



**SOUTHWEST**  
transitway

green means go.

## **Southwest LRT**

### **Technical Memorandum No. 8C**

# **TRANSPORTATION CAPACITY**

**DRAFT**

**PRELIMINARY  
FOR REVIEW ONLY**

**September 9, 2009**





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## 1.0 INTRODUCTION

The intent of this memorandum is to evaluate the impact of each alternative on the existing and planned transportation capacity in the Study Area. The proposed Southwest LRT project includes four build alternatives which were identified through the Southwest Transitway Alternatives Analysis and National Environmental Policy Act (NEPA) Scoping processes. These alternatives include 1A, 3A, and 3C-1 (Nicollet Mall) and LRT 3C-1 (11th/12th Streets). Refer to Figure 1 for a map of the alternatives.

For analysis purposes, the alternatives were divided into logical segments, including segments A, C1 (Nicollet Mall), C2 (11th/12th Street), 1, 3, and 4. Table 1 presents the segments for each alternative; Refer to Figure 2 for a map of the segments.

*Table 1 Segments Associated with Alternatives*

Alternative	Segments
1A	1, 4, A
3A	3, 4, A
3C-1 (Nicollet Mall)	3, 4, C1 (Nicollet Mall)
3C-2 (11 <sup>th</sup> /12 <sup>th</sup> Street)	3, 4, C2 (11 <sup>th</sup> /12 <sup>th</sup> Street)

### 1.1 Transportation Capacity

The criteria and measurement for this section includes a qualitative assessment of the potential impacts to several factors, including the changes to highway and roadway capacity (number of lanes affected), intersection capacity (at-grade crossings, access modifications), bridges, driveways, parking facilities, and bicycle/pedestrian trails. A summary of the potential impacts for each alternative is shown in Table 2.

Table 2 Summary of Impacts

Criteria	Alternative			
	LRT 1A	LRT 3A	LRT 3C-1 (Nicollet Mall)	LRT 3C-2 (11 <sup>th</sup> /12 <sup>th</sup> Street)
Quantitative assessment of the roadway travel lanes removed from service by LRT alternative	0	0	2 lanes of Nicollet Avenue/Mall between Franklin Avenue and 4 <sup>th</sup> Street	1 lane of Blaisdell 1 lane of 1 <sup>st</sup> Avenue or 1 lane of 11 <sup>th</sup> Street 1 lane of 12 <sup>th</sup> Street Reconstruction of Nicollet Mall Grant to 11 <sup>th</sup> Street
Qualitative assessment of traffic intersections affected by each LRT alternative	Low	Medium	High	High
Qualitative assessment of bridges affected by each LRT alternative	Low	Medium	High	High
Qualitative assessment of driveways affected by each LRT alternative	Low	Medium	High	High
Qualitative assessment of parking facilities affected by each LRT alternative	Low	Medium	High	High
Qualitative assessment of bike and pedestrian trails affected by each LRT alternative	Medium	Low	Medium*	Medium*

\*A Medium impact assumes bike/ped trails in the midtown corridor will remain

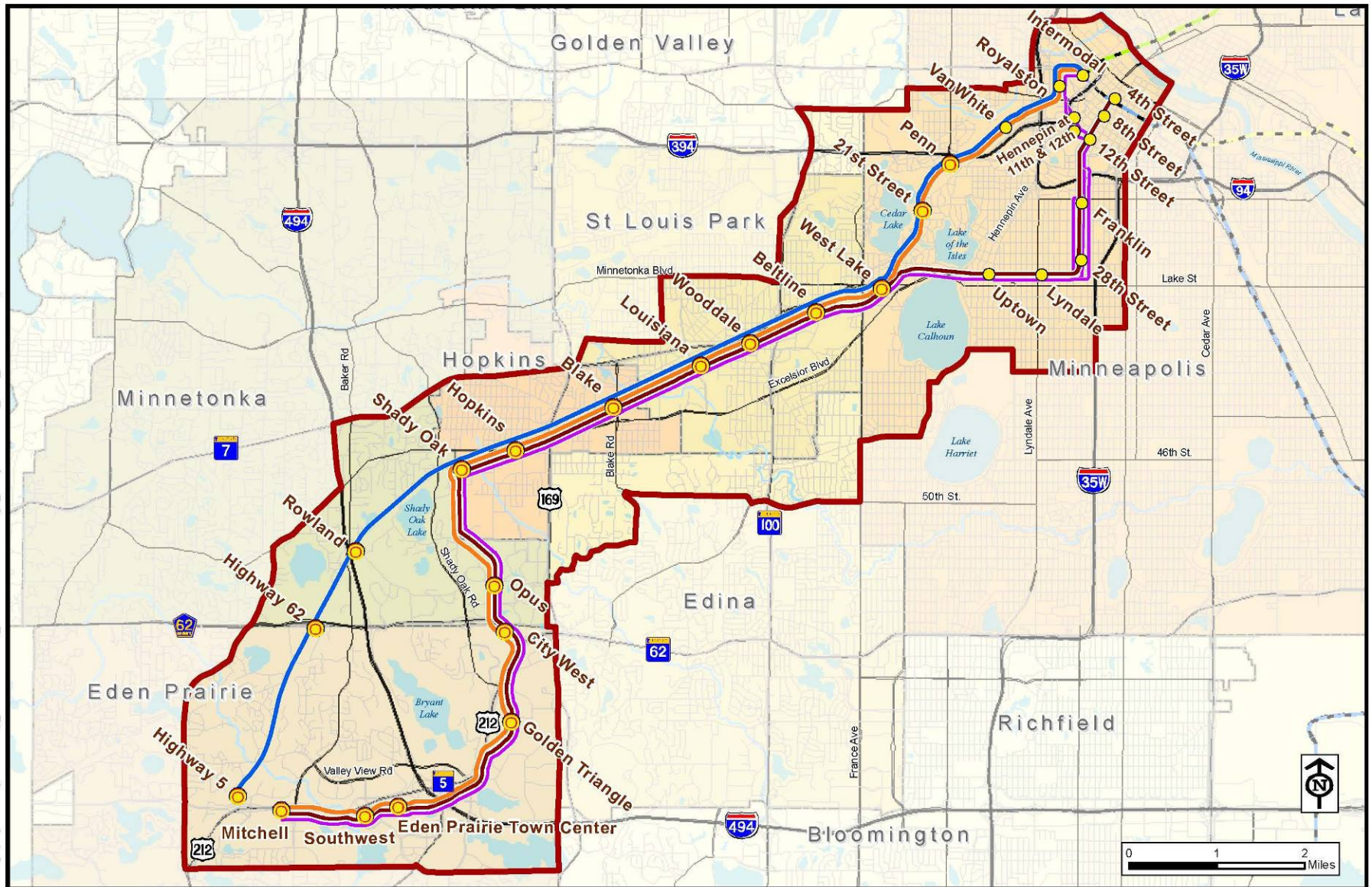
## 2.0 LRT 1A

### 2.1 Highways and Roadways

Implementation of the LRT 1A alternative is not anticipated to result in significant impacts to highways or roadways in the project Study Area. The LRT will cross multiple roadways at grade between the Highway 5 and Van White Boulevard stations. Several of the proposed crossings are currently crossed by existing freight railway tracks. Although the LRT would cross these roadways more frequently than the freight trains, the crossings are not anticipated to result in significant vehicle queues along these roadways or at nearby intersections. A roadway and traffic impact analysis will be included as part of the Draft Environmental Impact Statement (DEIS) for the project, and will determine impacts to all at-grade roadway crossings and intersections.

Figure 1 - Study Area and LRT Alternatives

# Southwest Transitway Study Area



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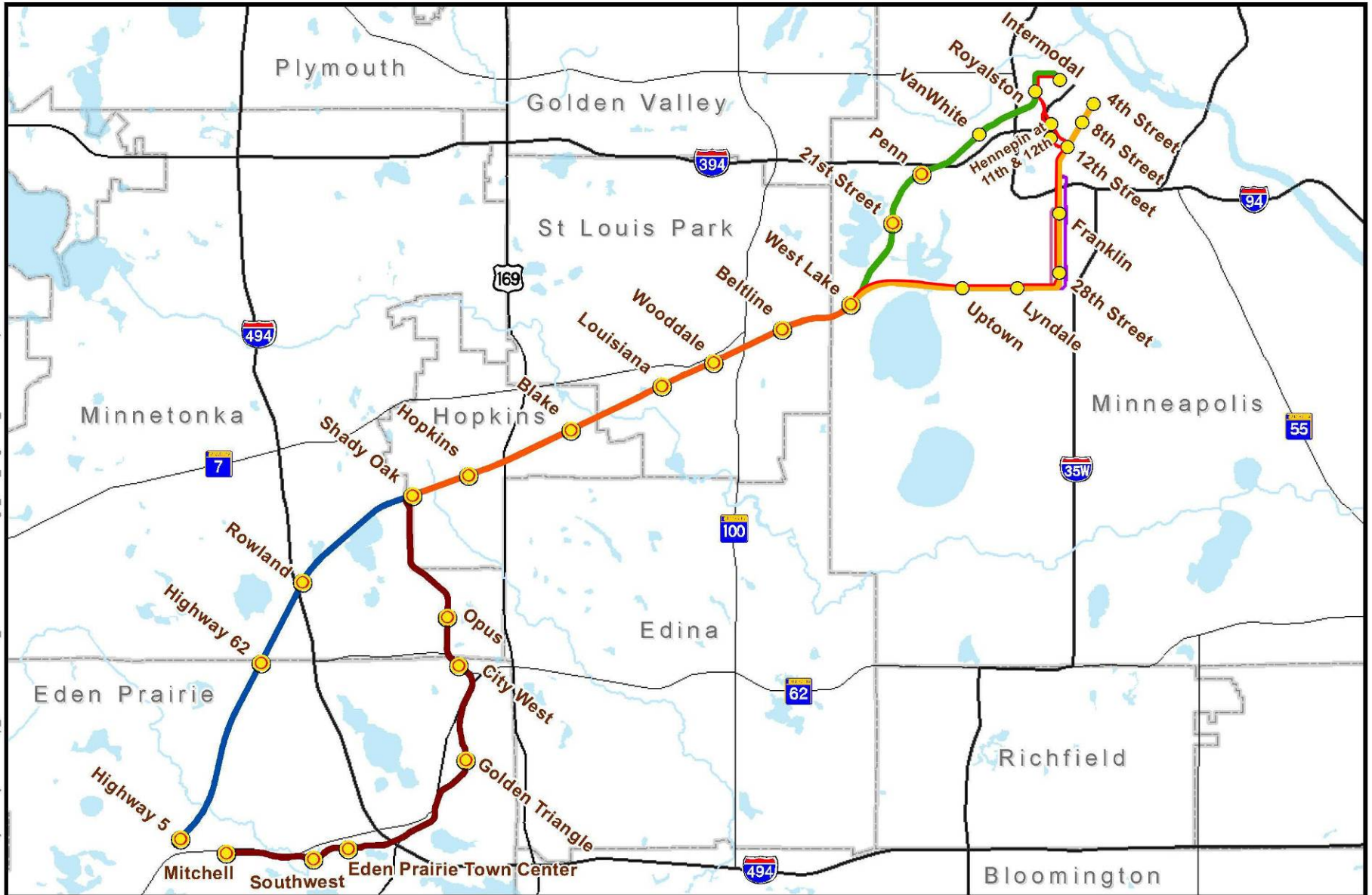
## LPA Report

### Legend


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

# LRT Segments

Figure 2 - LRT Segments



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 <p><b>LPA Report</b></p>	<p>Legend</p> <ul style="list-style-type: none"> <li><span style="color: yellow;">●</span> Station</li> <li><span style="color: orange;">●</span> Park &amp; Ride Station</li> </ul>		<ul style="list-style-type: none"> <li><span style="color: blue;">—</span> Segment 1</li> <li><span style="color: brown;">—</span> Segment 3</li> <li><span style="color: orange;">—</span> Segment 4</li> <li><span style="color: green;">—</span> Segment A</li> </ul>	<ul style="list-style-type: none"> <li><span style="color: yellow;">—</span> Segment C-1 (Nicollet Mall)</li> <li><span style="color: red;">—</span> Segment C-2 (11th/12th Street)</li> <li><span style="color: purple;">—</span> Segment C-2A (Blaisdell Avenue)</li> <li><span style="color: purple;">—</span> Segment C-2B (1st Avenue)</li> </ul>
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While implementation of the LRT 1A alternative is not anticipated to adversely impact highway capacity within the Study Area, it would include multiple at-grade roadway crossings as well as modifications to existing intersections. Several of these areas are discussed in further detail below.

The intersection of 5<sup>th</sup> Avenue South and Excelsior Boulevard in Hopkins is approximately 100 feet north of the proposed LRT alignment. This is a four-way signal controlled intersection with protected left turn lanes. South of the intersection, 5<sup>th</sup> Avenue South is a primary access road to the SuperValu Foods warehousing and distribution center that receives heavy semi-truck traffic daily. LRT crossing 5<sup>th</sup> Avenue is not anticipated to restrict access by automobiles or large vehicles to this facility. Traffic impacts around the intersection of 5<sup>th</sup> Avenue South and Excelsior Boulevard will be evaluated as part of the DEIS.

The intersection of Excelsior Boulevard, St. Louis Street and Milwaukee Avenue is a diagonally configured, four-way signal controlled intersection approximately 450 feet east of the northbound entrance and exit ramps to TH 169. The proposed LRT alignment would diagonally cross Excelsior Boulevard and Milwaukee Avenue south and east of the intersection on a grade-separated structure, allowing traffic to pass underneath the LRT guideway. Short-term construction impacts are anticipated at this intersection, but the grade-separated structure is not anticipated to incur traffic impacts once operational.

The reconfiguration of Royalston Avenue in downtown Minneapolis is the most significant roadway modification along the LRT 1A alternative. Construction and operation of the LRT would require the reconfiguration of the southbound lane where the embankment would be constructed for the trackway to transition between the railway trench below Royalston Avenue. This reconfiguration is not anticipated to affect the northbound lane on Royalston Avenue. The embankment construction necessary for the trackway to transition between the trench and the Royalston Avenue would require the closure of Holden Street from connecting to Royalston Avenue. The LRT would require the removal of the center median along Royalston Avenue to accommodate dual trackway and a center platform station, but the current width of the roadway would remain intact. The existing median has two breaks to allow traffic to cross the median, one break at the intersection of Royalston Avenue and 5<sup>th</sup> Avenue, and a second break immediately south of this intersection for parking lot access on the west side of the street. Applying the same access criteria adopted for the Central Corridor LRT, vehicles would not be able to cross over the fixed-guideway except at signalized intersections. Access at unsignalized intersections would be restricted to right-in, right-out turning movements. The dual trackway on Royalston Avenue would limit turning movements where both of the breaks occur currently to right-in, right-out movements. 5<sup>th</sup> Avenue also has direct access from North 7<sup>th</sup> Street. The LRT would travel through a short tunnel underneath 7<sup>th</sup> Street to connect with the tail tracks of the Hiawatha LRT line. This would avoid the creation of an at-grade crossing on 7<sup>th</sup> Street, and would impact traffic operations only during the tunnel's construction. A roadway and traffic impact analysis will be included as part of the DEIS for the project, and will determine impacts to all at-grade roadway crossings and intersections.

## 2.2 Bridges

Proposed bridge enhancements or new construction are not anticipated to result in long-term impacts to associated transportation facilities. LRT 1A would travel across or under several small bridge structures between Eden Prairie and Minneapolis. In several instances, bridges are

already crossed by freight railroad trackway, such as TH 100. At points where the LRT would cross bridge or water viaduct structures, these structures would need to be modified for the LRT trackway. In Minneapolis, the alignment currently proposed includes the construction of a grade-separated structure for LRT over Cedar Lake Parkway, between the West Lake and 21<sup>st</sup> Street Stations in response to community concerns regarding traffic impacts and concerns regarding the status of Cedar Lake Parkway as a designated parkland. Currently, freight trains cross this roadway at-grade. Additionally, the current railway bridge over the Lake of the Isles canal connecting Cedar Lake and Lake of the Isles would need to be replaced in order to accommodate a twin trackway alignment. Construction of a flyover bridge over the BNSF trackway would also be necessary. Preliminary Engineering and Final Design will determine the exact specifications and design requirements for all bridge, grade, and grade-separated structures and crossings.

### 2.3 Driveway Access and Parking Facilities

Implementation of the LRT 1A alternative is not anticipated to result in severe or adverse impacts to driveways or parking facilities along the alignment. Private driveways and parking facility entrances are only accessible from public streets, and traffic is not permitted on the Hennepin County Regional Railroad Authority (HCRRA) property. A parking lot entrance located on 11<sup>th</sup> Avenue in Hopkins is located on the south side of the at-grade crossing location. Driveway access to this parking facility is available at two other locations on 11<sup>th</sup> Avenue immediately south of this entrance way. The driveway closest to the grade crossing on 11<sup>th</sup> Avenue may need to be closed to avoid potential conflicts between light rail vehicles and automobiles entering or exiting this facility.

In Minneapolis, driveway and parking lot access issues are principally concentrated near the Royalston and Intermodal Stations. Land uses adjacent to Royalston Avenue are mixture of industrial commercial properties, low-rise commercial office buildings, a community services facility, and the City of Minneapolis Royalston Maintenance facility. As discussed above, the LRT trackway on Royalston Avenue would result in the replacement of the existing center median. This median has two breaks, one allowing southbound traffic on Royalston Avenue to turn left onto 5<sup>th</sup> Avenue North, and a second median break allowing northbound traffic on Royalston Avenue to access a parking lot. Applying the same access criteria adopted for the Central Corridor LRT, vehicles would not be able to cross over the fixed-guideway except at signalized intersections. Access at unsignalized intersections would be restricted to right-in, right-out turning movements. The LRT trackway on Royalston Avenue would limit the access to this facility to right-in, right-out southbound traffic on Royalston Avenue. Access to the City of Minneapolis Royalston Maintenance facility and the community services building is on 5<sup>th</sup> Avenue North, and is not anticipated to be adversely affected.

The LRT 1A alternative would also result in crossing the driveway entrance to the Hennepin Energy Resource Center (HERC) property. The “tail” track to the existing Hiawatha LRT line extends to this driveway paralleling 5<sup>th</sup> Street and 6<sup>th</sup> Avenue, but does not cross the driveway entrance. This entrance is a stop-light controlled entranceway, and also provides access to the Hennepin County Environmental Services building. This driveway crossing is anticipated to remain open following construction and operation of the line, and would only be temporarily closed when LRVs would cross the driveway. Garbage trucks and Hennepin County employee vehicles are the principal vehicles accessing both facilities on a regular basis.

As part of the project's construction and operation, all of the proposed stations between the Highway 5 and West Lake Street stations will be park and ride stations, resulting in increased parking capacity within the corridor. The LRT 1A alternative is not anticipated to physically impact any parking facilities within the corridor. All impacts and potential mitigation to property access changes will be identified in the DEIS.

## 2.4 Bicycle/Pedestrian Trails

The majority of the LRT 1A alignment would be located on existing HCRRA property. Currently, bicycle and pedestrian trails are located within the HCRRA's right-of-way (ROW). The Southwest LRT Trail and the Kenilworth Trail are primary corridors for bicycle commuting between downtown Minneapolis and suburban southwestern communities. Conceptual engineering indicates that existing bicycle and pedestrian trails could be relocated within the HCRRA right-of-way to accommodate the addition of LRT. Impacts to trails would be limited to short-term construction impacts. Modifications to the trails will be determined once the project enters the Preliminary Engineering and Final Design phases. The fixed-guideway would include fencing or other separation measures to protect bicyclists and pedestrians from trains, and discourage walking or riding within the trackway ROW while permitting crossings at roadway intersections.

At roadway crossings and around stations, walkways and bicycle lanes would be improved to allow access to and from stations. Measures would be taken to discourage pedestrians from illegally crossing the tracks along the alignment and to enhance safety at permitted crossing locations. Light rail stations would be designed with pedestrian and bicycle-friendly linkages to community facilities and include bicycle and pedestrian amenities such as bicycle lockers, bicycle racks, and covered seating areas. Construction of the LRT alternative would meet ADA design standards. Modifications to the trails will be determined once the project enters the Preliminary Engineering and Final Design phases. The fixed-guideway would include fencing or other separation measures to protect bicyclists and pedestrians from trains, and discourage walking or riding within the trackway ROW while permitting crossings at roadway intersections. All impacts and potential mitigation to bicycle and pedestrian facilities would be identified during the DEIS.

## 3.0 LRT 3A

### 3.1 Highways and Roadways

Implementation of alignment Alternative LRT 3A will require the LRT to cross several roadways at-grade, which may potentially impact traffic operations. The LRT will cross multiple roadways at-grade between the Mitchell Station and the Intermodal Station in downtown Minneapolis.

Between the Mitchell Station and the Shady Oak Station, the alternative would run adjacent to several major roadways including TH 5, Technology Drive and Flying Cloud Drive. Although the trackway would not be located in the roadway, the LRT would need to cross these and other roads at several points to gain access to stations or to avoid natural landscape features such as ponds, lakes, or steep slopes. Between the Mitchell and Southwest stations, the LRT would cross the current bus-only access ramp for north and east-bound buses into the Southwest Station area. An evaluation of this crossing in terms of impacts to bus operations would be conducted as part of the DEIS. Furthermore, impacts to traffic operations and highway access points would also be conducted as part of the DEIS.

Mitchell Road and Valley View Roads in Eden Prairie currently carry high volumes of traffic and signal controlled intersections are located close to the proposed LRT alignment. The City of Eden Prairie has raised concerns about LRT crossing these roads at-grade and potential disruptions to traffic operations on these roads and at adjacent intersections.

In addition to the crossings identified in Eden Prairie, conceptual engineering has identified at-grade crossings of Bren Road East, Bren Road West, and Smetana Road in Minnetonka. An evaluation of all impacts to traffic operations will be provided in the DEIS, along with potential mitigation techniques. Continued refinements will be made during the Preliminary Engineering and Final Design phases of the project.

Beyond the construction of grade-separated structures to span major roadways mentioned above or the at-grade crossings identified, LRT 3A is not anticipated to result in significant impacts to roadways or highways in the Study Area, and would share the same impacts to roadways between the Shady Oak and Intermodal stations as those discussed for LRT 1A.

### **3.2 Bridges**

LRT 3A would require the construction of four new bridge structures that would allow LRT vehicles to cross I-494, TH 62, and TH 212 in Eden Prairie and Minnetonka. At I-494, conceptual engineering has determined the need for a bridge structure that would span I-494 and Flying Cloud Drive to avoid impacts to traffic operations on the freeway and on the existing Flying Cloud Drive bridge over I-494. Similarly, a third elevated platform would be constructed over TH 62 and TH 212 near the City West Station. Between the City West, Opus, and Shady Oak stations, cut-and-fill embankment work would be necessary to provide sufficient grade for the LRT to travel through these areas.

Between the Shady Oak Station and the Intermodal Station, modifications to bridge structures would be similar to those described for LRT 1A. The LRT 3A would also require the construction of a flyover bridge above the BNSF trackway in Minneapolis. Preliminary Engineering and Final Design will determine the exact specifications and design requirements for all bridge, grade, and grade-separated structures and crossings.

### **3.3 Driveway Access and Parking Facilities**

LRT 3A would cross several business driveways and parking lots, particularly in Eden Prairie and Minnetonka, where the LRT would not be located along current ROW owned by HCRRA. The grade crossings of select driveways could result in the full closure of the driveways, resulting in the need to create new access points. However, conceptual engineering has identified an alignment that would minimize driveway crossings or entrances to parking facilities, reducing the risk of needing to relocate access entrances.

Between the Mitchell Station and the Shady Oak Station, several grade crossings would have implications for access. At the Southwest Station, the LRT would cross the exclusive bus lane entrance from TH 5. Along Technology Drive, the location of the Eden Prairie Town Center Station would close a short portion of a driveway running adjacent to the Costco Wholesalers building with access to a parking lot facility. As part of the stations construction, the portion of driveway closed would be re-routed to connect with another driveway access point to Technology Drive.

Between the Shady Oak Station and the Van White Boulevard Station, the train would travel in ROW owned by HCRRA and make several at-grade roadway crossings. The train is not anticipated to affect access to properties along the alignment.

In Minneapolis, driveway and parking lot access issues between the VanWhite Station and the Intermodal and would share the same impacts as those discussed for LRT 1A.

As part of the project's construction and operation, all of the proposed stations between the Mitchell and West Lake Street stations will be park and ride stations, resulting in increased parking capacity within the corridor. The LRT 3A alternative is not anticipated to physically impact any parking facilities within the corridor.

### **3.4 Bicycle/Pedestrian Trails**

Between the Mitchell Station in Eden Prairie and the Shady Oak Station in Hopkins, off-road bicycle and pedestrian trails, typically parallel to the roads, are available through the Opus and Eden Prairie Town Center areas. In the Golden Triangle area, paved walking trails are available off of Flying Cloud Drive and Valley View Road. In several cases, the trail systems also act as sidewalks. Impacts at locations where the bicycle lanes and multi-use paths cross the LRT alignment are anticipated, but are expected to be short-term construction impacts, and are not anticipated to affect the future use of the trail system. Current design standards will require traffic signals with pedestrian indicators at all locations where the multi-use paths cross the LRT alignment. Trails along Technology Drive and Flying Cloud Drive may need to be relocated to the opposite sides of each street to accommodate the LRT, however, any modifications to existing trail systems will be determined during the Preliminary Engineering and Final Design phases of the project. In each case, construction of the LRT alternative would improve on the current sidewalk and trail system infrastructure. Light rail stations would be designed with pedestrian and bicycle-friendly linkages to community facilities and include bicycle and pedestrian amenities such as bicycle lockers, bicycle racks, and covered seating areas. Construction of the LRT alternative would meet ADA design standards. Modifications to the trails will be determined once the project enters the Preliminary Engineering and Final Design phases. The fixed-guideway would include fencing or other separation measures to protect bicyclists and pedestrians from trains, and discourage walking or riding within the trackway ROW while permitting crossings at roadway intersections. All impacts and mitigation to bicycle and pedestrian facilities would be identified during the DEIS. Despite the temporary impacts noted, implementation of LRT 3A is not anticipated to adversely affect the use of these facilities.

Between the Shady Oak Station and the Downtown Minneapolis Intermodal Station potential impacts to the existing bicycle and pedestrian trail system are similar to those described for LRT 1A. All impacts and mitigation to bicycle and pedestrian facilities would be determined during Preliminary Engineering and Final Design.

## **4.0 LRT 3C-1 (NICOLLET MALL)**

### **4.1 Highways and Roadways**

Implementation of LRT 3C-1 (Nicollet Mall) would share the same impacts to roadways between the Mitchell and West Lake stations as those discussed for LRT 3A.

Between the West Lake Station and the 4<sup>th</sup> Street Station, the LRT would have exclusive and semi-exclusive right-of-way. In the midtown and downtown areas of Minneapolis, LRT 3C-1 (Nicollet Mall) would likely result in several roadway impacts. East of the West Lake Station, the alignment would travel down the Midtown Corridor with at-grade crossings at James, Irving, and Humboldt Avenues between the West Lake Station and the Uptown Station. These roads carry mostly residential traffic at low vehicle volumes, and are not anticipated to experience significant impacts to traffic operations.

LRT service operating below and on Nicollet Avenue and Nicollet Mall would likely have significant impacts to roadways. As LRT 3C-1 transitions between the sunken corridor and tunnel between 29<sup>th</sup> and 27<sup>th</sup> streets, Nicollet Avenue would retain one lane of traffic in each direction, but would lose the two-way left-turn lane to accommodate LRT running down the center of the roadway in a sunken corridor. The geometry of Nicollet Avenue will remain unchanged where LRT would be in a shallow cut-and-cover tunnel between 27<sup>th</sup> and 22<sup>nd</sup> Streets. Between 22<sup>nd</sup> Street and Groveland Avenue, Nicollet Avenue would retain one lane of traffic in each direction, but would lose the two-way left-turn lane to accommodate the Franklin Station in the sunken corridor and the transition of LRT from a tunnel section to an at-grade alignment. North of Groveland Avenue, LRT will run down the center of Nicollet Avenue at-grade, retaining one lane of traffic in each direction. While Nicollet Avenue would retain travel lanes, the capacity of these streets would be reduced, and the removal of the two-way left-turn lane would likely result in traffic queues at the intersection of Franklin and Nicollet Avenues (assuming cars would be permitted to make left turns). A roadway and traffic impact analysis will be included as part of the DEIS for the project, and will determine impacts to all at-grade roadway crossings and intersections.

LRT service on Nicollet Mall would likely result in several conflicts with the future planning efforts and vision for Nicollet Mall as expressed in *Access Minneapolis*. Specifically, plans for Nicollet Mall support the relocation of express bus service to Marquette and 2<sup>nd</sup> Avenues, and improvements in efficiency and frequency of local bus service. *Access Minneapolis* supports the continued use of Nicollet Mall for local bus service. The implementation of LRT on Nicollet Mall would preclude local bus service from operating on Nicollet Mall and force local buses to relocate to other downtown streets. This would have the potential to negatively impact the ridership of these local routes both in and outside of the downtown core area. Additionally, *Access Minneapolis* notes that the streets onto which local bus service would be relocated are already operating near capacity, and the addition of more bus routes would likely create capacity problems. Local buses are intended to operate as downtown shuttles from Washington Avenue on the north end of Nicollet Mall to Grant Street at the southern end near the Minneapolis Convention Center. Through an agreement negotiated with downtown businesses, the intent of this is to allow pedestrians at any point to use any bus to travel on Nicollet Mall between Washington Avenue and Grant Street as a free fare zone. Local buses would terminate at one end of the Mall or the other, depending on their route origin, and would not take fares as they traveled up or down Nicollet Mall. If LRT and bus service were to be retained on Nicollet Mall, the street would need to be widened significantly, resulting in the removal of the sidewalk, impacting both pedestrian movement and business activities (outdoor dining, farmers market, outdoor festivals, and the Holidazzle Parade). The operational planning for train service, coupled with the service plans and stop requirements and requests of the buses would likely be infeasible and inefficient.

In addition to local bus service remaining on Nicollet Mall, *Access Minneapolis* supports the reinstatement of bicycle traffic on the Mall during the daytime hours. Due to the high volume of current bus traffic, bicycles are prohibited on Nicollet Mall from 6:00 a.m. to 6:00 p.m. during weekdays. Furthermore, the existing streetscape façade of Nicollet Mall is a unique feature of downtown Minneapolis, with open-air dining, large sidewalks, and as a downtown parade route. The placement of LRT on Nicollet Mall would require street widening to include sufficient space for bicycles and separate the travel paths for trains and bicycles.

## 4.2 Bridges

Between the Mitchell and West Lake Stations, grade separated structures and bridge modifications would be similar to those described for the LRT 3A alternative above. In Minneapolis, LRT 3C-1 (Nicollet Mall) would likely require the reconstruction and retrofitting of existing bridges along the Midtown Corridor. Please refer to Technical Memorandum 9 for further discussion of impacts to historic resources. In addition to these bridges, the LRT 3C-1 (Nicollet Mall) alternative would require the retrofitting of the existing Nicollet Avenue bridge over I-94 to accommodate the LRT guideway. Design requirements or modifications for all bridge, grade, and grade-separated structures and crossings will be made during the Preliminary Engineering and Final Design phases of the project.

## 4.3 Driveway Access and Parking Facilities

Driveway access and parking facility modifications between the Mitchell Station and the West Lake Station are the same as those described for LRT 3A. The LRT 3C-1 (Nicollet Mall) alternative would not result in any driveway access or parking facility conflicts from the West Lake Station through the Midtown Corridor to a tunnel entrance under Nicollet Avenue. Between 29<sup>th</sup> and 27<sup>th</sup> streets, on-street parking will be removed to accommodate the 28<sup>th</sup> Street Station and alignment where LRT transitions from an at-grade alignment into a tunnel running below Nicollet Avenue. Left turns from the travel lanes to driveways will not be possible due to the sunken corridor in the center. Similar on-street parking and access changes will occur between 22<sup>nd</sup> Street and Groveland Avenue to accommodate the Franklin Avenue Station and the transition of LRT from a tunnel alignment to an at-grade alignment. North of Groveland Avenue, parking spaces would have to be removed to accommodate left-turn lanes at 18th Street, 15th Street and Grant Street. The reduction in available parking could pose potential quality-of-life issues for local residents, businesses, and institutions, especially those that have on-street parking as their only option. The loss of on-street parking may result in additional off-street parking land uses, and/or additional parking restrictions for the area.

Implementation of LRT 3C-1 (Nicollet Mall) alternative would require access modifications to several properties on Nicollet Avenue. Applying the same access criteria adopted for the Central Corridor LRT, vehicles would not be able to cross over the fixed guideway except at signalized intersections located approximately ¼ mile apart. Access at unsignalized intersections would be restricted to right-in, right-out only. Application of these criteria to Nicollet Avenue would result in the elimination of vehicle access across Nicollet Avenue at 14<sup>th</sup> Street, 16<sup>th</sup> Street, 18<sup>th</sup> Street, Groveland Avenue, and 19<sup>th</sup> Street. This may result in the removal of the traffic signals at Groveland Avenue/19<sup>th</sup> Street and Nicollet Avenue. The change in access to and from these properties may challenge drivers needing access to them, since some one-way streets would require a more circuitous route and would result in travel delays. Pedestrians would be able to cross Nicollet Avenue at every intersection. A roadway and traffic impact analysis will be

included as part of the DEIS for the project, and will determine impacts to all at-grade roadway crossings and intersections.

At the junction of Nicollet Avenue and Nicollet Mall between Grant Street and 13th Street, both the Hyatt Regency Hotel and the Millennium Hotel have porte-cochere driveways and parking ramp entrances for vehicles to temporarily park underneath for passenger and baggage loading and unloading. Private vehicles are allowed on this short portion of Nicollet Mall up to 13<sup>th</sup> Street, before the Mall becomes bus and taxi service only. The construction of the LRT trackway would likely eliminate these entrances or result in reducing the sidewalk width to fit in one way travel lanes for access or creating new access rights-of-way (ROW) on either Grant or 13<sup>th</sup> streets.

#### 4.4 Bicycle/Pedestrian Trails

Impacts to the bicycle and pedestrian trail systems between the Mitchell Station and the West Lake Station are the same as discussed for LRT 3A.

East of the West Lake Station, the LRT 3C-1 (Nicollet Mall) would be located in the Midtown Corridor. The Midtown Corridor connects trails on the eastern and western sides of Minneapolis, and serves as a major bicycle commuting route and recreational trail used throughout the year. According to the City of Minneapolis Department of Public Works, over 2,000 bicyclists travel portions of the Midtown Corridor. Construction of LRT in the Midtown Corridor would require significant modifications to this trail, including re-routing the trail out of the corridor and over the LRT tunnel entrance on Nicollet Avenue.

Conceptual engineering for the LRT 3C-1 (Nicollet Mall) alignment indicates that a dual trackway design would necessitate narrowing the existing bicycle and pedestrian trail at certain locations in order for trains to maneuver around the bridge piers for the bridges spanning the Midtown Corridor. While the HCRRA owns the ROW through the Midtown Corridor, the current embankments supporting development above the Midtown Corridor narrow the physical ROW width at the ground level. While embankment work would be necessary for the LRT, and may provide additional space, the bridge piers do not align with one another, and a serpentine alignment through the Midtown Corridor would be necessary in order for trains to weave around the bridge piers. The room necessary to accommodate LRT, given the more narrow ROW and the bridge piers, would necessitate narrowing the trail in certain areas. Additionally, the Uptown and Lyndale stations would also require the narrowing of the trail system to provide sufficient width for the station platforms.

Where the train would enter and exit the tunnel below Nicollet Avenue, significant modifications to the trail would be necessary. Safety requirements do not permit the trail to cross the trackway, and because the trackway would be located on the southside of the existing trail, a trail crossing west of the tunnel portal is not feasible. In order to connect the trail on both sides of the tunnel, conceptual engineering indicates that the trail would need to travel over the tunnel, and briefly cross Nicollet Avenue. This also presents a safety issue between cars and bicycles, particularly if plans are carried forward to re-open Nicollet Avenue.

While no bicycle lanes are striped on Nicollet Avenue, the train operating in a tunnel would not preclude bicycles from traveling on the street. Short-term construction impacts for the tunnel's construction would mostly be disturbance to the pedestrian and bicycle environment on Nicollet



Avenue between 29<sup>th</sup> Street and Franklin Avenue. Impacts to the sidewalk areas or for bicycles are not anticipated beyond short-term construction impacts at the Franklin Station where the train would enter or exit the tunnel to operate at-grade.

LRT on Nicollet Mall would likely result in several impacts to the bicycle and pedestrian network in downtown. LRT would likely displace bicycles from Nicollet Mall entirely. In order for bicycles and LRT to be collocated on Nicollet Mall, portions of the pedestrian walkway would need to be removed. This would be inconsistent with the goal of allowing bicycle traffic on Nicollet Mall regularly as outlined in *Access Minneapolis*. Current design standards will require traffic signals with pedestrian indicators at all locations where the bicycle lanes or sidewalks cross the LRT alignment.

Construction of the LRT alternative would meet ADA design standards and light rail stations would be designed with pedestrian and bicycle-friendly linkages to community facilities and include bicycle and pedestrian amenities such as bicycle lockers, bicycle racks, and covered seating areas. Modifications to the trails and on-street facilities will be determined once the project enters the Preliminary Engineering and Final Design phases. The fixed-guideway would include fencing in certain areas or other separation measures to protect bicyclists and pedestrians from trains, and discourage walking or riding within the trackway ROW while permitting crossings at roadway intersections. All impacts and mitigation to bicycle and pedestrian facilities would be identified during the DEIS.

## 5.0 LRT 3C-2 (11<sup>TH</sup>/12<sup>TH</sup> STREET)

Potential impacts to transportation facilities for the LRT 3C-2 (11<sup>th</sup>/12<sup>th</sup> Street) are similar to the potential impacts identified for the LRT 3A and LRT 3C-1 (Nicollet Mall) alternatives from the Mitchell Station to the West Lake Station. The potential impacts discussed in the following section pertain only to the additional impacts created by the LRT 3C-2 (11<sup>th</sup>/12<sup>th</sup> Street) alternative where it deviates from the alignment of LRT C3-1 (Nicollet Mall).

### 5.1 Highways and Roadways

LRT 3C-2 (11<sup>th</sup>/12<sup>th</sup> Street) is similar to the LRT 3C-1 (Nicollet Mall) alternative where the alignment is located in a shallow cut-and-cover tunnel between the Midtown Corridor and Franklin Avenue. However, two additional options are proposed that would tunnel under Blaisdell Avenue or 1<sup>st</sup> Avenue instead of Nicollet Avenue. Both the Blaisdell Avenue (Option C-2A) and 1<sup>st</sup> Avenue (Option C-2B) options would travel under and eventually on roadways classified as collector streets.<sup>1</sup> These options would also be shallow cut-and-cover tunnels, with portal entrances between 29<sup>th</sup> and 28<sup>th</sup> Streets and 22<sup>nd</sup> Street and Franklin Avenue. Both Blaisdell Avenue and 1<sup>st</sup> Avenue options are assumed to feature a dual track guideway flanked by a single traffic lane in each direction. Implementing either of these options would reduce the number of travel lanes on Blaisdell Avenue or 1<sup>st</sup> Avenue, thereby reducing that street's traffic capacity. At Franklin Avenue, the Blaisdell Avenue option (Option C-2A) would turn east, running at-grade, and then turn north to run along Nicollet Avenue. This turn

<sup>1</sup> The functional classification "collector" street means that the road typically provides for citywide trips and property access. Collectors in urban areas connect neighborhoods and minor business concentrations, and frequently connect to minor arterials. The streets serve short trips (1-4 miles), have parking restricted as necessary, carry between 1,000–15,000 vehicles per day, and have posted speed limits of 30-40 mph (30 mph in Minneapolis), with 60-150 feet for right-of-way (ROW).

could impact the capacity of Franklin Avenue. On the 1<sup>st</sup> Avenue option (Option C-2B), the train would continue to operate north of Franklin Avenue on 1<sup>st</sup> Avenue, running at-grade. Trains would travel across the existing bridge over I-94, and cross 15<sup>th</sup> Street before turning west and traveling through a surface parking lot commonly referred to as the “Meter Farm.” The train would then turn to run on Nicollet Avenue.

LRT 3C-2 (11<sup>th</sup>/12<sup>th</sup> Street) deviates from LRT 3C-1 (Nicollet Mall) alternative by traveling northwest from Nicollet Avenue at 11<sup>th</sup> and 12<sup>th</sup> Streets to the Intermodal Station. Both 11<sup>th</sup> and 12<sup>th</sup> Streets are classified as B-minor arterials, and are critical in providing access between downtown Minneapolis and I-394, I-94, and I-35W.<sup>2</sup> Implementing the LRT 3C-2 (11<sup>th</sup>/12<sup>th</sup> Street) assumes a single-track LRT guideway replacing at least one traffic lane on both streets, which will reduce each street’s capacity for bus and automobile traffic. The turns from Nicollet Avenue onto 11<sup>th</sup> Street and from 12<sup>th</sup> Street onto Nicollet Avenue would result in a full red intersection — all vehicle travel directions stopped — whenever a train moves through the intersection. LRT 3C-2 (11<sup>th</sup>/12<sup>th</sup> Street) operating on Nicollet Avenue would affect approximately two blocks of Nicollet Mall, between Grant Street and 11<sup>th</sup> Street in downtown Minneapolis. The trackway and station at 13<sup>th</sup> Street would require reconstruction of the curb lines, through traffic lanes, and sidewalk.

With implementation of LRT 3C-2 (11<sup>th</sup>/12<sup>th</sup> Street) several properties would require access modifications to and from Nicollet Avenue, Blaisdell Avenue, and 1<sup>st</sup> Avenue. Applying the same access criteria adopted for the Central Corridor LRT, vehicles would not be able to cross over the fixed LRT guideway except at signalized intersections. Access at unsignalized intersections would be restricted to right-in right-out only. Application of these criteria to Nicollet Avenue, Blaisdell Avenue, and 1<sup>st</sup> Avenue South would result in the elimination of access across these streets at 14<sup>th</sup> Street, 16<sup>th</sup> Street, 18<sup>th</sup> Street, Groveland Avenue, and 19<sup>th</sup> Street. This action would require the removal of traffic signals at Groveland Avenue and Nicollet Avenue. The loss of access from these properties may challenge drivers needing access to them from these streets. Some one-way streets would require a more circuitous route and would result in travel delays. Pedestrians would be able to cross Blaisdell Avenue, Nicollet Avenue, and 1<sup>st</sup> Avenue South at every intersection.

## 5.2 Bridges

Between the Mitchell Station and the West Lake Station, modifications to bridge structures would be similar to those described for LRT 3A. Preliminary Engineering and Final Design will determine the exact specifications and design requirements for all bridge, grade, and grade-separated structures and crossings.

In Minneapolis, both the Blaisdell Avenue (Option C-2A) and 1<sup>st</sup> Avenue (Option C-2B) options would have an impact on the existing roadway bridges spanning the Midtown Corridor. These bridges serve traffic traveling north and south from Lake Street to downtown Minneapolis. The LRT guideway would transition from the Midtown Corridor to either Blaisdell Avenue or 1<sup>st</sup> Avenue South below street-grade, entering a shallow cut-and-cover tunnel south of 28<sup>th</sup> Street. It is likely the existing bridges for both Blaisdell and 1<sup>st</sup> Avenue over the Midtown Corridor would have to be reconstructed to preserve north-south access to Lake Street. The Blaisdell Avenue

<sup>2</sup> Minor arterials have many of the same general design criteria as collectors. B-minor arterial streets typically have 2-4 lanes, operate at 30 mph (in Minneapolis) and, typically feed into principal arterials..

option would affect southbound traffic flow at 28<sup>th</sup> Street. Nicollet Avenue becomes one-way south of 28<sup>th</sup> Street and southbound traffic must turn onto 29<sup>th</sup> Street heading west to Blaisdell Avenue in order to continue traveling south toward Lake Street. This is because Nicollet Avenue currently ends at the Midtown Corridor. The LRT transition from the Midtown Corridor onto Blaisdell Avenue as described above, and the reduction of southbound travel lanes on Blaisdell Avenue would affect this traffic movement. LRT 3C-2 (11<sup>th</sup>/12<sup>th</sup> Street) is likely to create circulation and traffic impacts for Blaisdell and 1<sup>st</sup> Avenue between 28<sup>th</sup> and Lake Street based on the present configuration. Future planning efforts for Nicollet Avenue support re-establishing the city grid by removing the existing structures between 29<sup>th</sup> Street and Lake Street and re-opening Nicollet Avenue. At 1<sup>st</sup> Avenue, the portal entrance to the tunnel would be similar to the one described for the Nicollet Avenue. As part of construction, this bridge would likely need to be reconstructed in order to accommodate the tunnel entrance.

The Blaisdell Alternative would turn east at Franklin Avenue before turning north onto Nicollet Avenue that would cross I-94. The 1<sup>st</sup> Avenue option would require partial reconstruction of the existing bridge over I-94. The existing 1<sup>st</sup> Avenue bridge is not wide enough to accommodate a twin-track LRT guideway, two lanes of roadway, and sidewalks. A conceptual structural analysis of the bridge recommends that the concrete decks and select girders be replaced to handle LRT loading.

LRT 3C-2 (11<sup>th</sup>/12<sup>th</sup> Street) would require two new LRT bridge crossings over I-394. The new structures would require piers to be set in the median and side slopes of the freeway. These new structures could result in the LRT running alongside Royalston Avenue north of Glenwood Avenue, which could avoid the reconstruction of Royalston Avenue. The construction of a new bridge crossing above I-394 would be a significant capital cost to the project.

### 5.3 Driveway Access and Parking Facilities

Between the Mitchell Station and the West Lake Station, impacts to driveways and parking facilities are similar to those described for LRT 3A. Preliminary Engineering and Final Design will determine the exact specifications and design requirements for the LRT and potential conflicts and prescribed mitigation measures for driveways and parking facilities.

In midtown and downtown Minneapolis, LRT 3C-2 (11<sup>th</sup>/12<sup>th</sup> Street) would likely have several operational impacts to driveways and parking facility access points. To remain within the existing ROW between the Midtown Corridor and Franklin Avenue, the twin-track LRT guideway would likely eliminate both parallel parking lanes on Blaisdell Avenue, Nicollet Avenue, and 1<sup>st</sup> Avenue near the vicinity of the tunnel's entrance and exit points. On-street parking would also be removed to allow for left-turn lanes near Franklin Avenue, 15<sup>th</sup> Avenue and Grant Street under any of these alternatives. Parking spaces would have to be removed near 18<sup>th</sup> Street to accommodate left-turn lanes under the Nicollet Avenue and 1<sup>st</sup> Avenue alternatives. On each of these streets, on-street parking would be eliminated for a half-block north and south of Franklin Avenue at the tunnel's portal entrance and exit points, and an entire block between 12<sup>th</sup> Street and 13<sup>th</sup> Street. These actions would result in the removal of approximately 50 percent of the on-street parking along Nicollet Avenue, Blaisdell Avenue, and 1<sup>st</sup> Avenue. The reduction in available parking could cause potential quality-of-life issues for Whittier and Stevens Square neighborhood residents who have previously identified parking availability as a critical problem for their neighborhoods, and affect businesses and institutions that have on-street parking only.

The loss of on-street parking may also result in additional off-street parking land uses, and additional parking restrictions for the area.

The LRT guideway on 11<sup>th</sup> Street and 12<sup>th</sup> Street would remove one lane of parallel parking along the right curb line of each street, and on-street parking on both sides of each street would likely be further reduced to accommodate station platforms and thru traffic movement. All on-street parking would be removed on the south side of 12<sup>th</sup> Street between Hennepin Avenue and Harmon Place, and on the north side of 11<sup>th</sup> Street between Hawthorne Avenue and Hennepin Avenue. Parallel parking stalls would also be removed near the Royalston Station platform.

No driveways exist between Nicollet Avenue and Harmon Place on the north side of 11<sup>th</sup> Street. Between 11<sup>th</sup> and 12<sup>th</sup> Streets, access to alleyways and driveways would be restricted by the LRT trackway. To maintain access, vehicles would need to be allowed to cross the trackway or a frontage road would likely need to be installed.

Entrances to alleyways, surface parking lots, and above or underground parking ramps are available from the right-hand outside lanes of both 11<sup>th</sup> and 12<sup>th</sup> streets. The LRT trackway would result in the removal of the right-hand outside traffic lane, which would affect access to several surface parking lots and parking facilities or driveways for businesses and residential buildings. This also presents conflicts for selected services to these buildings. For example, delivery trucks that cannot use alleys would not be able to use the right lane for making deliveries to businesses and residences along these new one-way streets. Construction of the LRT would likely force delivery trucks onto side streets that may also be incapable of handling large vehicles.

## 5.4 Bicycle/Pedestrian Trails

Potential impacts to bicycle and pedestrian facilities are similar to those described for the previous alternatives (3C-1). The placement of a fixed-guideway below Blaisdell Avenue would result in the temporary closure of the existing bicycle lane during construction. No striped bicycle lanes are available on 1<sup>st</sup> Avenue or Nicollet Avenue. Striped on-street bicycle lanes are available on 11<sup>th</sup> and 12<sup>th</sup> Streets in downtown Minneapolis, and the implementation of LRT on these streets would require modifications to the bicycle lanes within the remaining curb-to-curb street width (following the removal of one lane of parallel parking). The LRT trackway on 11<sup>th</sup> Street would likely affect implementation of the *Access Minneapolis Plan* to widen the 11<sup>th</sup> Street bike lane to standard width. All impacts and mitigation to bicycle and pedestrian facilities would be identified during preliminary for the DEIS.

Construction of the LRT alternative would meet ADA design standards and light rail stations would be designed with pedestrian and bicycle-friendly linkages to community facilities and include bicycle and pedestrian amenities such as bicycle lockers, bicycle racks, and covered seating areas. Modifications to the trails will be determined once the project enters the Preliminary Engineering and Final Design phases. The fixed-guideway would include fencing or other separation measures to protect bicyclists and pedestrians from trains, and discourage walking or riding within the trackway ROW while permitting crossings at roadway intersections. All impacts and mitigation to bicycle and pedestrian facilities would be identified during the DEIS.