# 9.0 INDIRECT EFFECTS AND CUMULATIVE IMPACTS

There are three types of categories of impact that must be considered during the National Environmental Policy Act (NEPA) process: direct, indirect, and cumulative. Direct effects of the proposed project are discussed in the previous chapters of this Draft Environmental Impact Statement (Draft EIS). This chapter describes the potential indirect effects and cumulative impacts of the Southwest Transitway project.[1]

## 9.1 Introduction

The Southwest Transitway project may cause indirect effects and contribute to cumulative impacts through improvements to transit service and mobility.

#### 9.1.1.1 Indirect Effects

Indirect effects are those that are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. When an action enables indirect effects, it does not directly cause the change but, along with other factors, helps to provide more opportunities for change. Indirect effects may include growth inducing effects and other effects related to induced changes in the land use pattern, population density, or growth rate, and related effects on air and water and other natural systems. Examples include new development and land use changes that could occur due to transit improvements.

Indirect effects would most likely occur in the areas around stations because of the improved access provided by the transit service and the increased pedestrian traffic in and around the station areas.

#### 9.1.1.2 Cumulative Impacts

Cumulative impacts result from "the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions (RFFAs) regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." (40 C.F.R. § 1508.7). The purpose of a cumulative impacts analysis is to look for impacts that may be minimal and therefore neither significant nor adverse when examined within the context of a single proposed action, but that may accumulate and become both significant and adverse over a large number of actions.

Cumulative impacts could occur through the combination of a Build Alternative's direct and indirect effects, combined with other development that is not directly dependent on the Build Alternative.

[1] The CEQ regulations use the terms "indirect effects" (40 C.F.R. § 1508.8) and "cumulative impacts" (1508.7). Though the two terms are synonymous, this chapter uses the terms in keeping with CEQ regulations.

## 9.2 Methodology

This assessment of indirect effects and cumulative impacts uses the following resources and guidance:

- National Environmental Policy Act (NEPA) (40 C.F.R. §§1500–1508)
- *Considering Cumulative Effects Under the National Environmental Policy Act* (CEQ, 1997)
- *Interim Guidance: Questions and Answers Regarding Indirect and Cumulative Impact Considerations in the NEPA Process* (FHWA, 2003)
- *Guidance on the Consideration of Past Actions in Cumulative Effects Analysis* (CEQ, 2005)
- American Association of State Highway and Transportation Officials (AASHTO) *Practitioner's Handbook #12* (2011)

In addition, state, regional, and local resource, planning, and guidance documents related to each natural and social resource including but not limited to land use, transportation, travel forecasts, population, employment, economic development, cultural sites, water and water quality, and parklands were studied. See Chapters 3, 4, 5, and 6 of this Draft EIS and the appended technical reports for a complete listing of the documents referenced.

In considering what resources could be vulnerable to indirect effects or cumulative impacts, several factors were considered. The existing conditions, including the status, viability, and historical context of all resources analyzed in the Draft EIS, were examined to determine how vulnerable the resources would be to indirect effects and cumulative impacts from implementation of each of the Southwest Transitway alternatives. For each resource, special designations or standards were considered that relate to the resource such as ongoing regulatory authority (such as water quality, endangered species, and cultural resources regulations), policies (such as local policies related to transit that guild land use and visual quality), and plans (such as those for transit oriented development, new parks, and local and regional roads). These regulations, policies, and plans afford some measure of protection to the potentially affected resource or prescribe measures that could avoid or minimize negative effects on the resource.

For cumulative impacts, it was also necessary to examine how the resources have been affected by past actions (public or private) and RFFAs to understand trends. These actions must be combined with existing conditions and the potential effects of implementation of the Southwest Transitway as described in the previous chapters of the Draft EIS to determine whether a cumulative impact would occur.

Two general assumptions were made when conducting this assessment: first, in most cases the construction-related effects described in each section of Chapters 3 and 4 are considered to be short-term, with the effect ending at the same time as the construction activity causing it. Secondly, operational effects of the Southwest Transitway alternatives are considered to be long-term and permanent.

### 9.2.1 Indirect Effects

Because of the urban and suburban nature of the Southwest Transitway study area, the assessment of indirect effects focused on changes in land use and the intensity of development that could occur around the project as a result of each Build Alternative. No residential, commercial, or industrial development is proposed by the Southwest Transitway, but this type of public investment is known to stimulate natural market forces that bring housing, shopping/service, and employment opportunities. In most cases, these indirect effects are desired and the local and regional governments are planning for them.

### 9.2.2 Cumulative Impacts

The cumulative impacts assessment identifies other development that is expected to occur regardless of whether a Build Alternative is constructed. In addition to the guidance and information sources presented above, data developed for the New Starts application to Federal Transit Administration (FTA) were analyzed to characterize past, present, and foreseeable future land uses and how local and regional government agencies are working to guide development and its potential effects on communities along the proposed alternatives for the Southwest Transitway. The documented/approved land use and transportation plans of each of the cities in the Southwest Transitway corridor were considered and are presented in Section 3.1 of this Draft EIS. Impacts to resources from the indirect effects of each Build Alternative and other actions, including past, present, and future, were identified and added to the direct effects of each alternative (as presented in Chapters 3, 4, 5, 6, and 7 of this Draft EIS) to arrive at the total potential cumulative impact.

### 9.2.3 Study Area Definition

#### 9.2.3.1 Indirect Effects

The analysis for indirect effects uses a one-half mile study area. The National Cooperative Highway Research Program (NCHRP) Report 466, *Desk Reference for Estimating Indirect Effects of Proposed Transportation Projects* states that "development effects are most often found up to … one-half mile around a transit station." The Build Alternatives considered have the potential for producing indirect effects that would most likely occur in the areas around stations because of the improved access provided by the transit service and the increased pedestrian traffic in and around the station areas.

#### 9.2.3.2 Cumulative Impacts

Cumulative impacts could occur through the combination of the project's direct and indirect effects, combined with other development in the corridor that is not directly dependent on the project. For this analysis, the study area, which includes an area of about one mile on each side of the Build Alternatives' alignments, was used in most cases.

### 9.2.4 Time Frame

Existing conditions are the result of all of the activities leading to the present state of each resource. Thus, the analyses of Indirect Effects and Cumulative Impacts start with existing conditions for all resources.

As presented in Chapter 1, the year 2030 is the current transportation planning horizon for the region. The Metropolitan Council's *2030 Transportation Policy Plan*, 2009 (2030 TPP) represents the current extent of transportation and land-use planning in the Twin Cities metropolitan region, and uses available demographic forecasts and transportation planning analyses. Thus, the analyses for indirect effects and cumulative impacts include RFFAs to the year 2030.

## 9.3 Existing Conditions and Development Trends

To give context to the Southwest Transitway study area, the potential for indirect effects, and the likelihood for cumulative impacts, it is important to understand how the Southwest Transitway fits into its region. The Twin Cities' strong employment base, its long history of good regional planning and civic and public involvement, its high quality urban infrastructure, and its attractive amenities, such as arts and natural amenities (lakes, rivers and parks), are just a few reasons that the metropolitan area is an attractive place to live and work, and why it is likely to remain so. Suburbanization continues to occur in the region, and the cities in the region are active supporters of transit development, along with the regional economic development incentives for controlled redevelopment and transit-supportive, sustainable development. The result is that mixed-use development, particularly moderate to high density residential development with ground floor retail, has become common throughout the region, particularly when regional funding incentives have fueled developer and community interest.

According to the October 2008 Market Assessment that was completed for the Southwest Corridor, the southwest quadrant of the region, where the LRT will operate, is the most dynamic real estate sector of the Twin Cities Metropolitan Area. Although not necessarily the most populous sector, the southwest quadrant has the region's highest concentration of well-paying jobs, office space, retail space, and affluent households. This dynamism has resulted in higher than average land prices and a willingness among the development community to tackle complex redevelopment projects. Population, household, and employment data are located in Chapter 3 and Appendix H of this Draft EIS.

Existing conditions for all of the topics assessed for the indirect effects and cumulative impacts analyses are presented in Chapters 3, 4, 5, and 6 of this Draft EIS. A short discussion of "trends" for each resource is presented in Section 9.6, below.

## 9.4 Reasonably Foreseeable Future Actions

The actions listed in Table 9.4-1 are projects and developments currently anticipated in state, county, and city plans, known private development actions, and planned and funded roadway and other infrastructure projects in or within an area of influence of the seven planning segments (the location column notes the Planning Segment and associated alternatives—also see Table 2.3-8 in Section 2.3-3). None of

these RFFAs are the result of the Southwest Transitway project; they would be constructed whether or not the Southwest Transitway is implemented (No-Build Alternative).

These actions are reasonably foreseeable in that they are likely to occur by virtue of being funded, approved, or part of an officially adopted planning document or publicly available development plan. Because specific details about possible land development proposals are not comprehensively available for the geographic area and period covered by this analysis, a general description of the type and amount of development as anticipated in county and local land use plans is used. Data used in Table 9.4-1 were obtained from the Metropolitan Council, city, and county websites, and the Minnesota Department of Transportation (MnDOT).

**Table 9.4-1. Reasonably Foreseeable Future Actions**

| Location (Planning Segment and Alternatives) | Action | Description | Source |
|---|---|---|---|
| **Federal and State Actions** | | | |
| **Segment 3**<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-location Alternative)[2]<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | I-494/TH 169 Interchange reconstruction | Under construction. | Minnesota Department of Transportation website Hwy 169/I-494 <http://www.dot.state.mn.us/metro/projects/169/>, and MnDOT consultation |
| **Segment 4**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Reconstruction of Highway 100 south of I-394 (TH 100 from 36th Street to Cedar Lake Road) | – Highway improvements to TH 100 between 36th Street and 26th Street in St. Louis Park.<br>– Reconstruct road<br>– Reconstruct bridge<br>– Replace TH 7 and Minnetonka Boulevard bridges<br>– Replace 2 rail and trail bridges<br>– Reconstruct the TH 7 and Minnetonka Boulevard interchanges<br>– Letting scheduled for 2014 | Metropolitan Council website <http://www.metrocouncil.org/planning/transportation/MHSIS/majorprojectshandout.pdf>, and MnDOT consultation, and MnDOT consultation<br><br>Minnesota Department of Transportation website, Plans, Studies, and Future Projects <http://www.dot.state.mn.us/roadwork/future.html>, and MnDOT consultation |
| **Segment C**<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | I-35 W Southbound from I-94 to 46th Street | – Adding HOT/transit priority lane, which is also a MnPASS lane, and Lake Street Interchange with Bus Rapid Transit station<br>– Programmed for 2021–2030 | Minnesota Department of Transportation website, Plans, Studies, and Future Projects <http://www.dot.state.mn.us/roadwork/future.html>, and MnDOT consultation |
| **Hennepin County Actions** | | | |
| **Segment 1, Segment 3, and Segment 4**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Road 61 Hopkins and Minnetonka | Reconstruction of County Road 61 (Shady Oak Road) in Hopkins and Minnetonka from County Road 3 (Excelsior Boulevard) to North of TH 7 | Hennepin county website Road 61 Hopkins and Minnetonka. <http://www.hennepin.us/portal/site/HennepinUS/menuitem.b1ab75471750e40fa01dfb47ccf06498/?vgnextoid=2bb1cd7ce5e95210VgnVCM20000048114689RCRD> |

[2] Please see Section 2.1.2.1 of this Draft EIS for why LRT 3A-1 (co-location alternative) is included in this Draft EIS.

| Location (Planning Segment and Alternatives) | Action | Description | Source |
|---|---|---|---|
| **Segment A and Segment C**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | The Transportation Interchange intermodal facility | – The Interchange will unite transit and development creating a civic space connecting multiple transportation options, supporting a vibrant regional economy, reducing greenhouse gas emissions, and increasing mobility.<br>– The Interchange project will initially focus on LRT enhancements, then expansion of commuter and passenger rail service. The goal is to complete LRT enhancements prior to the opening of Central Corridor LRT in 2014. | Hennepin county website, the Interchange. <http://hennepin.us/portal/site/HennepinUS/menuitem.b1ab75471750e40fa01dfb47ccf06498/?vgnextoid=25652a31f8c2e210VgnVCM1000000b124689RCRD> |
| **Segment A and Segment C**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Interchange Transit Hub development partnership | – Hennepin County officials are seeking private development proposals to provide extra cash for the proposed $67.7 million Interchange transit mecca in Minneapolis, which would update the Target Field station serving the Hiawatha LRT line, Northstar Commuter Rail, and local and regional bus service.<br>– The station is included on the $957 million Central Corridor LRT line connecting Minneapolis and St. Paul starting in 2014.<br>– The request for proposals (RFP) is seeking a developer interested in building on 30,000 square feet of county-owned space, along Sixth Avenue North and Fifth Street North, across the street from Shapco Printing and the Ford Center and next to the main Interchange project.<br>– The county is flexible on air rights, so a potential project could be much larger. | Finance and Commerce January 6, 2012, “Hennepin county seeks transit hub development proposals.” <http://finance-commerce.com/2012/01/hennepin-county-seeks-transit-hub-development-proposals/> |
| **Segment A and Segment C**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Interchange Transit Hub plaza sponsor | Hennepin County is seeking a private sponsor for a 67,000-square-foot open plaza planned at the Interchange. | Finance and Commerce January 6, 2012, “Hennepin county seeks transit hub development proposals.” <http://finance-commerce.com/2012/01/hennepin-county-seeks-transit-hub-development-proposals/> |
| **Segment A and Segment C**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Interchange Transit Hub parking partnership | – Hennepin County is seeking a private sponsor for a long-term lease to operate and manage two levels of parking that the county would like to include at the Interchange<br>– 150 stalls on the upper level and 250 stalls on the lower level | Finance and Commerce January 6, 2012, “Hennepin county seeks transit hub development proposals.” <http://finance-commerce.com/2012/01/hennepin-county-seeks-transit-hub-development-proposals/> |

| Location (Planning Segment and Alternatives) | Action | Description | Source |
|---|---|---|---|
| **City Actions – Eden Prairie** | | | |
| **Segment 3**<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Improvement of Shady Oak Road (County Road 61) between and including the interchanges of Highway 62 and Highway 212 | – The City of Eden Prairie in coordination with Hennepin County, MnDOT, and the City of Minnetonka<br>– The proposed project will be constructed in multiple phases and will add turn lanes, a median, and trails along Shady Oak Road.<br>– It will also improve connections to Highways 62 and 212. The project includes roadway and trail improvements along both West 62nd Street and City West Parkway.<br>– The proposed improvements to Shady Oak Road have been identified in both the City of Eden Prairie's and Hennepin County's Capital Improvement Plans.<br>– The catalyst for implementing the project at this time is the proposed UnitedHealth Group (UHG) development on the east side of Shady Oak Road.<br>– The completion of the northern phase of the Shady Oak Road improvements is scheduled to coincide with the initial phases of the UHG development. | City of Eden Prairie website. <http://www.edenprairie.org/vCurrent/live/article.asp?r=8880> |
| **City Actions – Hopkins** | | | |
| **Segment 4**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | 8th Avenue Redevelopment | – The City of Hopkins has directed transit oriented redevelopment and pedestrian/streetscape improvements along 8th Avenue South to the proposed Hopkins station to support the future LRT and provide better and connections (via 8th Avenue S) to Downtown Hopkins.<br>– An RFP for developers was issued in June 2010.<br>– A developer was selected to build 110 apartment units on the vacant former one-story Park Nicollet Clinic building site.<br>– The site is on the west side of 8th Avenue South between Excelsior Boulevard and the LRT station and Mainstreet. (Park Nicollet closed shop there in 2009) | City of Hopkins website.8th Avenue South Redevelopment. <http://www.hopkinsmn.com/development/current/eighth/index.php> |

| Location (Planning Segment and Alternatives) | Action | Description | Source |
|---|---|---|---|
| **City Actions – St. Louis Park** | | | |
| **Segment 4**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Fire Station #1 3750 Wooddale Avenue South | – The new building will be 30,695 square feet in area and two stories tall.<br>– The building will include Fire Department administration offices, station administration, training room, kitchen/dayroom, fitness room, locker rooms, hose tower, sleeping quarters, and eight apparatus bays of varying depths.<br>– Both buildings incorporate energy efficient and environmentally sound design in accordance with the St. Louis Park's Green Building Policy. | City of St. Louis Park website, Development Activity in St. Louis Park. <http://www.stlouispark.org/webfiles/file/community-dev/development_projects_web_082011.pdf> |
| **City Actions – Minneapolis** | | | |
| **Segment A**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-location Alternative) | Linden Yards/Bassett Creek Valley | – Minneapolis issued an RFP for development of the city-owned Linden Yards and impound lot.<br>– Exclusive development rights were granted to Ryan Companies, Inc. for portions of the city owned site, and the developer is conducting development feasibility analyses adjacent to the proposed Van White Station.<br>– The projected redevelopment of the area will create thousands of jobs, hundreds of units of housing, and bring opportunity to North Minneapolis. | City of Minneapolis website, <http://www.ci.minneapolis.mn.us/cped/rfp/cped_bassett_creek_valley_update_2010_information> |
| **Minneapolis Park and Recreation Board** | | | |
| **Segment C**<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | The Mall and Walker Library | – The Walker Library is soon to be rebuilt on its current site at 2880 Hennepin Avenue.<br>– The vision for the library imagines connections to its vibrant Uptown surroundings.<br>– A section of the long, rectangular parkland known as The Mall lies immediately north of Walker Library in the Uptown area of Minneapolis.<br>– The Mall's proximity to the library, as well as to the Midtown Greenway, Hennepin Avenue, and the Uptown transit station, presents an opportunity to create an improved park that enhances connections to all four places. | Minneapolis Park & Recreation Board website, Design and Planning, The Mall and Walker Library, <http://www.minneapolisparks.org/default.asp?PageID=1289> |
| **Private Actions** | | | |
| **Segment 1**<br>LRT 1A | Project M Entertainment Complex | – 701 Seventh Street N<br>– 1000-seat theater<br>– 144-room hotel<br>– Restaurants | Metropolitan Council New Starts documentation |

| Location (Planning Segment and Alternatives) | Action | Description | Source |
|---|---|---|---|
| **Segment 1**<br>LRT 1A | 701 2nd Street North (700 Washington Avenue N) Apartments | Adding 100 dwelling units to allow a total of 243 units in a planned unit development (PUD) | Metropolitan Council New Starts documentation |
| **Segment 3**<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | UnitedHealth Group Data Park Expansion-Phase 2 | – Data Park Drive, Opus Station area<br>– New ten-story, 354,000 square-foot office building<br>– Attached 1,592-stall, 10-level structured parking (4 levels underground<br>– Part of Data Park expansion | Metropolitan Council New Starts documentation |
| **Segment 3**<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Liberty Plaza | – Eden Prairie, proposed Golden Triangle Station.<br>– The 120,000-square-foot Liberty Plaza office complex development agreement stipulates future land use for the south half of the property shall be transit oriented development (TOD) | Metropolitan Council New Starts documentation |
| **Segment 3**<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Presbyterian Homes Mixed Multifamily Housing Development | – Eden Prairie, Town Center Station.<br>– Large scale, mixed use development in seven buildings on a 21-acre site<br>– 372 units of senior housing<br>– 260 units of multifamily market rate apartment housing<br>– 75 workforce units<br>– 70,000 square feet of retail space, including convenience retail and restaurants<br>– The plan calls for dense housing, up to 13 stories | Metropolitan Council New Starts documentation |
| **Segment 3**<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | United Health Group Mixed Use Development | – Eden Prairie, City West Station at the southeast corner of TH 62 and Shady Oak Road<br>– 72-acre area<br>– March 2012, Eden Prairie City Council approved development plans for the following:<br>o 1.5 million square-foot office campus accommodating nearly 7,000 new jobs.<br>o Ground breaking in 2012 and could be complete by the time Southwest Transitway opens.<br>o Eden Prairie required reservation of 6.5 acres within the development area around proposed City West Station for LRT, surface water management, and other purposes. | Metropolitan Council New Starts documentation |
| **Segment 3**<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Marketplace & Main Luxury Apartments | – Former Hopkins Honda site<br>– 4-story building<br>– 44 luxury apartments<br>– 5,500 square feet of retail on the first level | Metropolitan Council New Starts documentation |

| Location (Planning Segment and Alternatives) | Action | Description | Source |
|---|---|---|---|
| **Segment 4**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Wooddale Point | – Wooddale Station Area.<br>– 115-unit, five-story senior living building includes two levels for independent senior living, one level of assisted living, and one level of memory care.<br>– 16,000 square feet of retail space<br>– 80 new jobs | Metropolitan Council New Starts documentation |
| **Segment 4**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Hoigaard Villages | – Wooddale Station Area.<br>– 416 new multifamily housing units, including row townhouses and condos | Metropolitan Council New Starts documentation |
| **Segment 4**<br>LRT 1A<br>LRT 3A (Preferred Alternative)<br>LRT 3A-1 (Co-location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Park Summit | – 192 market rate condominiums<br>– 12-story building | Metropolitan Council New Starts documentation |
| **Segment A**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-location Alternative) | The Cameron | – 754–6 4th Street N<br>– Conversion of an existing vacant building to 44 dwelling units | Metropolitan Council New Starts documentation |
| **Segment A and Segment C-2**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-location Alternative)<br>LRT 3C-2 (11th/12th Street) | Fifth Avenue Flats | – Redevelop the block between 5th and 6th Avenues from Mainstreet to 1st Street North<br>– Mixed-use (housing/retail) project<br>– 254-unit luxury apartments<br>– 13,000 square feet of retail space on Mainstreet | Metropolitan Council New Starts documentation |
| **Segment A and Segment C-2**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-location Alternative)<br>LRT 3C-2 (11th/12th Street) | Dock Street Residential | – 3.25 acre parking lot at 333 Washington Avenue N<br>– 400 residential units<br>– 21,5000 commercial square feet | Metropolitan Council New Starts documentation |

| Location (Planning Segment and Alternatives) | Action | Description | Source |
|---|---|---|---|
| **Segment A and Segment C-2**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-location Alternative)<br>LRT 3C-2 (11th/12th Street) | North Loop Village | – 5th Street North, and surrounding the Target Field<br>– Long-term development vision in North Loop of a mixed use village<br>– 1,250 housing units<br>– 120,000 square feet office space<br>– 45,000 square feet of retail have been proposed by Hines on an 8-acre site adjacent to the ballpark<br>– Project can begin in 2011and extend to 2030 | Metropolitan Council New Starts documentation |
| **Segment A and Segment C-2**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-location Alternative)<br>LRT 3C-2 (11th/12th Street) | First Avenue Lofts | – 117 N Second Street<br>– 259 units of rental housing<br>– Ground floor retail | Metropolitan Council New Starts documentation |
| **Segment A and Segment C-2**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-location Alternative)<br>LRT 3C-2 (11th/12th Street) | Boxleitner Place | – 336-bed supportive housing facility<br>– Services for formerly homeless persons | Metropolitan Council New Starts documentation |
| **Segment A and Segment C2**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-location Alternative)<br>LRT 3C-2 (11th/12th Street) | First Avenue Lofts | – 117 N Second Street<br>– 259 units of rental housing<br>– Ground floor retail | Metropolitan Council New Starts documentation |
| **Segment C**<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Loring Park Tower | – 1368 LaSalle Avenue<br>– New mixed use building<br>– 355 housing units | Metropolitan Council New Starts documentation |
| **Segment C**<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | New grocery | – South end of Nicollet Mall on Hennepin Avenue near Loring Park | Metropolitan Council New Starts documentation |
| **Segment C1**<br>LRT 3C-1 (Nicollet Mall) | The Zenith, Phase II | – 901 Second Street South<br>– 100 units of additional apartments | Metropolitan Council New Starts documentation |
| **Segment C1**<br>LRT 3C-1 (Nicollet Mall) | Emanuel Housing | – 822 South Third Street<br>– A mixed use project<br>– 101 apartment units for very low income people, mostly homeless and people with disabilities | Metropolitan Council New Starts documentation |

| Location (Planning Segment and Alternatives) | Action | Description | Source |
|---|---|---|---|
| **Segment C1**<br>LRT 3C-1 (Nicollet Mall) | ArtCube | – 600 Washington Avenue South<br>– A mixed use live/work project<br>– 45 mixed income apartments<br>– 8,000 sq ft of commercial space for neighborhood-oriented services, and a<br>– 20,000-square-foot art incubator space, with a rooftop farm | Metropolitan Council New Starts documentation |
| **Segment C1**<br>LRT 3C-1 (Nicollet Mall) | New grocery | – Washington and Hennepin (former site of Jaguar dealership)<br>– Whole Foods Market grocery proposed | Metropolitan Council New Starts documentation |
| **Segment C1**<br>LRT 3C-1 (Nicollet Mall) | New grocery | – 222 Hennepin Avenue<br>– 6-story, mixed use property<br>– 252 luxury apartments<br>– 37,500-square-foot grocery store | Metropolitan Council New Starts documentation |
| **Segment C-1 and Segment C-2**<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Shubert Theater Renovation | In construction | Metropolitan Council New Starts documentation |
| **Segment C2**<br>LRT 3C-2 (11th/12th Street) | 2626 West Lake | – 46 condominium project at the edge of the station area<br>– Currently on hold | Metropolitan Council New Starts documentation |

## 9.5 Potential for Indirect Effects and/or Cumulative Impacts

As discussed above, all of the environmental topics presented in Chapters 3, 4, 5, and 6 were considered for their potential to be affected indirectly and/or cumulatively by the Southwest Transitway alternatives. Table 9.5-1 below presents each topic discussed in this Draft EIS and why or why not each was found to have the potential for indirect effects or cumulative impacts. More detail about the resources with potential for indirect effects or cumulative impacts is presented below the table.

**Table 9.5-1. Resources with potential for indirect effects or cumulative impacts**

| NEPA Topic | Possible indirect effects | Possible cumulative impacts |
|---|---|---|
| Land use and socioeconomics | Yes, possible—development around transit stations is anticipated. | Yes, possible—continued indirect effects around transit stations in combination with RFFAs will increase density in the study area. |
| Neighborhoods, community services, and community cohesion | Yes, possible—changes to neighborhood characteristics related to development around transit stations are anticipated. | Yes, possible—continued indirect effects around transit stations in combination with RFFAs will change the characteristics of some neighborhoods in the study area.<br>Gentrification is possible. |
| Acquisitions and displacements/relocations | Yes, possible --development around transit stations could result in acquisitions/relocations | Yes, possible—other public transportation projects would need to acquire right-of-way and also relocate some households and businesses. Cumulative impacts could occur. |
| Cultural resources | Yes, possible—changes in physical context related to development around transit stations are anticipated, and direct impacts to properties due to development could occur. | Yes, possible—continued additions to transportation facilities and RFFAs in addition to the effects of anticipated development related to transit stations could cumulatively affect cultural resources. |

| NEPA Topic | Possible indirect effects | Possible cumulative impacts |
|---|---|---|
| Parklands and recreation areas | Yes, possible—changes in density/intensity of development related to transit stations could increase park and recreation facility usage. Park users may see LRT facilities from the parks. | Yes, possible—continued population growth, development, and redevelopment in the Twin Cities is likely to place increased demands on parks and recreation facilities—a cumulative effect. |
| Visual quality and aesthetics | Yes, possible—anticipated development around transit stations is likely to change the views around the new stations. | Yes, possible—continued additions to transportation facilities in the Twin Cities region in addition to the effects of anticipated development around transit stations and other developments in the RFFAs will change the views in many neighborhoods, which is a cumulative effect. |
| Safety and security | Yes, possible—changes in density/intensity of anticipated development around transit stations could affect service providers. | Yes, possible—continued population growth in addition to the RFFAs could affect staffing and budgets of service providers. |
| Environmental justice | Yes, possible—neighborhood characteristics and land values in areas with relatively high numbers of low-income and minority households could change around transit stations. Demand for new housing and businesses close to transit stations is anticipated. | Yes, possible—some of the RFFAs have the potential to affect areas with environmental justice populations—gentrification is possible as more affluent people are attracted to minority and low income neighborhoods. |
| Geology and Ground Water resources | None is anticipated | None is anticipated. |
| Water resources | Yes, possible—unless best management practices (BMPs) are employed, water quality could degrade. | Yes, possible—RFFAs have the potential to increase impervious surfaces and or disturb soil, thus cumulatively affecting surface waters. |
| Biota and habitat | Yes, possible—unless BMPs are employed, habitat could degrade. | Yes, possible—RFFAs have the potential to cumulatively affect biota and habitat. |

| NEPA Topic | Possible indirect effects | Possible cumulative impacts |
|---|---|---|
| Threatened and endangered species | Yes, possible—unless BMPs are employed, habitat for threatened and endangered species could degrade. | Yes, possible—RFFAs have the potential to cumulatively affect habitat for threatened and endangered species. |
| Farmlands | No, unlikely—the area is defined by NRCS as urban. No farmland will be affected. | No, unlikely—the area is defined by NRCS as urban. No farmland will be affected. |
| Air quality | Yes, possible—diversion of person trips to LRT would contribute to reductions in air pollution. A beneficial indirect effect. | Yes, possible—Reduced automobile traffic and congestion are expected to cumulatively improve air quality. |
| Noise | Yes, possible—changes in development density/intensity anticipated around transit stations would put more people near the noise produced by LRT. LRT ridership could also lead to reductions in roadway traffic noise elsewhere in the communities served by LRT. | Yes, possible—as more LRT lines are completed, the Transportation Interchange area may experience more LRT noise throughout longer portions of the day and night. LRT ridership could also lead to reductions in roadway traffic noise elsewhere in the communities served by LRT. |
| Vibration | Yes, possible—changes in development density/intensity anticipated around transit stations would put more people near the vibration produced by LRT. | Yes, possible—as more LRT lines are completed, more people will be near vibration produced by LRT. |
| Hazardous and contaminated materials | Yes, possible—anticipated development around transit stations would affect hazardous materials sites if proper BMPs (legally required) are not employed. | Yes, possible—indirect effects along with RFFAs could release hazardous materials sites if proper BMPs (legally required) are not employed. |
| Electromagnetic interference and Utilities | No, unlikely—no direct effects are anticipated from electromagnetic interference.<br>Yes, possible—Anticipated developments around transit stations could affect demand for service from utility providers | No, unlikely— RFFAs such as housing would result in no cumulative effects from electromagnetic interference.<br>Yes, possible— RFFAs and regional growth may have cumulative impacts on utility providers. |

| NEPA Topic | Possible indirect effects | Possible cumulative impacts |
|---|---|---|
| Energy and climate change | Yes, possible—slightly lower operational energy consumption is anticipated. | Yes, possible—in context with other greenhouse gas emission reduction efforts, a positive impact on greenhouse gas emissions is anticipated. |
| Economic effects | Yes, possible—positive economic changes from development around transit stations such as increased employment opportunities, and transit oriented development are anticipated. | Yes, possible—continued indirect effects from Southwest Transitway and RFFAs and regional growth are anticipated to have a beneficial cumulative impact. |
| Station area development | Yes, possible—development around stations is expected to increase in density and intensity—transit oriented development—as planned by the project's partner cities. | Yes, possible—combined with the project's indirect effects, the RFFAs are expected to continue until demand is met near transit stations in the Twin Cities. |
| Development effects | See Land Use, Neighborhoods, and Station Area Development | See Land Use, Neighborhoods, and Station Area Development |
| Transit effects | Yes, possible—increased ridership on all existing transit lines is anticipated, in part because of developments near the proposed transit stations. | Yes, possible—increased ridership on all existing and future transit lines is anticipated, in part because of developments near the proposed transit which include many of the RFFAs. |
| Effects on roadways | Yes, possible—beneficial indirect effects to local and regional traffic because of development expected near transit stations that encourage the use of transit—a potential reduction in VMT. | Yes, possible—future traffic and transportation will be influenced by the light rail system and the land use and transportation investment decisions— RFFAs—that are based on it. |
| Other transportation facilities and services | Yes, possible—increased use of bicycle and pedestrian facilities located close to transit stations, and demand for more facilities, goods, and services related to these modes is possible. | Yes, possible—the use of alternative transportation modes such as walking and bicycling will be influenced by the presence and growth of the light rail system and ability of the RFFAs to accommodate alternative modes. |

Only the topics with anticipated potential for indirect effects or cumulative impacts are discussed in Section 9.6. provides a summary of the anticipated indirect impacts and cumulative effects.

## 9.6 Long–Term Effects

Table 9.6-1 below presents a summary of anticipated indirect effects and cumulative impacts on resources in the study area.

### 9.6.1 No Build Alternative

Under the No Build Alternative, minimal improvements in transportation system capacity, mode choice, route choice, or mobility would occur. The No Build Alternative would not decrease traffic congestion around key activity centers or the roadway routes used to travel between them. Demand for improved transit would likely continue to increase. The same overall regional market conditions and public policies would be expected under the No Build and Build Alternatives, but the expected indirect and cumulative economic benefits of improved access to transit and transit oriented development would not be satisfied.

### 9.6.2 Land Use

#### 9.6.2.1 Trends

Descriptions of land uses in each of the planning segments are located in Sections 3.1 and 3.2 of this Draft EIS. In general, Segment 1 is suburban, built during the 1960s to the 1990s as highway projects made easy commuting to downtown Minneapolis possible—a stable area where conversions from open space and farmland is essentially complete. Segment 3 is adjacent to commercial and industrial development—this area is experiencing more growth in office and commercial uses, and new multifamily/mixed use developments. Open space remaining in Segment 3 continues to be protected. Much of Segment 4 is historically a corridor for freight railroads, but the corridor is abutted by residential uses—another stable area. Segment A, which approaches downtown Minneapolis, has residential and park/open space uses toward the southwest, and concentrations of industry toward the northeast, where conversions of old industrial and commercial buildings, as well as new developments, are occurring because of the demand for urban residential and mixed-use developments. Segments C-1 and C-2 also respond to demand for diversity in urban living that is close to parks, trails, and open space. The FRR Segment continues be a railroad corridor that is surrounded by urban uses that include commercial and industrial spaces, residences, parks, and community facilities. Forecast population growth is expected to place demands for new and infill housing, retail and service areas, and employment centers on all of the towns in the Southwest Transitway corridor. The implementation of the Southwest Transitway and guidance documents developed by the cities and Hennepin County may affect the distribution of growth allowing it to concentrate somewhat around the new transit facilities.

#### 9.6.2.2 Anticipated indirect effects

The primary sources of potential indirect effects to land use, as described above in Table 9.5-1, would be the increased development and redevelopment in and near the proposed station areas; the project will influence the market for transit-oriented development and other development decisions. The addition of the Southwest Transitway would not directly cause development and redevelopment activities, but many are being proposed or are already underway in the corridor. These changes will be the result of natural market forces that strive to meet the demand for convenient housing and businesses near LRT service. See Table 9.6-1 below.

#### 9.6.2.3 Anticipated cumulative impacts

Cumulative impacts to land use resources would be continuing development attracted to underutilized land and buildings near proposed stations (continued indirect effects) along all LRT lines in the Twin Cities in combination with other RFFAs. These projects would likely continue as the population grows until demands for housing, retail space, office space, and industrial sites are met.

#### 9.6.2.4 Mitigation

In many respects, the cities are addressing the expected population growth and attractiveness of the station areas with plans and regulatory guidance that would control the location and quality of the developments and ensure that they are compatible with their surroundings (see Section 3.1 Land Use and Socio-Economics). The indirect effects and cumulative impacts of the Southwest Transitway project for land use impacts are, thus, planned for, expected, and in most cases desired by the cities. The consideration of station area plans can help guide future land use changes, growth around stations, and stabilize market forces.

No mitigation for the expected indirect effects and cumulative impacts to land use is proposed for any of the Build Alternatives currently under consideration, with the exception of the preferred alternative. During Preliminary Engineering, the Metropolitan Council will work with communities in the Southwest Transitway to mitigate any local concerns raised in regard to land use changes, anticipated developments, resident and business concerns, and so forth. Comprehensive Plans required by the Council are intended to ensure consistency of local plans with broader regional development goals.

### 9.6.3 Neighborhoods and community cohesion

#### 9.6.3.1 Trends

As described in Section 9.6.2, above, stable towns and neighborhoods in the study area are likely to be the location of much of the new and infill housing that is needed to accommodate a growing population drawn to the Twin Cities by its well-paying jobs and life style. These neighborhoods and their development histories are described in Section 3.2 of this Draft EIS.

#### 9.6.3.2 Anticipated indirect effects

As mobility is improved by Southwest Transitway's infrastructure, natural market forces are expected to bring new residential and mixed-use development to the neighborhoods where stations are proposed. Density and intensity of uses around the stations are likely to increase and new residents will strive to fit into established neighborhoods. Ultimately, this influx will cause some of the characteristics of these neighborhoods to change.

#### 9.6.3.3 Anticipated cumulative impacts

The Southwest Transitway—in combination with the RFFAs and natural market forces—will continue to attract a portion of the anticipated population growth to the study area. It is likely that over time, this continued development and redevelopment activity could change some of the ethnic, racial, and income characteristics of established neighborhoods. See Table 9.6-1 below.

#### 9.6.3.4 Mitigation

As above, the cities are addressing the expected population growth and market attraction of the station areas with plans and regulatory guidance that would control the location and quality of the developments and ensure that they are compatible with their surroundings. The indirect effects and cumulative impacts of the Southwest Transitway project for land use impacts are, thus, planned for, expected, and in most cases desired by the cities. No further mitigation is necessary.

### 9.6.4 Acquisitions and displacements/relocation

#### 9.6.4.1 Trend

Property acquisition has been associated with numerous transportation improvements since the 1960s when several interstate highway projects were initially constructed. Today, acquisitions still occur for transportation projects, but the acquisition process is also a result of urban expansion and land redevelopment efforts as the Twin Cities area continues to expand. Investments in transportation infrastructure create new or improved access opportunities to surrounding land areas, where the value of property is often less expensive as compared to dense urban areas. Over time, as the population of the Twin Cities metropolitan region has continued to grow, past investments in transportation infrastructure have enabled greater access to lands in the southwest metropolitan area, and contributed to the rapid growth of southwestern communities in the 1980s and 1990s.

#### 9.6.4.2 Indirect

Private development and redevelopment around transit station areas could involve acquisitions and relocations, resulting in indirect effects from construction of the Southwest Transitway. Housing and business relocation stock is currently available within the Southwest Transitway partner communities. See Table 9.6-1 below.

#### 9.6.4.3 Cumulative

An adverse cumulative impact due to property acquisition is not expected.

The direct effects of acquiring (right-of-way) ROW for this project in combination with the direct effects of property acquisition for future projects (listed in Table 9.4-1), including those for public uses such as transportation, would continue the acquisition of property and relocation of existing residents and businesses. The acquisitions for RFFAs might otherwise occur as a result of the other projects across the study area.

Although housing market conditions are difficult to forecast, future housing stock conditions currently appear to be favorable for future relocatees based on existing available housing and forecasts. Prospects for future housing availability are positive due to extensive planned development and redevelopment projects listed in Table 9.4-1, and the plans and land development policies of the communities in the Southwest Transitway study area (listed in Section 3.1). Many of these same projects also provide business relocation opportunities. Based on favorable housing stock and business location conditions and forecasts, no cumulative relocation impacts are expected from the Southwest Transitway project.

#### 9.6.4.4 Mitigation

All acquisitions associated with the proposed project (direct impacts) would be mitigated through applicable relocation assistance programs. Because there are expected to be more residential and employment opportunities created by projects in the Southwest Transitway study area than are lost, an adverse cumulative impact due to property acquisition is not expected. No other mitigation for indirect effects and cumulative impacts is proposed.

### 9.6.5 Cultural Resources

#### 9.6.5.1 Trends

Many of the historic sites and districts are located in the project study area because of their historic relationship to the area's railroad lines. Demand for redevelopment of warehouses and commercial buildings to lofts, condominiums, and mixed uses in some of the historic transportation corridors has made them prime real estate investment sites. The region's existing trail system was also built to follow the railroads and the lakes. Grand Rounds is one such important system of roadways, parkways, and trails focused on connecting natural areas, cultural/historic neighborhoods, and scenic locations. The cultural resources present in the study area are described in more detail in Section 3.4 of this Draft EIS.

#### 9.6.5.2 Anticipated indirect effects

Development and redevelopment associated with the proposed transit stations could change the setting, context, and land use around the stations. These changes may have indirect effects on historic sites and districts such as changing the visual quality of the site's setting with modern buildings, adding a transportation facility to the block, or increasing residential and commercial densities. In some cases,

development induced by the project could also directly affect historic properties through demolition, change in property values, or other impacts.

#### 9.6.5.3 Anticipated cumulative impacts

Over time, continued development and redevelopment around stations in combination with other RFFAs that are close to districts historic or properties could result in changes that diminish the integrity of an historic property's or district's location, feeling, or association. Some properties could be converted or demolished to take advantage of development/redevelopment opportunities.

Preliminary planning for station area development around the downtown Hopkins station suggests that there are substantial redevelopment opportunities along 8th Street to Main Street, which includes the Hopkins Commercial Historic District. Given the right guidance and incentives, redevelopment in this area could benefit the integrity and vitality of that historic district. However, it is also possible that without adequate planning, historic components could be removed or impacted due to these RFFAs.

Cumulative impacts could also occur to the Historic Warehouse District due to the Target Field Station and The Interchange (neither are part of the Southwest Transitway project) and the number of private developments in that area.

In addition, ongoing private redevelopment projects are likely to be intensified in the areas around the proposed Southwest Transitway's Royalston Station and The Interchange, which are near historic districts and properties. It should be noted that the Section 106 agreement for The Interchange project acknowledges the local planning documents that have been adopted (Warehouse District Heritage Streets Plan and Minneapolis Pedestrian Master Plan) that will help guide the process to protect historic resources in this district, addressing cumulative impacts. See Table 9.6-1 below.

#### 9.6.5.4 Mitigation

Methods for avoidance, minimization, or mitigation of indirect effects to historic property would be developed under the Section 106 consultation process for the Southwest Transitway. See Section 3.4 Cultural Resources for more details about the Section 106 consultation process.

Possible mitigation measures for indirect and cumulative impacts in the downtown Hopkins Commercial Historic District area could include investigation of measures to promote appropriate rehabilitation, including the use of state and federal tax incentives that are in place for rehabilitation of historic resources. These tax incentives could be used by developers to help protect and rehabilitate historic resources as part of the planned redevelopment in the station area.

Mitigation measures for the indirect effects and cumulative impacts of the Transportation Interchange intermodal facility are addressed in that project's environmental assessment, which is separate from the NEPA process for the Southwest Transitway. Information can be found at the project's website: http://www.theinterchange.net/.

All of the RFFAs that receive federal funding would be subject to the same regulations and protections of Section 106, including any mitigation that may be necessary for identified adverse impacts to eligible properties.

## 9.6.6 Parklands and recreation areas

### 9.6.6.1 Trends

Public parks, conservation areas, and recreation areas are owned and maintained by the municipalities in which they are located. In the City of Minneapolis, these properties are owned and maintained by the independent Minneapolis Park and Recreation Board. In the cities of St. Louis Park, Hopkins, Eden Prairie, and Minnetonka, these properties are maintained by a parks department that is part of the city government.

As the Twin Cities' urban and suburban areas continue to develop and the population grows, it is expected that increased use of the parks and recreations facilities within it would take place regardless of the implementation of the Southwest Transitway. As can be seen everyday regardless of weather, Twin Cities' residents highly value the trails, parks, and recreation resources provided—they are used year round. Without the project, these resources would continue to be heavily used, and providers would continue to plan and manage the systems as they do today. New regional parks are already planned by Metropolitan Council (see Section 3.5).

### 9.6.6.2 Anticipated indirect effects

Residents attracted to the anticipated developments around transit stations would be part of the expected population and household growth in the Twin Cities. New stress on nearby parks and recreation facilities may result from this influx of new residents to the region who choose to live in the Southwest Transitway study area.

### 9.6.6.3 Anticipated cumulative impacts

With or without the Southwest Transitway project, urbanization and population densification in general will increase the use of parks within the Southwest Transitway study area and the region. More demand on parks and recreation facilities is unavoidable. The direct effect of converting 0.30 to 1.20 acre (depending on the alternative) of parkland to the Southwest Transitway transportation right-of-way—considered in the context of other past, present, and RFFAs—would contribute a small physical change to the long-term cumulative effect of development on the Twin Cities' recreational lands.

The urban and suburban areas along the Southwest Transitway, as in the entire Twin Cities area, are expected to continue to develop and become denser. The Southwest Transitway's proposed stations in combination with RFFAs—especially residential projects—will be part of this trend. Because fully developed urban areas typically have little opportunity for the creation of new parks and recreation areas, the existing parks are likely to become more crowded and intensely used. See Table 9.6-1 below.

#### 9.6.6.4 Mitigation

To meet the needs of the growing region to 2030 and beyond, the Metropolitan Council proposes to expand the current regional park system to nearly 70,000 total acres including four new regional parks, acquisition of lands within existing park boundaries, and expansions at five existing parks. Regional trail system mileage will quadruple—from 231 miles of trails open to the public today to almost 1,000 miles by 2030. Miles of new greenways are proposed to provide natural linkages between regional parks in Scott, Dakota, and western Hennepin County. These new parks and trail connections will allow area residents to have a variety of new park experiences close to home that accommodates existing and future population growth (Metropolitan Council 2030 Regional Parks Policy Plan, update adopted December 2010 http://www.metrocouncil.org/planning/parks/2010/2030ParksPolicyPlan.pdf).

Because anticipated indirect effects and cumulative impacts would not affect the overall purpose and mission of the park system, no mitigation by the Southwest Transitway project is proposed for indirect effects or cumulative impacts.

### 9.6.7 Visual quality and aesthetics

#### 9.6.7.1 Trends

The wide range of settings along the Southwest Transitway alternatives is the result of continued investment in high-capacity roadway infrastructure such as interstate and state highways, along with arterial roads that allow developers to convert farmland and natural open spaces to suburban environments that attract residents and businesses. Each new facility and development changes the visual quality of the environment, sometimes for the better. Table 9.5-1 lists the many public and private developments that without the Southwest Transitway will continue to change the visual character of the study area for years to come.

#### 9.6.7.2 Anticipated indirect effects

Changes to the visual character of the areas around the Southwest Transitway would occur because of the expected development and redevelopment and increasing density around transit stations. Because much of the alignments are along existing freight rail right-of-way, and other portions are in established urban environments, the changes would not be considered a negative indirect effect.

#### 9.6.7.3 Anticipated cumulative impacts

Continued additions to transportation and transit facilities in the study area, the RFFAs, and the indirect effects of the Southwest Transitway project will cumulatively change the views in study area neighborhoods over time. It is important to note that many of these changes are planned by the cities and Hennepin County and would not be considered adverse impacts. See Table 9.6-1.

#### 9.6.7.4 Mitigation

Mitigation for direct effects of the transit lines and its stations' aesthetics will be addressed during Preliminary Engineering and Final Design, which will include discussions with affected communities, resource agencies, and stakeholders. In addition, the cities, county, and Metropolitan Council have prepared plans and guidance documents for the expected developments around the Southwest Transitway facilities that ensure they will be visual compatible with their surroundings. No further mitigation is necessary.

### 9.6.8 Safety and security

#### 9.6.8.1 Trends

Public safety and security within the study area are provided by the police departments, fire departments, and emergency response units of the cities of Eden Prairie, Minnetonka, Hopkins, St. Louis Park, and Minneapolis. Emergency medical services are located in each city.

Although public safety and security resources for the study area are primarily the responsibility of the five cities through which the Build Alternatives pass, Metro Transit Police currently provide roving security for bus transit facilities within the corridor. Transit police routinely patrol bus routes, bus stops, and transit centers, such as the Uptown Transit Center. Transit police officers currently travel along the Hiawatha LRT to provide security at LRT stations and on rail cars, and would provide similar services on the Southwest Transitway.

#### 9.6.8.2 Anticipated indirect effects

It is possible that the increased density and intensity anticipated for transit oriented development around new transit stations would affect local law enforcement and emergency service providers. New, planned concentrations of housing, commercial uses, and office spaces would put more people into close contact with transit vehicles, tracks, and crossings and freight rail (LRT 3A-1 co-location alternative), and could cause changes in patrol routes, schedules, and equipment needs.

#### 9.6.8.3 Anticipated cumulative impacts

With or without the proposed project, the population in the study area is projected to grow. The Southwest Transitway along with plans and guidance documents developed by the cities and Hennepin County, however, may affect the distribution of growth allowing it to concentrate around the new transit facilities and continue to put more people into contact with transit vehicles, tracks, and crossings and freight rail (direct effects). The anticipated and planned increase in population around transit stations in combination with the RFFAs in the study area could affect the staffing and budgets of local law enforcement and emergency service providers over the long-term. See Table 9.6-1 below.

#### 9.6.8.4 Mitigation

Safety and security plan development for the project would be closely coordinated with city and county law enforcement and emergency service providers.

## 9.6.9 Environmental Justice

### 9.6.9.1 Trends

Environmental justice populations live in the Southwest Transitway study area. Minority populations, while scattered throughout the study area, are principally located in the midtown and downtown regions of Minneapolis where compact, densely populated neighborhoods are home to a diverse mix of ethnic communities: non-Hispanic Whites, African-Americans, recent East African immigrants, Asian and Pacific Islander populations, Native American populations, and Latino populations. In addition to Minneapolis, small clusters of minority populations are found in southwest St. Louis Park, the Knollwood area of Hopkins, and Eden Prairie. Minority populations in the study area appear to be growing, with an approximate increase of some 7 percent between 2000 and 2010, according to Census Bureau data.

The greatest proportion of low-income populations are also found in midtown and downtown areas of Minneapolis, where there is the greatest income variability within a half mile of the build alternatives considered.

### 9.6.9.2 Anticipated indirect effects

Potential indirect effects to environmental justice communities would most likely be from increased development and redevelopment in the proposed station areas for the Southwest Transitway project where demand for new housing, retail, and employment opportunities are anticipated to be strong. It is likely that natural market forces in these areas will drive up property values, especially closer to the stations. Although these indirect effects would be experienced by all populations within the project study area, low-income persons may experience the expected increase in property values to a greater extent if rents or real estate taxes increase.

### 9.6.9.3 Anticipated cumulative impacts

Development around station areas in combination with RFFAs could trigger some degree of gentrification, which is considered a cumulative impact. Gentrification is the process of upper- or middle-income families buying and rehabilitating property in urban neighborhoods thus increasing property values, and often displacing low-income families and small businesses that can no longer afford the new rents. Over time, economically or ethnically homogeneous areas may change as the purchasing habits of new residents begin to dominate. Although gentrification is not an environmental justice issue, the potential for gentrification of urban areas is often associated with minority and low-income community areas where major public investments have been made that attract developers and individuals to areas with convenient transit access and high quality service. See  below.

### 9.6.9.4 Mitigation

In an effort to retain existing businesses and residents located in the study area, the project partner cities have engaged in extensive land use planning activities around stations to stabilize natural market forces and create a set of guidelines for expected and desired development. In effect, the plans and policies of the

Metropolitan Council, Hennepin County, and the cities encourage long-term public and private investments that are intended to benefit the people in surrounding population and the region. More details on mitigation are presented in Chapter 10 of this Draft EIS.

## 9.6.10 Geology and groundwater

No indirect effects or cumulative impacts are anticipated.

## 9.6.11 Water resources

Cumulative impacts to water resources could occur within the Minnesota River and Mississippi River watersheds, which are beyond the general one-mile study area.

### 9.6.11.1 Trends

Urban development throughout the study area has led to the decline of wetlands because of drainage or filling. More recently, however, developments in suburban areas have worked to retain wetland areas. For this reason, wetlands within the study area are most densely concentrated near the proposed western end of the Southwest Transitway, in the vicinity of Segments 1 and 3, or in the vicinity of the Iron Triangle portion of the Freight Rail Relocation Segment. The quality of water resources within the corridor has been negatively affected by previous development. Paving and construction for new developments throughout the region, including the study area continue to increase the volume of stormwater runoff by changing ground surfaces from a pervious to an impervious condition. Additionally, these same activities continue to negatively impact water quality because pollutants, deposited on impervious surfaces, are readily transported to receiving waters.

### 9.6.11.2 Anticipated indirect effects

The anticipated development and redevelopment activities around station areas likely would involve temporary soil disturbance and possible increases in impervious surfaces, which could indirectly impact water resources. However, these activities would be subject to current water quality regulations, and installation of BMPs would be required to protect water quality.

### 9.6.11.3 Anticipated cumulative impacts

Cumulative impacts from continuing urban development (RFFAs) within the Minnesota River and Mississippi River watersheds could include increased sediment and pollutant load. However, the RFFAs are subject to the same water quality regulations as the Southwest Transitway and would use similar BMPs during construction and operation. Thus, no cumulative adverse impacts to surface water quality are anticipated. See Table 9.6-1 below.

#### 9.6.11.4 Mitigation

BMPs would be used during construction of the Southwest Transitway to minimize and avoid direct impacts to water resources and permanent BMPs will be employed as necessary. Permanent impacts to wetlands and floodplains will be mitigated according to applicable regulations and temporary and indirect impacts will be mitigated through construction BMPs. RFFAs would follow similar approaches mitigating direct and indirect impacts. No additional mitigation is necessary.

### 9.6.12 Biota and habitat

#### 9.6.12.1 Trends

Urban development throughout the study area has led to a change of natural habitats into more urbanized land cover. The quality of habitat within the corridor has been negatively affected by previous development. Paving and construction for new developments throughout the region, including the study area, continue to change vegetation types to paved surfaces and/or manicured yards.

#### 9.6.12.2 Anticipated Indirect Effects

The LRT alternatives have the potential for indirect impacts to habitat, primarily to aquatic habitat, if proper BMPs are not used during construction to limit erosion and sediment load. However, the planned use of BMPs and the limited amount of adjacent natural habitats in the study area would result in limited to no indirect impacts to biota and habitat. Other indirect effects could occur if the induced development around the station areas results in direct impacts to natural habitat. The amount of these habitat effects should be limited, as the station areas are located within already urbanized and suburbanized areas. See Table 9.6-1 below.

#### 9.6.12.3 Anticipated Cumulative Impacts

The RFFAs would be anticipated to have similar minor effects on biota and habitat as the indirect effects from the induced development, because they are located in already urbanized and suburbanized areas with limited amounts of natural habitat. The planned projects would be expected to adhere to BMPs during construction in order to limit indirect impacts to aquatic habitats, and no adverse cumulative impacts are anticipated.

#### 9.6.12.4 Mitigation

Because no adverse cumulative or indirect impacts are anticipated, no additional mitigation beyond project-specific BMPs is proposed.

## 9.6.13 Threatened and endangered species

### 9.6.13.1 Trends

As described above for Biota and Habitat, the historical trend in the study area has been towards converting natural habitat to urbanized and suburbanized land cover. This has resulted in few threatened and endangered species currently being found in the study area.

### 9.6.13.2 Anticipated Indirect Effects

Similar to the Biota and Habitat resource, there are very limited chances for indirect impacts to threatened and endangered species. One possibility would be from habitat degradation if BMPs are not used; habitat for rare species could also be impacted through construction of induced development in the station areas. However, very limited amounts of indirect impacts are anticipated because the station areas are located in already urbanized and suburbanized areas with minimal rare or unique habitat, and the proper implementation of planned construction BMPs would result in minimal to no indirect impacts to threatened and endangered species.

### 9.6.13.3 Anticipated Cumulative Impacts

Induced development and RFFAs would be anticipated to coordinate with the USFWS and DNR on their potential impacts to threatened and endangered species. This coordination would identify avoidance, minimization and mitigation measures as necessary. Taken with the fact that there is limited habitat in the study area and relatively few recent records of species occurrences in the already urbanized area the planned projects would be located, adverse cumulative impacts are not anticipated. See Table 9.6-1 below.

### 9.6.13.4 Mitigation

Because no adverse cumulative or indirect impacts are anticipated, no additional mitigation beyond project-specific BMPs is proposed.

## 9.6.14 Farmlands

No direct impacts, indirect effects, or cumulative impacts are anticipated.

## 9.6.15 Air quality

The impacts of traffic on air quality are regulated by the Environmental Protection Agency (EPA) at the regional level, so the discussion of cumulative impacts here reflects it as a regional issue. For more information about the extent of the region, see Section 4.6 Air Quality.

#### 9.6.15.1 Trends

Automobile exhaust is the primary source of carbon monoxide, nitrogen oxide, and volatile organic compound emissions within Hennepin County (NEI 2008). According to the traffic analysis completed for the project, traffic volumes and vehicle miles traveled (VMT) are anticipated to steadily increase in the study area between today and 2030.[3]

#### 9.6.15.2 Anticipated indirect effects

The Southwest Transitway project is expected to divert about 6,600 to 7,000 person trips from the automobile mode to the transit mode. This diversion would reduce about 5,500 to 6,000 automobile trips from the highway system. Though some of this reduction would be distributed to areas outside the study area, it would still contribute to reductions in overall air pollution in the region. See Table 9.6-1 below.

#### 9.6.15.3 Anticipated cumulative impacts

The EPA expects regional air quality to improve as recent air quality regulations are fully implemented and improvements occur over time. In general, the implementation of LRT service within the project study area is anticipated to help improve air quality by providing travelers with a rapid transportation alternative powered by electricity that can help reduce automobile traffic on congested freeways and arterial roads.

#### 9.6.15.4 Mitigation

No mitigation is necessary.

### 9.6.16 Noise

#### 9.6.16.1 Trends

With the exception of neighborhoods adjacent to the Kenilworth Corridor, the MN&S section of the Canadian Pacific (CP) railway, and the few Minneapolis neighborhoods near freight rail, commuter rail, and LRT, rail noise is not typically heard in the Southwest Transitway study area. Noise from highways and local arterials, however, is not unusual, and as the population has increased in the Twin Cities, noise along these transportation facilities has affected more residences, parks, and trails. Away from the highways and rail corridors, a low level of ambient noise has mostly been maintained.

#### 9.6.16.2 Anticipated indirect effects

Expected and planned for development around transit stations would bring more people into contact with transit noise and noise potentially generated by park-and-ride facilities. At the same time, some highway/arterial noise could be reduced because of the potential increase in pedestrians and bicyclists using these modes to

[3] NEI 2008 emissions by county, pollutant, and source category downloaded on May 17, 2012. http://www.epa.gov/ttn/chief/net/2008inventory.html

gain access to LRT service. The driver-to-LRT passenger conversion also has potential to reduce roadway traffic noise in the study area.

#### 9.6.16.3 Anticipated cumulative impacts

As population growth in the study area continues and the trend toward more density puts more people near transportation corridors, the noise from highways and arterials will affect more people. The transitway project will add a new noise source, but it will also allow for and encourage the use of alternative modes and transit-oriented development.

The only RFFA near the Southwest Transitway that could contribute to a cumulative noise effect is The Interchange transportation hub project near the Target Field Station in downtown Minneapolis. Although not part of The Interchange, the Southwest Transitway project would contribute to the noise effects of the other previously built, planned, and under-construction transportation projects using this facility as these projects continue to operate into the reasonably foreseeable future. See Table 9.6-1, below.

#### 9.6.16.4 Mitigation

The project will not mitigate indirect effects or cumulative impacts. The cumulative impact of transportation-related noise in the Twin Cities is gradually being mitigated as many new transportation improvement projects incorporate modern noise reduction strategies, such as lids and noise walls. Further, as motor vehicles become more efficient and incorporate new ways to generate power, such as electric or hydrogen propulsion, the proportion of quieter vehicles will increase over time.

### 9.6.17 Vibration

#### 9.6.17.1 Trends

Ground-borne vibration from land-based transportation sources is not uncommon, and typically vibration from transportation sources occurs at acceptable levels. As population grows, traffic grows, and there is a corresponding increase in transportation-related ground-borne vibration.

#### 9.6.17.2 Anticipated indirect effects

Growth in transit-oriented development and park-and-ride facilities could result in an increase in the number of residential land uses exposed to transportation-induced ground-borne vibration—in this case from LRT and automobiles and buses arriving at station areas. Typically vibration from transportation sources occurs at acceptable levels. The growth of pedestrians and cyclists using LRT service could also reduce traffic-induced vibration on roadways in the study area.

#### 9.6.17.3 Anticipated cumulative impacts

Human response to vibration is a per-event experience. Expected population growth is likely to lead to an increase in roadway traffic and use of public transportation systems such as Metropolitan Council's expanding LRT network. The Southwest Transitway project, which is part of that network, will contribute to

increases in ground-borne vibration events along its alignment, and cumulative effects may be present where this project is near other public transportation vibration sources in Downtown Minneapolis such as at The Interchange transportation hub where buses and other LRT and commuter rail lines will converge. Ground-borne vibration due to rubber-tired vehicles (buses), however, is often within acceptable ranges. See Table 9.6-1 below.

#### 9.6.17.4 Mitigation

No mitigation is necessary.

### 9.6.18 Hazardous and contaminated materials

#### 9.6.18.1 Trends

Hazardous materials are not themselves a resource that would be evaluated for cumulative effects. Hazardous materials can, however, enter the air and water and eventually affect human health and ecosystems. Hazardous materials can be associated with contaminated soils and groundwater, building materials encountered through demolition, accidental spills at construction sites, and leaking underground storage tanks. Depending on the type of contamination, there can be risks to worker safety and public health as well as environmental damage.

#### 9.6.18.2 Anticipated indirect effects

Underutilized land and buildings near some station areas would become prime development and redevelopment sites. Those with known and unknown hazardous/regulated materials contamination would be cleaned up as redevelopment occurs.

#### 9.6.18.3 Anticipated cumulative impacts

The Build Alternatives are anticipated to have positive effects on contaminated land and buildings with the development and redevelopment of commercial and residential sites located near transit stations, and would contribute to the overall remediation of such sites all along the Southwest Transitway. See Table 9.6-1 below.

#### 9.6.18.4 Mitigation

It would be the responsibility of the parties involved in those projects to address hazardous material impacts resulting directly from those actions or as otherwise prescribed by the applicable federal or state laws

### 9.6.19 Electromagnetic interference and utilities

No direct impacts, indirect effects, or cumulative impacts to electromagnetic interference are anticipated. More detailed discussion on potential effects to utilities follows.

#### 9.6.19.1 Trends

Utilities within the study are provided by municipal, public, and private agencies. Each of these providers is responsible for planning and managing additional service needed as the area population grows.

#### 9.6.19.2 Anticipated indirect effects

It is possible that the increased density and intensity anticipated for transit oriented development around new transit stations would affect utility providers. New, planned concentrations of housing, commercial uses, and office spaces would put more people and businesses in those specific areas and could cause changes in the patterns of local utility demand. Such changes could be considered beneficial because higher density land use typically results in more efficient distribution of services.

#### 9.6.19.3 Anticipated cumulative impacts

With or without the proposed project, the population in the study area is projected to grow. The Southwest Transitway along with implementation of plans and use of guidance documents developed by the cities and Hennepin County, however, may affect the distribution of growth by concentrating it around the new transit facilities. The anticipated and planned increase in population around transit stations in combination with the RFFAs in the study area would likely change the location of utility demand, which would increase the utility providers' long-term ability to more efficiently supply all types of service. See Table 9.6-1 below.

#### 9.6.19.4 Mitigation

As the location and intensity of demand for services changes to areas around transit stations, utility providers would address these changes as part of their regular planning processes.

### 9.6.20 Energy and climate change

#### 9.6.20.1 Trends

Transportation in the study area, as in the rest of the United States, is a major consumer of energy. Growth in the region, especially in the suburbs of the Twin Cities, has been facilitated by construction of interstate and state highways that make commuting to employment centers feasible. As discussed in previous sections of this Draft EIS, this trend continues--existing highway capacity is decreasing and it is becoming difficult to meet demand in some areas.

If historic and recent transportation trends continue, $CO_2$ emissions will continue to increase. By 2030, $CO_2$ emitted from vehicles on all regional (7-country metropolitan planning area) roadways, including I-94, are expected to increase over existing conditions. For example, the population is expected to increase in the study area by 30 percent between 2000 and 2030, which could have a dramatic effect on the VMT in the region.

#### 9.6.20.2 Anticipated indirect effects

As shown in the energy analysis completed for this Draft EIS (see Section 4.11), all of the Build Alternatives have slightly lower operational energy consumption as compared to the No Build Alternative(assuming the source of energy is a source that produces air pollution, using less of that source will create less air pollution).

#### 9.6.20.3 Anticipated cumulative impacts

When considered in a cumulative context with other greenhouse gas emission reduction efforts, implementation of any of the Build Alternatives could have a positive impact on greenhouse gas emissions. Given that the change in regional energy consumption between any of the alternatives and the No Build Alternative is much less than one percent of the total regional energy consumption, however, it is anticipated that these impacts will be negligible regardless of where the emissions are generated or how the increased energy is produced.

The amount and type of emissions resulting from the electricity used to power the light rail are dependent on the type of electric generation (i.e., coal versus wind versus nuclear, etc.) used to supply power to the system. The energy decrease would contribute to slightly lower emissions for any of the Build Alternatives as compared to the No Build Alternative if one assumes equivalent sources of power generation across all alternatives. Additionally, while the energy usage associated with conventionally-powered heavy duty vehicles, buses, and passenger vehicles contribute to emissions increases along their locally travelled routes, energy usage due to light rail contribute to emissions increases near the source of the power generation. See Table 9.6-1 below.

#### 9.6.20.4 Mitigation

No mitigation by the project is proposed.

### 9.6.21 Economic effects

The economic effects of the Southwest Transitway could be felt throughout the local economy, which reaches much farther than a mile from the project. Thus, the cumulative effects discussion includes the Twin Cities region.

#### 9.6.21.1 Trends

The Twin Cities Metropolitan Area has the fourth-fastest population growth rate among major metro areas in the Midwest. The Twin Cities Metropolitan Area ranks high in economic market indicators among the nation's metro areas, and particularly the "frost belt," metro areas. According to the October 2008 Market Assessment that was completed for the Southwest Corridor, the southwest quadrant of the region, where Southwest LRT will operate, has the region's highest concentration of well-paying jobs, office space, retail space, and affluent households. This dynamism has resulted in higher than average land prices and a willingness among the development community to tackle complex redevelopment projects. Details about the economic conditions of the Twin Cities region are available in Chapter 5.

#### 9.6.21.2 Anticipated indirect effects

Economic development would be a positive and planned-for indirect effect. New commercial and residential development located near transit stations would contribute economic benefits by improving the tax base of the cities of Eden Prairie, Minnetonka, Hopkins, St. Louis Park, and Minneapolis. Plans drafted by these communities encourage and support higher-density residential and commercial land uses near transit facilities.

#### 9.6.21.3 Anticipated cumulative impacts

With implementation of any of the Build Alternatives in combination with other RFFAs increased earnings would result in positive economic impacts to the local economy. These impacts would occur through direct hiring to fill jobs and as workers spend their earnings, thus creating additional consumer demand and jobs to meet that demand in the Twin Cities region. This is a beneficial cumulative impact. See Table 9.6-1 below.

#### 9.6.21.4 Mitigation

As discussed in Section 5.1 Economic Conditions, implementation of any Build Alternative is anticipated to have positive economic effects for the study area and greater Twin Cities metropolitan region. As discussed in Section 5.2, some of the communities through which the Southwest Transitway project would travel are actively pursuing the economic development potential that would accrue with the addition of the Southwest Transitway. Because the cumulative impacts from the project, in combination with the RFFAs, is beneficial no mitigation is necessary.

### 9.6.22 Station area development

#### 9.6.22.1 Trends

The Southwest Transitway project is an important component of the metropolitan region's transit and public transportation network, which includes the Hiawatha line (existing), the Central Corridor line (in construction), the Bottineau line (proposed), and such regionally important facilities at the transportation hub known as The Interchange (in project development).

#### 9.6.22.2 Anticipated indirect effects

Changes in land use and denser development near stations—indirect effects—are anticipated, and are consistent with existing plans and policies. See Land Use, Neighborhood and Community Cohesion, and Economic Effects, above.

#### 9.6.22.3 Anticipated cumulative impacts

Changes in land use and denser developments near Southwest Transitway stations as well as RFFAs—cumulative effects—are anticipated, and are consistent with existing regional plans and policies. See Table 9.6-1 below.

#### 9.6.22.4 Mitigation

Because the indirect effects and cumulative impacts are desired and planned for by the communities, no mitigation is needed.

### 9.6.23 Development effects

See Land Use, Neighborhoods, Community Facilities and Services, and Neighborhood Cohesion, and Station Area Development above. See Section 5.2 of the Draft EIS for additional detail.

### 9.6.24 Transit effects

Cumulative transit impacts of the Southwest Transitway could be experienced throughout the Twin Cities region. The cumulative impacts discussion reflects this potential.

#### 9.6.24.1 Trends

The 2020 TPP provides policy guidance on proposed future changes and investments to the transit network and transit infrastructure within the seven-county metropolitan region. In an effort to achieve the goal of doubling ridership levels by 2030, the 2030 TPP also identifies the need for expanded passenger facilities and transit infrastructure as a catalyst for attracting new riders. Noting that transit passenger facilities "provide convenient and attractive service," the 2030 TPP identifies several existing transit facilities for expansion and proposes the construction of new facilities. In addition to the 2030 TPP, each of the cities in the Southwest Transitway study area have drafted or adopted new comprehensive plans that specify future transportation and transit improvements. High-capacity transit improvements in the southwest area of the Twin Cities have been studied by the Hennepin County Regional Railroad Authority (HCRRA) and the Metropolitan Council Regional Transit Board (RTB) since the mid-1980s. In the mid 1980s, the region planned to implement the Southwest Transitway as an LRT line extending from downtown Minneapolis to Hopkins.

A primary goal outlined in the 2030 TPP is to double current transit ridership levels by 2030. To achieve this goal, the 2030 TPP proposes two approaches: 1) maintain and expand the current bus system and ridership, and 2) develop a network of high-frequency bus and rail transitways.

#### 9.6.24.2 Anticipated indirect effects

A system-wide increase in linked transit trips would be accompanied by a similar decrease in auto trips because the total number of person trips in the entire system is held constant. The reduction in auto trips is referred to as "new transit trips" because they are the result of people switching from auto to transit mode for the first time. Most of the new trips would be generated within the Southwest Transitway corridor and therefore, most of the auto trip reduction would be seen in the Southwest Transitway corridor.

#### 9.6.24.3 Anticipated cumulative impacts

Any of the Build Alternatives, when considered as part of Metropolitan Council's expanding fixed guideway system, would play an important role in improving transportation system capacity in an area of high travel demand. The Build Alternatives would improve capacity by responding to travel demand created by existing and planned residential and employment growth, including the RFFAs, and providing a competitive travel option that will attract choice riders. This would be a beneficial cumulative impact.

Combined with planned future transit service in the region, the implementation of LRT in the Southwest Transitway Corridor is likely to reduce reliance on single occupancy vehicles for work and recreation trips for choice riders in the region, and encourage the use of alternate modes, particularly bicycling and walking where stations will not have dedicated parking for transit users.

Although changes in land-use or changes in the intensity of existing land uses could adversely impact the surrounding transportation system near stations, transit oriented development and such projects as the Transportation Interchange may slow the growth of automobile traffic volumes. As the population grows and redevelopment along the corridor continues, additional demand for transit service, and pedestrian and bicycle facilities should be anticipated. See Table 9.6-1 below.

#### 9.6.24.4 Mitigation

Because the indirect effects and cumulative impacts are considered desirable and beneficial, no mitigation is required.

### 9.6.25 Effects on roadways

As described in the trends and cumulative impacts discussions below, the effects of the Southwest Transitway are expected to go beyond the study area of one-mile from the alignments.

#### 9.6.25.1 Trends

The Metropolitan Council TPP indicates that the existing roadway network is expected to experience a substantial increase in automobile demand by the year 2030. By 2030, the regional VMT is forecasted to increase by 37 percent. The Metropolitan Council has indicated in the TPP that more than $40 billion (2005 dollars) in highway investments would be needed by 2030 to "fix" congestion in the region, more than five times the total highway revenues expected to be available to MnDOT's Metro District between now and 2030. Potential capacity expansion of the principal arterial system is also limited by physical, social, and environmental constraints. The Metropolitan Council has concluded that it is not realistic to assume that congestion will be eliminated. Portions of all of the principal arterial roadways near the Southwest Transitway alignment are projected to experience congestion in 2030, including I-494, I-35W, I-394, TH 7, 169, 100, 62, and 212.

#### 9.6.25.2 Anticipated indirect effects

See Transit Effects above. VMT is expected to be reduced. The Build Alternatives are projected to divert 4,170 to 5,670 person trips from auto to transit modes (including buses). This reduction in auto person trips would primarily be diverted from the major interstate and trunk highways in the southwest metro area, such as I-494, I-394, I-35W, TH 62, 7, 169, 100, and 212.

#### 9.6.25.3 Anticipated cumulative impacts

Even when combined with the RFFAs, the implementation of the Southwest Transitway is likely to reduce reliance on single occupancy vehicles for work and recreation trips for choice riders, and reduce traffic congestion associated with trips that have both origins and destinations in the Southwest Transitway corridor. Demand for capacity improvements to local roadways may be reduced as projects such as the Transportation Interchange intermodal facility are built and put into operation. See Table 9.6-1 below.

#### Mitigation

Because the indirect effects and cumulative impacts to roadways are expected to be beneficial, no mitigation is needed.

### 9.6.26 Other transportation effects

#### 9.6.26.1 Trends

As noted in the parks section above (also see Section 3.5 of this Draft EIS) pedestrian and bicycle trails, which are often multiuse facilities, are available region wide and are provided and maintained by the cities and counties, as well as Metropolitan Council, and Minneapolis Parks and Recreation Board. The regional trail system, alone—part of Metropolitan Council's Regional Park System established in 1974—comprises 38 trails, with 231 miles currently open to the public. These trails are purposefully located to be accessible by all types of the Twin Cities' residents, and are typically used year round by active people.

#### 9.6.26.2 Anticipated indirect effects

Implementation of the Build Alternatives is likely to result in an improvement for pedestrians and cyclists immediately surrounding the proposed station areas. The construction of the Southwest Transitway would provide them access to fixed guideway transit and greater mobility over longer distances. It is likely that demand for pedestrian and bicycle access to transit stations would increase.

#### 9.6.26.3 Anticipated cumulative impacts

Increased access to transit would be a beneficial cumulative impact. Demand for better pedestrian and bicycle access is likely to continue. See Table 9.6-1 below.

### 9.6.26.4 Mitigation

No mitigation would be needed.

**Table 9.6-1. Summary of Anticipated Indirect Effects and Cumulative impacts**

| Resource/ Planning Segment and Alternative(s) | Indirect Effects | Cumulative Impacts | Mitigation |
|---|---|---|---|
| **Land use and socioeconomics** | | | |
| **Segment 1**<br>LRT 1A | Increased development and redevelopment in and near the proposed station areas. These changes will be the result of natural market forces. | Continuing development attracted to underutilized land and buildings near proposed stations of LRT lines. RFFAs would likely continue as the population grows. | The indirect effects and cumulative impacts of the Southwest Transitway project for land use impacts are planned for, expected, and in most cases desired by the cities.<br>During Preliminary Engineering, the Metropolitan Council will work with communities to mitigate any local concerns. |
| **Segment 3**<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1 | Same as Segment 1 | Same as Segment 1 |
| **Segment 4**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1 | Same as Segment 1 | Same as Segment 1 |
| **Segment A**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1 | The Interchange intermodal hub would have mostly positive cumulative impacts. | Same as Segment 1 |
| **Segment C1**<br>LRT 3C-1 (Nicollet Mall) | Same as Segment 1 | Same as Segment A | Same as Segment 1 |
| **Segment C2**<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1 | Same as Segment A | Same as Segment 1 |

| Resource/ Planning Segment and Alternative(s) | Indirect Effects | Cumulative Impacts | Mitigation |
|---|---|---|---|
| **Segment FRR**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street | No indirect effects anticipated. | This segment would not contribute to cumulative land use changes because it would not result in direct or indirect land use changes from existing uses. | None proposed. |
| **Neighborhoods, community services, and community cohesion** | | | |
| **Segment 1**<br>LRT 1A | Natural market forces are expected to bring new residential and mixed-use development around the stations. This will cause some neighborhood characteristics to change. | It is likely that continued development and redevelopment could change some of the ethnic, racial, and income characteristics of established neighborhoods. | The effects and impacts are expected and planned for. No further mitigation is necessary. |
| **Segment 3**<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1 | Same as Segment 1 | Same as Segment 1 |
| **Segment 4**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1 | Same as Segment 1 | Same as Segment 1 |
| **Segment A**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1 | Same as Segment 1<br>Gentrification is a potential cumulative impact. | Same as Segment 1 |
| **Segment C1**<br>LRT 3C-1 (Nicollet Mall) | Same as Segment 1 | Same as Segment A | Same as Segment 1 |
| **Segment C2**<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1 | Same as Segment A | Same as Segment 1 |

| Resource/ Planning Segment and Alternative(s) | Indirect Effects | Cumulative Impacts | Mitigation |
|---|---|---|---|
| **Segment FRR**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | No indirect effects anticipated. | No adverse impacts are anticipated. This segment would not contribute to cumulative impacts to community cohesion because it would not result in direct or indirect changes from existing conditions | None proposed. |
| **Acquisitions and displacements/relocations** | | | |
| **Segment 1**<br>LRT 1A | Development and redevelopment could involve acquisitions and relocations. | No adverse cumulative impacts are anticipated. Prospects for future housing and business property availability are positive. | Federal and Minnesota regulations must be followed. No other mitigation for indirect effects and cumulative impacts is proposed. |
| **Segment 3**<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1 | Same as Segment 1 | Same as Segment 1 |
| **Segment 4**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1 | Same as Segment 1 | Same as Segment 1 |
| **Segment A**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1 | Same as Segment 1 | Same as Segment 1 |
| **Segment C1**<br>LRT 3C-1 (Nicollet Mall) | Same as Segment 1 | Same as Segment 1 | Same as Segment 1 |
| **Segment C2**<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1 | Same as Segment 1 | Same as Segment 1 |

| Resource/ Planning Segment and Alternative(s) | Indirect Effects | Cumulative Impacts | Mitigation |
|---|---|---|---|
| **Segment FRR**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | No indirect effects | Same as Segment 1 | None needed. |
| **Cultural Resources** | | | |
| **Segment 1**<br>LRT 1A | No indirect impacts anticipated. | No cumulative impacts are anticipated in this segment. | Methods for avoidance, minimization, or mitigation of indirect effects to historic property would be developed under the Section 106. |
| **Segment 3**<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | The setting, context, and land use around the stations is likely to change. | In combination with other RFFAs that are close to districts historic or properties, cumulative impacts could occur. | Same as Segment 1 |
| **Segment 4**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Same as Segment 3 | Same as Segments 3.<br>8th Street to Main Street in Hopkins may experience cumulative impacts. | Same as Segment 1 |
| **Segment A**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 3<br>The Interchange transit hub development has the potential to indirectly affect the setting and character of the Historic Warehouse District. | Same as Segment 3.<br>The Historic Warehouse District in Minneapolis and the areas of ongoing private redevelopment around the proposed Southwest Transitway's Royalston Station and The Interchange are vulnerable to cumulative impacts. | Same as Segment 1 |
| **Segment C1**<br>LRT 3C-1 (Nicollet Mall) | Same as Segment 3 | Same as Segment 3. | Same as Segment 1 |
| **Segment C2**<br>LRT 3C-2 (11th/12th Street) | Same as Segment 3 | Same as Segment 3. | Same as Segment 1 |

| Resource/ Planning Segment and Alternative(s) | Indirect Effects | Cumulative Impacts | Mitigation |
|---|---|---|---|
| **Segment FRR**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | No indirect impacts anticipated. | No cumulative impacts anticipated. | Same as Segment 1 |
| **Parklands and Recreation** | | | |
| **Segment 1**<br>LRT 1A | New stress on nearby parks and recreation facilities may result from an influx of new residents to the region choosing to live in the Southwest Transitway study area. | Continued population growth, urbanization, and population densification in general will increase the use of parks within the Southwest Transitway study area and the region. Southwest Transitway's proposed stations in combination with RFFAs will be part of this trend. | Metropolitan Council proposes to expand the current regional park system. Regional trail system mileage will quadruple by 2030.<br>No mitigation by the Southwest Transitway project is proposed. |
| **Segment 3**<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1 | Same as Segment 1 | Same as Segment 1 |
| **Segment 4**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1 | Same as Segment 1 | Same as Segment 1 |
| **Segment A**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1 | Same as Segment 1 | Same as Segment 1 |
| **Segment C1**<br>LRT 3C-1 (Nicollet Mall) | Same as Segment 1 | Same as Segment 1 | Same as Segment 1 |
| **Segment C2**<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1 | Same as Segment 1<br>. | Same as Segment 1 |

| Resource/ Planning Segment and Alternative(s) | Indirect Effects | Cumulative Impacts | Mitigation |
|---|---|---|---|
| **Segment FRR**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1 | Same as Segment 1. | Same as Segment 1 |
| **Visual Quality and Aesthetics** | | | |
| **Segment 1**<br>LRT 1A | Visual character of the areas around the Southwest Transitway stations is expected to occur. | Views in study area neighborhoods will continue to change as transportation projects and RFFAs are built. Changes planned by the cities and Hennepin County would not be considered adverse impacts. | Mitigation for direct effects of the transit lines and its stations' aesthetics will be addressed during Preliminary Engineering and Final Design. The cities, county, and Metropolitan Council have prepared plans and guidance documents for the expected developments to ensure visual compatibility. No further mitigation is necessary. |
| **Segment 3**<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1 | Same as Segment 1 | Same as Segment 1 |
| **Segment 4**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1.<br>Much of the alignment is along existing freight rail right-of-way. | Same as Segment 1 | Same as Segment 1 |
| **Segment A**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1 | Same as Segment 1 | Same as Segment 1 |
| **Segment C1**<br>LRT 3C-1 (Nicollet Mall) | Same as Segment 1 | Same as Segment 1 | Same as Segment 1 |
| **Segment C2**<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1 | Same as Segment 1 | Same as Segment 1 |

| Resource/ Planning Segment and Alternative(s) | Indirect Effects | Cumulative Impacts | Mitigation |
|---|---|---|---|
| **Segment FRR**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | No indirect visual effects anticipated from this segment, as it is not anticipated to induce growth or redevelopment. | Same as Segment 1 | Same as Segment 1. |
| **Safety and Security** | | | |
| **Segment 1**<br>LRT 1A | New, planned concentrations of housing, commercial uses, and office spaces could cause changes in patrol routes, schedules, and equipment needs. | Population in the study area is projected to grow. Some of the growth, including RFFAs may be concentrated around the proposed transit facilities. This could affect long-term staffing and budgets of local service providers. | Safety and security would be coordinated with city and county service providers. |
| **Segment 3**<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment 4**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | More development would put higher numbers of people close to transit vehicles, tracks, rail crossings, and freight rail (LRT 3A-1 co-location alternative). | Same as Segment 1. | Same as Segment 1. |
| **Segment A**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment C1**<br>LRT 3C-1 (Nicollet Mall) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment C2**<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |

| Resource/ Planning Segment and Alternative(s) | Indirect Effects | Cumulative Impacts | Mitigation |
|---|---|---|---|
| **Segment FRR**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | No indirect safety and security impacts anticipated from this segment, as it is not anticipated to induce growth or redevelopment | Same as Segment 1. | Same as Segment 1. |
| **Environmental Justice** | | | |
| **Segment 1**<br>LRT 1A | Increased demand for new housing, retail, and employment opportunities are anticipated to be strong and potentially drive up property values close to the stations. Although all socioeconomic groups would be affected, low income populations may be affected more strongly. | Some degree of gentrification, which is considered a cumulative impact, could be triggered. | To benefit all populations in the study area, project partner cities have engaged in extensive land use planning activities to stabilize natural market forces. No further mitigation is proposed. |
| **Segment 3**<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment 4**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment A**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment C1**<br>LRT 3C-1 (Nicollet Mall) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment C2**<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |

| Resource/ Planning Segment and Alternative(s) | Indirect Effects | Cumulative Impacts | Mitigation |
|---|---|---|---|
| **Segment FRR**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Water Resources** | | | |
| **Segment 1**<br>LRT 1A | The anticipated development and redevelopment activities would be subject to current water quality regulations and required BMPs. | The proposed project and the RFFAs are subject to the same water quality regulations and BMP requirements. No cumulative adverse impacts to surface water quality are anticipated. | No additional mitigation is necessary. |
| **Segment 3**<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment 4**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment A**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment C1**<br>LRT 3C-1 (Nicollet Mall) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment C2**<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |

| Resource/ Planning Segment and Alternative(s) | Indirect Effects | Cumulative Impacts | Mitigation |
|---|---|---|---|
| **Segment FRR**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Biota and habitat** | | | |
| **Segment 1**<br>LRT 1A | The planned use of BMPs and the limited amount of adjacent natural habitats in the study area would result in limited to no indirect impacts to biota and habitat. | Because the project area is mostly urbanized and suburbanized with limited amounts of natural habitat, and use of BMPs is required for development, no adverse cumulative impacts are anticipated | No mitigation beyond project-specific BMPs is proposed. |
| **Segment 3**<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment 4**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment A**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment C1**<br>LRT 3C-1 (Nicollet Mall) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment C2**<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |

| Resource/ Planning Segment and Alternative(s) | Indirect Effects | Cumulative Impacts | Mitigation |
|---|---|---|---|
| **Segment FRR**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Threatened and endangered species** | | | |
| **Segment 1**<br>LRT 1A | Similar to the Biota and Habitat resource, there are very limited chances for indirect impacts to threatened and endangered species. | Induced development and RFFAs would be anticipated to coordinate with the USFWS and DNR. Adverse cumulative impacts are not anticipated. | No mitigation beyond project-specific BMPs is proposed. |
| **Segment 3**<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment 4**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment A**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment C1**<br>LRT 3C-1 (Nicollet Mall) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment C2**<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |

| Resource/ Planning Segment and Alternative(s) | Indirect Effects | Cumulative Impacts | Mitigation |
|---|---|---|---|
| **Segment FRR**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Air Quality** | | | |
| **Segment 1**<br>LRT 1A | 6,600 to 7,000 person trips would be diverted to the transit mode, reducing automobile trips from the highway system contributing to reductions in overall air pollution in the region. | The EPA expects regional air quality to improve as recent air quality regulations are fully implemented and improvements occur over time. | No mitigation is necessary. |
| **Segment 3**<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment 4**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment A**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment C1**<br>LRT 3C-1 (Nicollet Mall) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment C2**<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |

| Resource/ Planning Segment and Alternative(s) | Indirect Effects | Cumulative Impacts | Mitigation |
|---|---|---|---|
| **Segment FRR**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Noise** | | | |
| **Segment 1**<br>LRT 1A | Transit-oriented development will bring more people close to transit noise, but the driver-to-LRT passenger conversion has potential to reduce roadway traffic noise in the study area. | The proposed project will add a noise source, but it will also allow for and encourage the use of alternative modes and transit-oriented development, which over time could reduce overall noise in the study area. | The project will not mitigate indirect effects or cumulative impacts. |
| **Segment 3**<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1 | Same as Segment 1 | Same as Segment 1 |
| **Segment 4**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1 | Same as Segment 1 | Same as Segment 1 |
| **Segment A**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1 | Same as Segment 1<br>The Interchange transportation hub project along with the transportation projects planned to use it would generate noise in its environs. | Same as Segment 1 |
| **Segment C1**<br>LRT 3C-1 (Nicollet Mall) | Same as Segment 1 | Same as Segments 1 and A. | Same as Segment 1 |
| **Segment C2**<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1 | Same as Segments 1 and A. | Same as Segment 1 |

| Resource/ Planning Segment and Alternative(s) | Indirect Effects | Cumulative Impacts | Mitigation |
|---|---|---|---|
| **Segment FRR**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Not applicable—no indirect effects, such as increased urban development from LRT on this segment. | The number of freight rail trips on this segment would increase—more noise events. | Same as Segment 1 |
| **Vibration** | | | |
| **Segment 1**<br>LRT 1A | Transit-oriented development will expose more land uses to transportation-induced ground-borne vibration. The growth of pedestrians and cyclists using LRT service could reduce traffic-induced vibration on roadways in the study area. | The Southwest Transitway project, will contribute to increases in ground-borne vibration events along its alignment. | No mitigation is necessary. |
| **Segment 3**<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1 | Same as Segment 1 | Same as Segment 1 |
| **Segment 4**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1 | Same as Segment 1 | Same as Segment 1 |
| **Segment A**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1 | Same as Segment 1<br>Cumulative effects—increased number of ground-borne vibration events—may be present at The Interchange transportation hub. | Same as Segment 1 |
| **Segment C1**<br>LRT 3C-1 (Nicollet Mall) | Same as Segment 1 | Same as Segment 1 | Same as Segment 1 |
| **Segment C2**<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1 | Same as Segment 1 | Same as Segment 1 |

| Resource/ Planning Segment and Alternative(s) | Indirect Effects | Cumulative Impacts | Mitigation |
|---|---|---|---|
| **Segment FRR**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Not applicable—no indirect effects, such as increased development from LRT on this segment. | An increased number of ground-borne vibration events may occur because of the increased number of freight rail trips | Same as Segment 1 |
| **Hazardous and contaminated materials** | | | |
| **Segment 1**<br>LRT 1A | Contaminated land and buildings near some station areas would be cleaned up as redevelopment occurs. | The Build Alternatives and RFFAs would contribute to the overall remediation of contaminated sites. | Hazardous material impacts would be mitigated as prescribed by the applicable federal or state laws. |
| **Segment 3**<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment 4**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment A**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment C1**<br>LRT 3C-1 (Nicollet Mall) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment C2**<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment FRR**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |

| Resource/ Planning Segment and Alternative(s) | Indirect Effects | Cumulative Impacts | Mitigation |
|---|---|---|---|
| **Energy and Climate Change** | | | |
| **Segment 1**<br>LRT 1A | All of the Build Alternatives have slightly lower operational energy consumption as compared to the No Build Alternative. | When considered in a cumulative context, implementation of any of the Build Alternatives could have a positive impact on greenhouse gas emissions. | No mitigation by the project is proposed. |
| **Segment 3**<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment 4**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment A**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment C1**<br>LRT 3C-1 (Nicollet Mall) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment C2**<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment FRR**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Limited indirect impacts, as this segment would involve moving existing freight rail trips onto this existing segment | This segment would not be anticipated to contribute to cumulative impacts to energy and climate change | Same as Segment 1. |

| Resource/ Planning Segment and Alternative(s) | Indirect Effects | Cumulative Impacts | Mitigation |
|---|---|---|---|
| **Economic Effects** | | | |
| **Segment 1**<br>LRT 1A | Economic development would be a positive and planned-for indirect effect. | Any of the Build Alternatives in combination with other RFFAs increased earnings would result in positive economic impacts to the local economy. | No mitigation is necessary. |
| **Segment 3**<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment 4**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment A**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment C1**<br>LRT 3C-1 (Nicollet Mall) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment C2**<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment FRR**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | No indirect effects anticipated, as the segment would not be expected to induce development | This segment would not contribute to cumulative impacts to economics because it would not result in direct or indirect changes from existing conditions | None proposed |

| Resource/ Planning Segment and Alternative(s) | Indirect Effects | Cumulative Impacts | Mitigation |
|---|---|---|---|
| **Station Area Development** | | | |
| **Segment 1**<br>LRT 1A | Development around stations is anticipated, and is consistent with existing plans and policies. | Continued changes in land use near stations as well as RFFAs are anticipated and are consistent with existing local and regional plans and policies. | No mitigation is needed. |
| **Segment 3**<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment 4**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment A**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment C1**<br>LRT 3C-1 (Nicollet Mall) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment C2**<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment FRR**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Not applicable | Not applicable | Not applicable |

| Resource/ Planning Segment and Alternative(s) | Indirect Effects | Cumulative Impacts | Mitigation |
|---|---|---|---|
| **Development effects** | | | |
| **Segment 1**<br>LRT 1A | See Land Use, Neighborhoods, Community Facilities and Services, and Neighborhood Cohesion, and Station Area Development above. See Section 5.2 of the Draft EIS for additional detail. | See Land Use, Neighborhoods, Community Facilities and Services, and Neighborhood Cohesion, and Station Area Development above. | See Land Use, Neighborhoods, Community Facilities and Services, and Neighborhood Cohesion, and Station Area Development above. |
| **Segment 3**<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment 4**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment A**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment C1**<br>LRT 3C-1 (Nicollet Mall) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment C2**<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment FRR**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | No indirect effects anticipated to development, as the segment would not be expected to induce development | This segment would not contribute to cumulative impacts to development because it would not result in direct or indirect changes from existing conditions | None proposed |

| Resource/ Planning Segment and Alternative(s) | Indirect Effects | Cumulative Impacts | Mitigation |
|---|---|---|---|
| **Transit Effects** | | | |
| **Segment 1**<br>LRT 1A | A system-wide increase in linked transit trips would be accompanied by a similar decrease in auto trips. | Combined with planned future transit service in the region, Southwest Transitway is likely to reduce reliance on single occupancy vehicles for choice riders, and encourage the use of alternate modes. | Because the indirect effects and cumulative impacts are considered desirable and beneficial no mitigation is required. |
| **Segment 3**<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment 4**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment A**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1. | Long distance transit travel from and through the Southwest Corridor will be possible, as cumulatively, this project is connected with other regional transit projects at the Interchange transportation hub. | Same as Segment 1. |
| **Segment C1**<br>LRT 3C-1 (Nicollet Mall) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment C2**<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment FRR**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | No indirect effects anticipated, as the segment is just for freight rail | This segment would not contribute to cumulative impacts to transit as it has no direct or indirect effects | None proposed |

| Resource/ Planning Segment and Alternative(s) | Indirect Effects | Cumulative Impacts | Mitigation |
|---|---|---|---|
| **Effects on Roadways** | | | |
| **Segment 1**<br>LRT 1A | See Transit Effects above. VMT is expected to be reduced. | Even when combined with the RFFAs, the implementation of the Southwest Transitway is likely to reduce use of single occupancy vehicles, increase transit trips for choice riders, and reduce traffic congestion. | No mitigation is needed. |
| **Segment 3**<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment 4**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment A**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment C1**<br>LRT 3C-1 (Nicollet Mall) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment C2**<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment FRR**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | No indirect effects anticipated, as the segment is just for freight rail | This segment would not contribute to cumulative impacts to roadways, as it has no direct or indirect effects. | None proposed |

| Resource/ Planning Segment and Alternative(s) | Indirect Effects | Cumulative Impacts | Mitigation |
|---|---|---|---|
| **Effects on Other Transportation Facilities** | | | |
| **Segment 1**<br>LRT 1A | Improvements are likely for pedestrians and cyclists immediately surrounding the proposed station areas. | Increased access to transit would be a beneficial cumulative impact. | These are planned and desired effects of the project's partners and no mitigation is needed. |
| **Segment 3**<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment 4**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment A**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3A-1 (Co-Location Alternative) | The Interchange intermodal hub will give pedestrians and bicyclists greater range. | Same as Segment 1. | Same as Segment 1. |
| **Segment C1**<br>LRT 3C-1 (Nicollet Mall) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment C2**<br>LRT 3C-2 (11th/12th Street) | Same as Segment 1. | Same as Segment 1. | Same as Segment 1. |
| **Segment FRR**<br>LRT 1A<br>LRT 3A (LPA)<br>LRT 3C-1 (Nicollet Mall)<br>LRT 3C-2 (11th/12th Street) | No indirect effects are anticipated. | The direct effects from this segment (in the Cedar Lake Trail area) could contribute to cumulative impacts to this trail | None proposed |

## 9.7 Greenhouse Gas Emissions

This section summarizes the project's approach to assessing potential impacts associated with climate change and discusses future uncertainty associated with climate change. Although there is uncertainty about the climate impacts of anthropogenic greenhouse gas (GHG) emissions, the following assessment of the Southwest Transitway LRT project is provided to compare the GHG emissions of the proposed project and alternatives (Sections 9.7.2.2, and 9.7.4, and Table 9.7-1, below), given the potential for cumulative impacts on climate.

If the Twin Cities metro area becomes very transit-oriented, it may be possible to realize substantial GHG reductions with Southwest Transitway LRT implementation. According to the report "Reducing Greenhouse Gas Emissions From Transportation Sources in Minnesota" by the Center for Transportation Studies at the University of Minnesota (June 2008), commuter and light rail can yield GHG reductions of 40 percent and 75 percent, respectively. Measures to reduce the emission of GHG have been outlined by the State of Minnesota. The 2007 Minnesota Next Generation Energy Act established statewide GHG reduction goals of 15 percent by 2015, 30 percent by 2025, and 80 percent by 2050 compared with 2005.

### 9.7.1 Methodology

Future carbon dioxide ($CO_2$) emissions for the Southwest Transitway project are difficult to estimate precisely because a wide variety of factors could influence $CO_2$ emissions. Some of these factors include government regulations, price and availability of fuel and alternative energy sources, and vehicle technology (such as electric hybrid or fuel cell vehicles). The following methodology was used to compare GHG emissions produced in the study area with and without the Southwest Transitway LRT project in the year 2030. [4]

[4]Assumptions:

Daily vehicle miles traveled (VMT) for the No-Build, Baseline, and Build Alternatives were calculated using projections from the Metropolitan Council's Travel Demand Model (see Chapter 6).

In addition to CO2, gasoline contains other GHGs, including CH4 (methane) and N2O (nitrous oxide). The ratio of CO2 emissions to total GHG emissions was assumed to be 0.977, according to EPA guidelines (2009). Total GHG emissions in this analysis are expressed as CO2 equivalents (CO2E).

The 35 miles per gallon (mpg) fuel economy factor comes from the Energy Independence and Security Act. The fuel efficiency factor of 35 mpg required for new cars by 2020 was used for the fleet average of cars and Sport Utility Vehicles (SUVs) in 2030. The vast majority of the fleet in 2030 will likely be less than 10 years old, and thus, subject to the 35 mpg standard. Any further improvements in automobile efficiencies would improve (reduce) total GHG calculated emissions for all scenarios.

Gallons of gasoline consumed: Average heat content of conventional motor gasoline is 5.25 million British Thermal Units (BTUs) per barrel (EPA 2010). Average carbon coefficient

#### 9.7.1.1 Calculation

Greenhouse gas calculations were made using the methodology described for EPA's Greenhouse Gas Equivalencies Calculator (http://www.epa.gov/cleanenergy/energy-resources/calculator.html).

As the calculations below show, there is not a significant decrease in GHG emissions under the Build Alternatives. Further, it is likely that the decrease in GHG emissions is even smaller than shown below because, as discussed above, no estimate has been made here to account for GHG emissions possibly produced through the generation of electricity required by the LRT.

As shown in Table 4.11-4 of this Draft EIS, the net annual change in $CO_2$ emissions due to the any of the alternatives is a minor fraction of the total $CO_2$ emissions in the world or country, and on the order of the annual $CO_2$ emissions output by 10,000 passenger vehicles. Over time periods of a year or longer, it can be assumed that $CO_2$ is essentially evenly distributed throughout the atmosphere across the globe.

It is important to point out, however, that when considered in a cumulative context with other GHG emission reduction efforts, implementation of any of the Build Alternatives could have a positive impact on greenhouse gas emissions.

Greenhouse gas emissions are calculated by multiplying the quantity of GHG produced from the combustion of a gallon of fuel (in this case, gasoline) by the quantity of fuel burned. The quantity of GHG produced from the combustion of a gallon of gasoline is:

$$\frac{5.25\ \text{mmBtu}}{\text{barrel}} \times \frac{19.46\ \text{kg C}}{\text{mmBtu}} \times \frac{1\ \text{barrel}}{42\ \text{gallons}} \times \frac{44\ \text{g CO}_2}{12\ \text{g C}} \times \frac{1\ \text{metric ton}}{1000\ \text{kg}} = \frac{0.00892\ \text{metric tons CO}_2}{\text{gallon of gasoline}}$$

Note: Due to rounding, performing the calculations given in the equations below may not return the exact results shown. 8.92 * 10-3 metric tons of $CO_2$/gallon of gasoline (http://www.epa.gov/cleanenergy/energy-resources/refs.html).

---

of motor gasoline is 19.46 kilograms (kg) carbon per million BTUs (EPA 2010). Fraction oxidized to CO2 is 100 percent (IPCC 2006). CO2 emissions per barrel of gasoline were determined by multiplying heat content times the carbon coefficient time the fraction oxidized times the ratio of the molecular weight ratio of CO2 to carbon (44/12). A barrel equals 42 gallons.

No discussion has been included to account for the GHG emissions which would be produced to provide the electricity required to power the LRT. Any fossil fuels (i.e., coal) used in the generation of the electricity would lessen the GHG benefit of LRT.

The quantity of fuel burned was determined by using daily VMT for each alternative and an assumed fuel efficiency of 35 miles per gallon as described in the footnote on the previous page.

No Build Alternative

The calculation of GHG emissions for the No Build Alternatives results in 28,477 metric tons $CO_2E$ (carbon dioxide equivalent)/day:

$$\frac{109{,}168{,}370\ mi}{day} \times \frac{0.00892\ \text{metric tons } CO_2}{\text{gallon of gasoline}} \times \frac{1\ gal}{35\ mi} \times \frac{1\ CO_2,\ CH_4, and\ N_2O}{0.977\ CO_2} = \frac{28{,}477\ metric\ tons\ CO_2E}{day}$$

Baseline

The baseline scenario, as defined in Chapter 2, is the Enhanced Bus option. This option includes two new limited-stop bus routes that would provide bi-directional service between Eden Prairie, Minnetonka, Hopkins, St. Louis Park and downtown Minneapolis. It also includes minor modifications to the existing express bus service, increased service frequencies, and restructured local bus service to provide better access along the limited-stop routes to key areas, including Golden Triangle and downtown Minneapolis. The baseline results in 28,470 metric tons $CO_2E$/day, as shown in the GHG calculation below.

$$\frac{109{,}141{,}230\ mi}{day} \times \frac{0.00892\ \text{metric tons } CO_2}{\text{gallon of gasoline}} \times \frac{1\ gal}{35\ mi} \times \frac{1\ CO_2,\ CH_4, and\ N_2O}{0.977\ CO_2} = \frac{28{,}470\ metric\ tons\ CO_2E}{day}$$

Build Alternatives

The calculations for GHG for the Build Alternatives are based on traffic data (i.e., miles per day) which have been established for each GHG scenario. Thus, the results are presented in a single number—28,457 metric tons $CO_2E$/day—as shown in the equation below.

$$\frac{109{,}091{,}260\ mi}{day} \times \frac{0.00892\ \text{metric tons } CO_2}{\text{gallon of gasoline}} \times \frac{1\ gal}{35\ mi} \times \frac{1\ CO_2,\ CH_4, and\ N_2O}{0.977\ CO_2} = \frac{28{,}457\ metric\ tons\ CO_2E}{day}$$

**Table 9.7-1. GHG Scenario Summary**

| Scenario | VMT (miles/day) | $CO_2E$ (metric tons/day) |
|---|---|---|
| No Build Alternative | 109,168,170 | 28,477 |
| Baseline | 109,141,230 | 28,470 |
| Build Alternatives | 109,091,260 | 28,457 |

### 9.7.2 Existing Conditions

Transportation is a substantial source of GHG emissions through the burning of petroleum-based fuel. Any process that burns fossil fuel releases $CO_2$ into the air. Because the Southwest Transitway LRT is a transportation project, and $CO_2$ is the primary GHG emitted by vehicles, it is the focus of this analysis.

Changes in $CO_2$ emissions from fossil fuel combustion are influenced by many long-term and short-term factors—some of which change daily—including fuel prices, future VMT, future federal regulations and international agreements, estimates of carbon emissions from current and future fuels, timeframes for phasing in standards, land use development patterns, economic impacts of changing fuel, food, and crop prices, seasonal temperatures, consumer response to regulations, price increases, lifestyle changes, and new vehicle technology and fuel. On an annual basis, the overall consumption of fossil fuels in the United States generally fluctuates in response to changes in general economic conditions, energy prices, weather, and the availability of nonfossil alternatives (Center for Transportation Studies, University of Minnesota, June 2008).

Transportation currently accounts for an estimated 24 percent of Minnesota's $CO_2$ emissions (about 55 percent is attributable to coal use for the utility sector). Passenger cars account for nearly two-thirds of this amount and commercial vehicles powered by diesel engines account for about 16 percent. The remainder comes from aviation rail, marine, and off-road vehicles. Vehicle $CO_2$ emissions are predicted to increase by 2025 because VMT is expected to increase annually at the rate of 0.9 percent, as projected by MnDOT. Historically, Minnesota's VMT growth trend has been close to 2.3 percent, but growth has been flat over the past several years (Center for Transportation Studies, University of Minnesota, June 2008).

To support the 2007 Minnesota Next Generation Energy Act, the legislature funded a study to evaluate potential strategies for the transportation sector to help the state meet the legislated goals—Reducing Greenhouse Gas Emissions From Transportation Sources in Minnesota, by the Center for Transportation Studies at the U of M—which was released in June 2008. Some key findings of the study include the following:

- The study estimates that the federal CAFE standards or the California standards could contribute between 61 percent and 64 percent of the target emissions reductions for the transportation sector in 2015. In 2025, assuming no further efficiency improvements past 2020 (the final year for each standard), CAFE standards could contribute about 66 percent and California standards about 80 percent for the transportation reduction goal.
- The study encourages low-interest loans to Minnesota-based truckers to help implement GHG reduction strategies.
- The study shows that if Minnesota adopts a low-carbon standard requiring low-carbon biofuels and alternatives fuels, $CO_2$ emissions would fall by 10 percent by 2020 and 12 percent by 2025. This policy, according to the study, could contribute 27 percent of Minnesota's transportation reduction goals in 2015 and 40 percent in 2025.
- The amount of travel has a very significant effect on the success of the state's GHG goals, but it is the area with greatest uncertainty, particularly with rising gas prices. The team conducting the study researched a range of policies that reduce VMT—alternative travel modes, improved urban form, mixed land-use, population densification, pricing, telecommuting, pay-as-you-drive insurance, improved freight efficiency, and process alteration (such as creating an office of sustainability in MnDOT. Each implemented VMT reduction policy reduces total VMT between 0.1 percent and 5.3 percent in 2025. Combined, they would represent up to 14 percent of the transportation sector's goal for reduction in 2025.
- An important step in meeting the 2050 target is to develop infrastructure to shift the long-distance transport of freight and passengers to more efficient modes, such as rail. The study notes that recent data show that, on average, buses produce 16 percent less GHG per passenger-mile than personal vehicles. Commuter and light rail can yield GHG reductions of 40 percent and 75 percent, respectively, while choosing rail rather than air for long-distance passenger travel reduces emissions up to 28 percent.

### 9.7.3 Long-Term Effects

If historic and recent transportation trends continue, $CO_2$ emissions will continue to increase. By 2030, $CO_2$ emitted from vehicles on all regional (7-country metropolitan planning area) roadways, including I-94, are expected to increase over existing conditions. For example, the population is expected to increase in the study area by 30 percent between 2000 and 2030, which could have a dramatic effect on the VMT in the region.

Without the Southwest Transitway LRT improvements (the No Build Alternative), traffic in the corridor could produce 0.07 percent more GHG emissions by 2030 compared to the Build Alternatives, and the Baseline Alternative could produce 0.05 percent more GHG emissions by 2030 compared to the any of the Build Alternatives.

### 9.7.4 Short-Term Construction Effects

Short-term emissions of GHG that could potentially affect climate change in the long-term due to construction of the Build Alternatives would include emissions from vehicles due to traffic detours implemented, and construction vehicles within the construction sites.

### 9.7.5 Mitigation

Emissions of GHG due to construction operations for the Build Alternatives would be mitigated by implementation of BMPs including the following:

- A construction traffic control plan would be developed prior to construction to minimize the amount of additional vehicle emissions due to traffic issues as a result of the project's construction
- Construction, operation, and maintenance vehicles would be routinely maintained to make sure that engines remain tuned and emission-control equipment is properly functioning as required by law
- No unnecessary idling of vehicles or construction equipment will be allowed.