] Threshold number is based on the transit vehicle exposure to traffic

Table 6.10-8: BRT PM Peak Hour Intersection LOS Analysis by Minority and Low-Income Population Area

Map Ref No.	Intersection	Existing LOS	BRT LOS	Minority Population Area	Low-Income Population Area
1	Hennepin Avenue/Fifth Street South	B	E	No	No
2	Marquette Avenue/Fifth Street South	B	E	No	No
7	Hwy 280 SB (Eustis Avenue)/University Avenue	D	F [2/]	No	Yes
10	Raymond Avenue/University Avenue	E	F	Yes	Yes
11	Fairview Avenue/University Avenue	B	E	Yes	Yes
12	Aldine Street/University Avenue	B	F [2/]	Yes	Yes
13	Fry Street/University Avenue	A	E [2/]	Yes	Yes
14	Snelling Avenue/University Avenue	C	E [1/]	Yes	Yes
17	Hamline Avenue/University Avenue	C	E [2/]	Yes	Yes
18	Lexington Parkway/University Avenue	D	F [1/]	Yes	Yes
20	Dale Street/University Avenue	D	F	Yes	Yes
21	Marion Street/University Avenue	C	F [2/]	Yes	Yes
22	Rice Street/University Avenue	D	F [1/]	Yes	Yes
23	Constitution Avenue/University Avenue	B	F [2/]	Yes	Yes
Total Intersections			**14**	**11**	**12**

[1/] These intersections have a significant impact on the operations of the adjacent intersection. Mitigation measures at these intersections may result in considerable improvements to the adjacent intersections.

[2/] Intersection impacted by poor operations and queuing at adjacent intersection potentially resulting in improved LOS reported due to the inability of vehicles to access the intersection.

The BRT roadway segment analysis produced two segments that are expected to operate below LOS D. Both roadway segments would impact minority population areas and one roadway segment would impact low-income population areas, as shown in Table 6.10-9: Year 2020 BRT Roadway Segment LOS Results by Minority and Low-Income Population Area.

Intersection movements that are expected to operate below LOS D are identified in Table 6.10-10: BRT PM Peak Hour Intersection Movements at LOS E and F by Minority and Low-Income Population Area. Of the 19 intersection movements, 15 of those intersections are located within minority population areas and 17 intersections are located within low-income population areas.

Table 6.10-9: Year 2020 BRT Roadway Segment LOS Results by Minority and Low-Income Population Area

Map Ref.	Facility	Segment	BRT LOS	Minority Population Area	Low-Income Population Area
A	Fifth Street	Third Avenue North to Park Avenue	F	Yes	No
I	University Avenue	Dale Street to Rice Street	E	Yes	Yes
Total Segments			**2**	**2**	**1**

Table 6.10-10: BRT PM Peak Hour Intersection Movements at LOS E and F by Minority and Low-Income Population Area

Intersection	Movement	Movemen LOS	Minority Population Area	ow-Incom Population Area
Hennepin Avenue/Fifth Street	East Approach TH	F	No	No
Marquette Avenue/Fifth Street	East Approach TH and RT	F	No	No
Eustis Street/University Avenue	East Approach LT and North Approach LT and TH West Approach TH and RT	E F	No	Yes
Cromwell Avenue/University Avenue	West Approach LT	F	Yes	Yes
Raymond Avenue/University Avenue	West Approach LT East Approach TH and RT, and North Approach LT	E F	Yes	Yes
Fairview Avenue/University Avenue	West Approach TH and RT North, East, South and West Approach LT, and South Approach RT	E F	Yes	Yes
Aldine Street/University Avenue	West Approach TH	F	Yes	Yes
Fry Street/University Avenue	West Approach TH and RT	F	Yes	Yes
Snelling Avenue/University Avenue	North Approach LT, East Approach TH and RT, South Approach LT East Approach LT and West Approach All	E F	Yes	Yes
Pascal Street/University Avenue	North Approach TH, South Approach LT	E	Yes	Yes
Albert Street/University Avenue	South Approach RT	F	Yes	Yes
Hamline Avenue/University Avenue	North Approach TH, South Approach All, and West Approach TH and RT North, East and West Approach LT	E F	Yes	Yes
Lexington Parkway/University Avenue	North Approach RT, East Approach TH and RT, and South Approach All North Approach LT and TH, East Approach LT, and West Approach All	E F	Yes	Yes
Victoria Street/University Avenue	South Approach LT and TH	E	Yes	Yes
Dale Street/University Avenue	East Approach LT West, South and North Approach All	E F	Yes	Yes
Marion Street/University Avenue	East Approach LT and South Approach RT West Approach All, South Approach LT and TH, and North Approach LT	E F	Yes	Yes
Rice Street/University Avenue	West Approach LT and TH, South and North Approach All	F	Yes	Yes
Constitution Avenue/University Avenue	East Approach TH and RT, and North Approach LT	F	Yes	Yes
Jackson Street/4th Street	East Approach LT and TH	E	No	Yes
Total Intersections		**19**	**15**	**17**

Note: LT= Left Turn movement; RT= Right Turn movement; TH= Through movement; All= All Movements for the approach

Traffic impacts associated with the University Avenue Busway/BRT Alternative would potentially have high and adverse affects on minority and low-income populations if no improvement or mitigation is applied. Potential adverse impacts would occur more frequently in minority and low-income population areas than in non-minority or non-low-income population areas and therefore would be borne disproportionately to minority and low-income populations.

Parking

The loss of 660 on-street parking spaces on University Avenue between Washington Avenue and Rice Street would have the potential to impact minority and low-income populations.

Pedestrian and Bicycle Environment

The University Avenue BRT Alternative is expected to have moderate impacts on the pedestrian and bicycle environment in the Study Area. The frequency of buses on the corridor would increase the number of potential conflicts between pedestrians and vehicles throughout the corridor. Impacts to the pedestrian and bicycle environment would have the potential to impact minority and low-income populations.

Effects Due to Construction

The construction phase of the proposed University Avenue Busway/BRT Alternative would include constructing tracks, stations, structures, maintenance facility and/or other facilities that would result in the generation of various construction-related effects, such as noise, vibration, access and distribution of traffic; excavations, fill material, debris and spoils; and construction staging areas.

Both minority and low-income populations would be adversely affected due to the number of minority and low-income populations within the corridor. Construction-related impacts would be short-term and temporary.

6.10.4 Summary and Potential Mitigation

Transportation impacts associated with the build alternatives would have the potential to be borne disproportionately to minority and low income populations. Potential roadway improvements and mitigation that could be made through roadway construction or through modifying the signal system that would improve the intersection LOS, intersection movement LOS, or the queue lengths to acceptable conditions to minimize the negative impacts to minority or low income populations.

Both LRT and Busway/BRT Alternatives would eliminate on-street parking along University Avenue. The loss of 660 on-street parking spaces on University Avenue between Washington Avenue and Rice Street would have the potential to impact minority and low-income populations. Existing surveys of parking utilization along the corridor indicate that there would remain sufficient parking supply even with the alternatives in place.

The University Avenue LRT and BRT Alternatives are expected to have moderate impacts on the pedestrian and bicycle environment in the Study Area. Impacts to the pedestrian and bicycle environment would have the potential to be borne disproportionately to minority and low-income populations. Enhancing the pedestrian and bicycle environment is one of the main objectives established by the Twin Cities Metropolitan Council. Much of the station area planning, as detailed in Section 5.2: Station Area Impact Assessment, details the planning process utilized to create more efficient pedestrian connections to the station areas. Factors that would encourage

walking and bicycling include safety, reasonable distance to station areas and pleasant surroundings. Coordination with community-wide bicycle and pedestrian planning efforts of other organizations would be undertaken as the station area planning process proceeds.

All impacts identified in this document would be mitigated, if possible, to avoid adverse impacts to all neighborhoods, with special concern and emphasis with regard to minority and low-income populations. The active involvement of all neighborhoods in the corridor would continue to be a goal through design and implementation. Public engagement for all communities along the corridor is explained in detail in Chapter 8.0: Public and Agency Involvement Program.