



SOUTHWEST
transitway

green means go.

Southwest LRT Locally Preferred Alternative (LPA) Report

DRAFT Under TAC Review

PRELIMINARY
FOR REVIEW ONLY

September 10, 2009

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1.0 PURPOSE

1.1 Overview of the Project

The Southwest LRT is a proposed transit project intended to improve mobility in the southwest region of the Twin Cities metro area including the cities of Eden Prairie, Minnetonka, Hopkins, Edina, St. Louis Park, and Minneapolis. It is the intent of the Hennepin County Regional Railroad Authority (HCRRA) to partner with the Federal Transit Administration (FTA) as lead agencies to develop the Southwest LRT as a major transit capital investment.

1.2 Project Description

1.2.1 Introduction

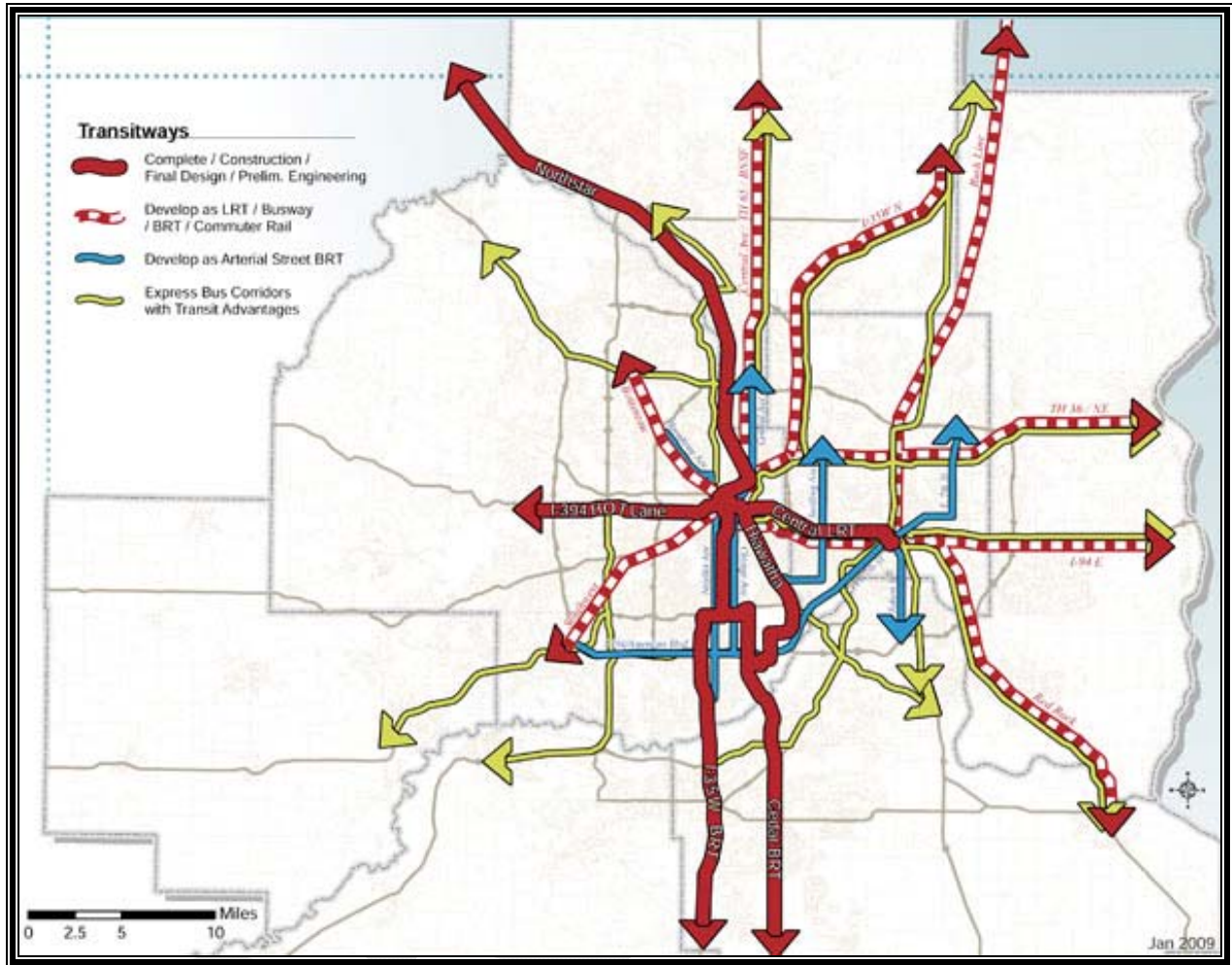
The Southwest LRT is a proposed 14-mile light rail transit (LRT) line in the Minneapolis/St. Paul region, connecting downtown Minneapolis to high growth areas in the southwest suburbs. The LRT line will increase transportation system capacity in an area of high travel demand, respond to travel demand created by existing and planned residential and employment growth, provide a competitive travel option that will attract 'choice' riders (who have a choice between transit and driving) and serve transit dependent populations. This line will also be an expansion of the region's transitway system comprised of the Hiawatha LRT line, the Northstar Commuter Rail (under construction), the Central Corridor LRT line (proposed), and the Bottineau Corridor (proposed). Figure 1 shows the proposed regional transitway system in the region including the Southwest LRT.

Three primary factors make the Southwest LRT project important for people who live and work in the southwest metro area: 1) growing roadway congestion; 2) lack of competitive, reliable transit options for choice riders and transit dependent persons; and 3) lack of reverse commute transit service.

1.2.2 Study Area Description

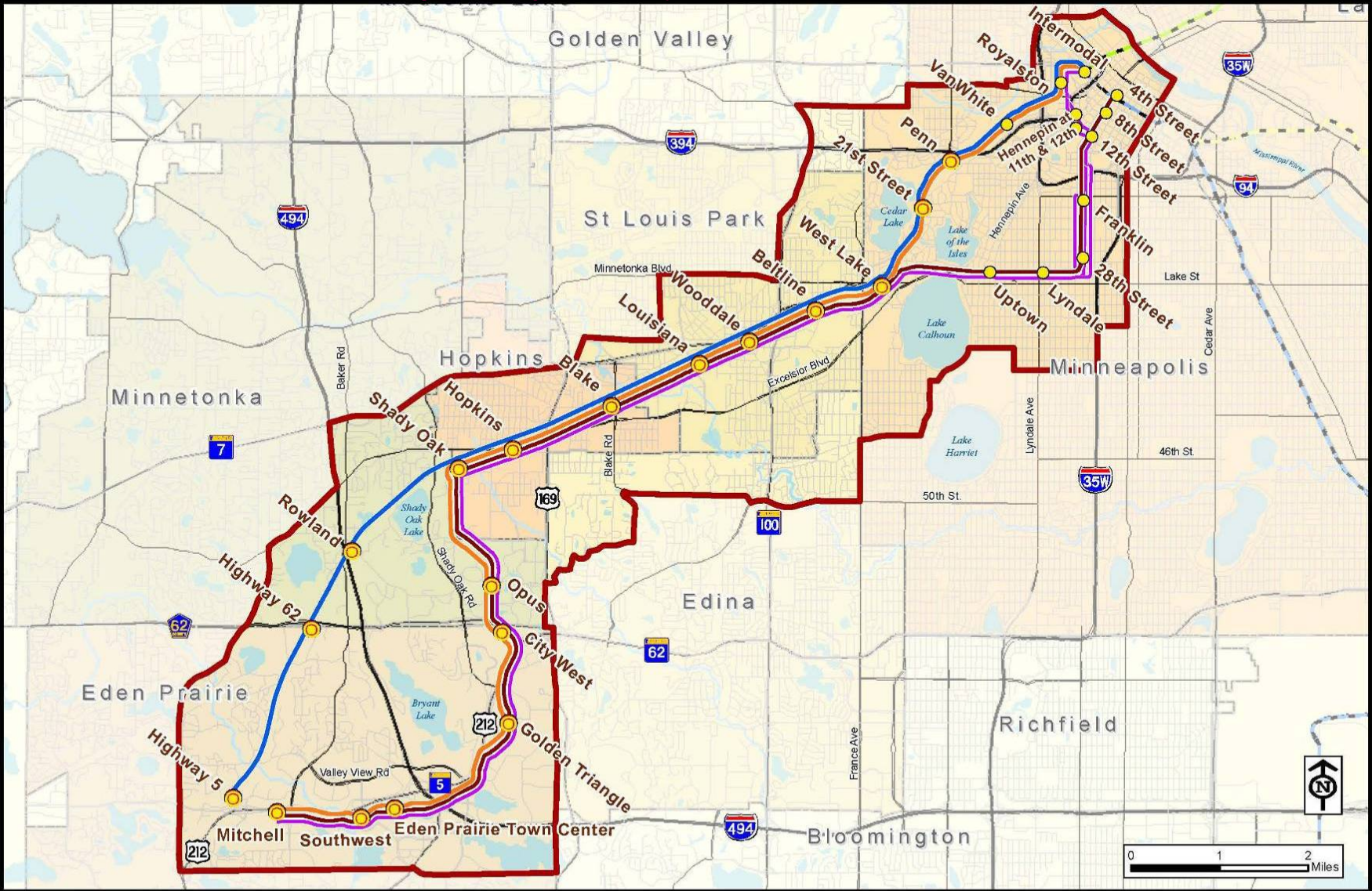
The Study Area encompasses the linear corridors for the proposed LRT alignments originating in downtown Minneapolis and traversing the southwest metro area to terminate in Eden Prairie. The Study Area was defined as the geographic area within the cities of Eden Prairie, Minnetonka, Hopkins, St. Louis Park, and southwestern and downtown Minneapolis. The study area is bounded roughly by I-494 to the south, the HCRRA right-of-way (ROW) and I-494 to the west, TH 169 south of Excelsior Boulevard and I-35W south of downtown Minneapolis to the east, and I-394 to the north. Refer to Figure 2 for a map of the proposed LRT alternatives and the Study Area.

Figure 1 - Proposed Regional Transitways



Source: The Metropolitan Council 2030 Transportation Policy Plan (TPP), January 2009.

Figure 2 - Study Area and Proposed LRT Alternatives



LPA Report

Legend

Study Area

Station

Park & Ride Station

LRT 1A

LRT 3A

LRT 3C-1 (Nicoret Mall)

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

Hiawatha Light Rail

Northstar Commuter Rail

Central Corridor Light Rail

Municipal Boundaries

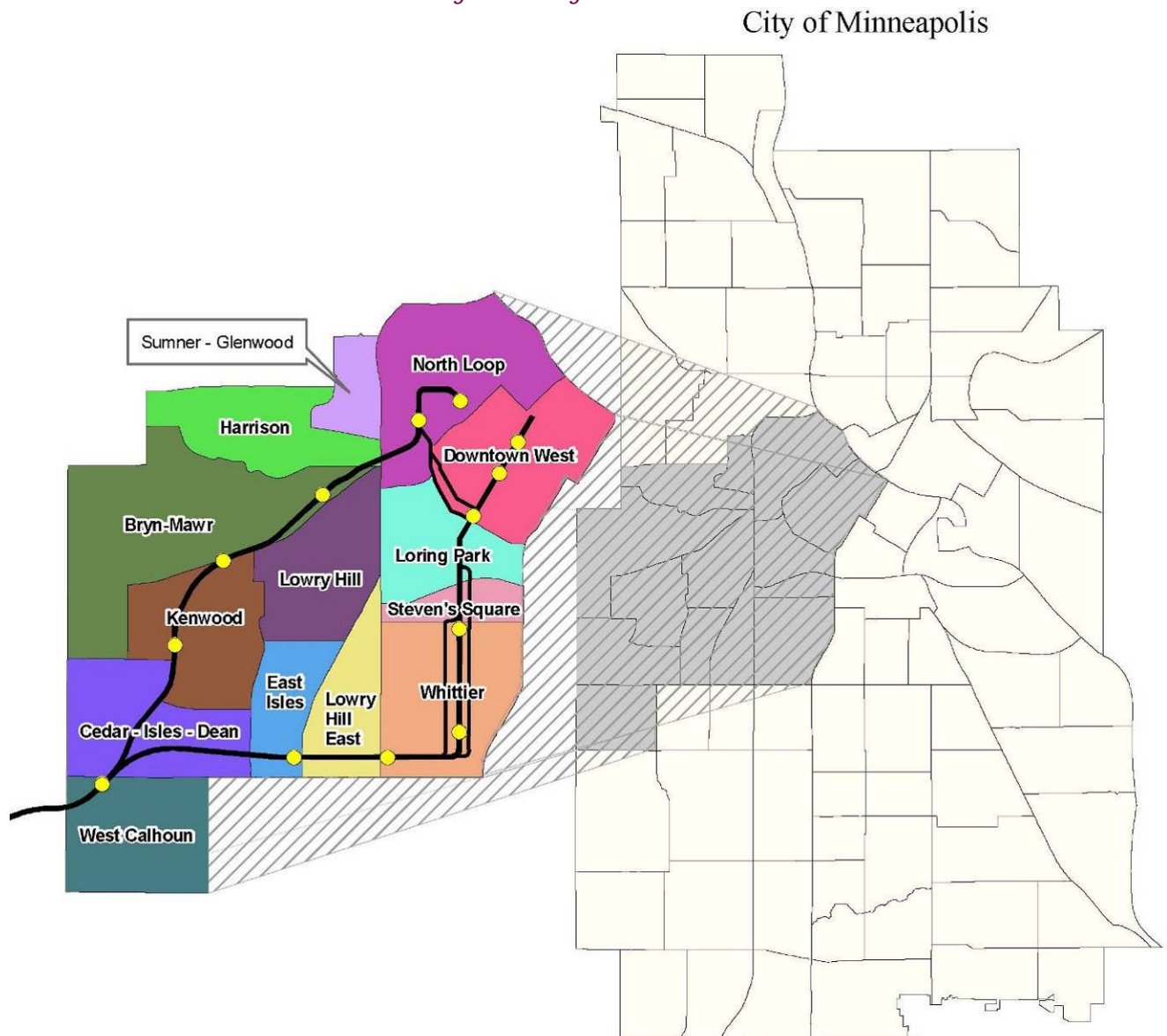
As documented in the 2007 Southwest Transitway Alternatives Analysis (AA) Purpose and Need statement, the Study Area is experiencing significant roadway congestion resulting from high residential and employment growth and limited infrastructure improvements. In terms of travel, currently 27 percent of all regional trips begin or end in the corridor, and 65 percent of all trips originating within the Study Area remain within the Study Area—people who live in the Study Area, also work in the Study Area. The Study Area is also home to many major employers. Downtown Minneapolis is the region's largest employment center with over 140,000 jobs (78 jobs/acre), and the Golden Triangle is the region's sixth largest employment center with over 20,000 jobs (4 jobs/acre). In addition to the high employment, this area has also experienced high residential growth with over 31,200 new residences since 1980—new homes in Eden Prairie accounted for more than half of this number. As a result of this strong growth, travel on area roadways has increased between 80 and 150 percent in the past 25 years. A number of study-area roadways—TH 100, TH 169, TH 62, I-494, I-394, and TH 7—have been identified by the Minnesota Department of Transportation (Mn/DOT) as having a high mobility deficiency rating. According to Mn/DOT's Metro District long-range transportation plan, the Transportation System Plan (TSP), there are no plans for major expansions or improvements to roadways in the Study Area.

Suburban express bus ridership in the area served by Metro Transit and SouthWest Transit has more than doubled in the past ten years and surpassed one million annual riders for the first time in 2007. Transit advantages, including bus shoulder-lanes, park-and-ride lots, and ramp meter bypass lanes have been implemented throughout the area, but bus speeds remain limited, even on shoulder-lanes, to a maximum of 35 miles per hour (mph) under congested conditions. Due to lack of planned highway capacity additions and transit facility capacity limitations in downtown Minneapolis, increased future travel demand by drivers and bus riders will not be adequately met. The bus system uses the same congested roadways as motorists so it is difficult to provide the significant travel time advantages that would attract "choice" riders to the transit system and to adequately serve transit-dependent people in and around downtown Minneapolis.

Reverse commute transit service is deficient in the Study Area. In addition to the strong job growth in downtown Minneapolis, the other cities have experienced, and are projected to continue to experience, substantial job growth into the future. This trend is shown by the 65 percent of the trips generated in the Study Area that remain within the Study Area. Many of these trips are reverse commute trips from the near-downtown neighborhoods to job centers in suburban locations. Currently these job centers are largely inaccessible by transit.

The Study Area roadway network is oriented north-south/east-west whereas development patterns have radiated outward from downtown Minneapolis on a diagonal to the southwest. Travel time is added to vehicle and transit trips due to the orientation of the roadway system. The number of transit-dependent people in the Study Area is growing, especially in and around downtown Minneapolis. The areas of growth include the North Loop, Harrison, and Bryn Mawr neighborhoods. The direction of the roadway network in these areas, especially Harrison and Bryn Mawr, makes it difficult to provide competitive transit travel times. The roadway network through these neighborhoods is circuitous and has many one-way streets. In many cases, people who live only a few miles from downtown Minneapolis have transit travel times ranging from nine minutes to 13 minutes because of the roadway network used by the bus system. Refer to Figure 3 for a map of neighborhoods in Minneapolis.

Figure 3 - Neighborhoods



1.3 Planning and Project Development Process for New Starts Projects

FTA's discretionary New Starts program is the federal government's primary financial resource for supporting locally-planned, implemented, and operated transit "guideway" capital investments.

Major transit infrastructure projects, which are candidates for the FTA's Section 5309 New Starts program, progress through a specific project development process, including the Alternatives Analysis (AA), Preliminary Engineering (PE), Final Design (FD), and Construction. Projects eligible for New Starts (49 USC §5309) funding include "any fixed-guideway system that utilizes and occupies a separate ROW or rail line for the exclusive use of mass transportation and other high occupancy vehicles, or uses a fixed catenary system and a ROW

usable by other forms of transportation. This includes, but is not limited to, rapid rail, light rail, commuter rail, automated guideway transit, people movers, and exclusive facilities for buses (such as bus rapid transit) and other high occupancy vehicles.”¹

The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) directs FTA to evaluate and rate candidate New Starts projects as an input to federal funding decisions and at specific milestones throughout each project’s planning and development. SAFETEA-LU further supports a comprehensive planning and project development process that New Starts projects must follow, and which is intended to assist local agencies and decision-makers to evaluate alternative strategies for addressing transportation problems in specified corridors and to select the most appropriate improvement to advance into engineering, design, and construction. Planning and project development for New Starts projects is a continuum of analytical activities carried out as part of metropolitan systems planning and National Environmental Policy Act of 1969 (NEPA) review processes.

Projects seeking New Starts funding must emerge from a locally-driven, multimodal corridor planning process. There are three key phases in the planning and project development process for projects seeking New Starts funding: 1) Alternatives Analysis; 2) Preliminary Engineering; and 3) Final Design. These key phases are discussed in further detail. Figure 4 presents the project development process for major capital transit investments below.

Figure 4 - Project Development Process



1.3.1 Alternatives Analysis

To specifically qualify for New Starts funding (49 USC §5309), projects must complete an alternatives analysis which evaluates appropriate modal and alignment options for addressing documented mobility needs in the Study Area. The Alternatives Analysis can be viewed as a bridge between systems planning (which identifies regional travel patterns and transportation corridors in need of improvements) and project development (where a project’s design is refined sufficiently to complete the NEPA environmental process). The AA is intended to compare the

¹ FTA. New Starts Project Planning and Development. http://www.fta.dot.gov/printer_friendly/planning_environment_5221.html

benefits, costs, and impacts of alternatives to determine which LRT alternative best addresses the purpose and need for the project.

The AA is considered complete when a locally preferred alternative (LPA) is selected by local and regional decision-makers and adopted by the metropolitan planning organization (MPO) into the financially constrained long range metropolitan transportation plan. At this point, the local project sponsor may submit to FTA the LPA's New Starts project justification and local financial commitment criteria and request FTA's approval to enter into the preliminary engineering phase of project development. Refer to Appendix A in the Southwest LRT *Technical Memorandum No. 1 Project Development Process* for more details on the New Starts project justification and local financial commitment criteria.

1.3.2 Preliminary Engineering

Preliminary Engineering (PE) includes refinement of the LPA's design with consideration of all reasonable design alternatives. PE results in estimates of project costs, benefits, and impacts at a level of detail necessary to complete the NEPA process, the culmination of which is a Record of Decision (ROD). PE for a New Starts project is considered complete when FTA has issued a ROD as required by NEPA. Projects that complete PE and whose sponsors are determined by FTA to have the technical capability to advance further in the project development process must request FTA approval to enter final design and submit updated New Starts criteria for evaluation.

1.3.3 Final Design

Final design (FD) is the last phase of project development, and includes ROW acquisition, utility relocation, the preparation of final construction plans (including construction management plans), detailed specifications, construction cost estimates, and bid documents.

1.4 National Environmental Policy Act (NEPA)/Minnesota Environmental Policy Act (MEPA)

As the public agency responsible for completing the Draft Environmental Impact Statement (DEIS), the HCRRA is required to comply with the requirements of the Minnesota Environmental Quality Board (EQB) pursuant to the Minnesota Environmental Policy Act (MEPA)² (Minn.Stat. §116D.04 and 116D.045). The project will also pursue federal funding from the FTA. As a result, the FTA is required to undertake environmental review in compliance with NEPA³. The FTA, as the federal lead agency under NEPA, and the HCRRA, as the responsible governmental unit (RGU) under EQB, has determined that the Southwest LRT project may have significant environmental impacts. To satisfy both NEPA and EQB requirements, the HCRRA and the FTA are preparing a DEIS for the Southwest LRT project.

² The Minnesota Environmental Quality Board (EQB) plays a vital role in Minnesota's environment and development. The board develops policy, creates long-range plans, and reviews proposed projects that would significantly influence Minnesota's environment. The EQB writes the rules for conducting environmental reviews. The EQB's environmental review duties are directed by Minnesota Environmental Policy Act Laws 1973, Chapter 412 (MEPA) Minnesota Statutes 116D.04.

³ The National Environmental Policy Act (NEPA) [42 U.S.C. 4321et seq.] was signed into law on January 1, 1970. The Act establishes national environmental policy and goals for the protection, maintenance, and enhancement of the environment, and it provides a process for implementing these goals within the federal agencies. NEPA requires federal agencies to integrate environmental values into their decision-making processes by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions.

The preparation of an Environmental Impact Statement (EIS) consists of four primary components:

1. Scoping – a process by which the purpose and need for the project is determined and or refined; reasonable alternatives to meet the project purpose and need are developed; and key social, economic, and environmental issues that will be analyzed are identified.
2. Draft Environmental Impact Statement – a detailed evaluation of the social, economic, and environmental impacts of the proposed project and identification of mitigation requirements (presuming that impacts cannot be avoided). Once complete, the DEIS is published and made available to federal, state, and local agencies and the general public for review and comment.
3. Final Environmental Impact Statement – the FEIS addresses substantive comments from agencies and the public on the project, updates impacts, and finalizes mitigation requirements.
4. Record of Decision – as noted above, the successful completion of the EIS process results in a ROD that documents the decision made by the lead federal agency, along with mitigation commitments. At the state level, the satisfactory completion of the EIS process results in the RGU issuing an Adequacy Determination.

The current phase of the Southwest LRT project includes the scoping and DEIS components of the overall EIS process. FTA integrates environmental policy into all planning and decision-making procedures in order to balance infrastructure, economic prosperity, health and environmental protection, community and neighborhood preservation, and quality of life when making decisions about initiating new transit infrastructure or making improvements to existing infrastructure. FTA and the HCRRA work with federal resource agencies; affected state, local and tribal governments; public and private organizations; and the general public to balance these goals. Refer to Appendix B in the Southwest LRT *Technical Memorandum No. 1 Project Development Process* for a listing of the federal, state and local agencies involved in the Southwest LRT DEIS process.

NEPA establishes an umbrella process for coordinating compliance with each law through the preparation of an EIS for all major federal actions significantly affecting the environment. The regulations of the Council on Environmental Quality (CEQ) implementing NEPA ensure that information on the social and environmental impacts of any federally funded action is available to public officials and citizens before decisions are made and before actions are taken. NEPA regulations direct federal agencies to integrate into their planning and decision-making the natural and social sciences, environmental amenities and values, and the design arts along with the necessary engineering and economic considerations. The objective is to balance infrastructure development, economic prosperity, health and environmental protection, community and neighborhood preservation, and quality of life.

In addition to NEPA, the provisions of other statutes, regulations and executive orders affect the decision-making on federally assisted transportation projects. These mandates and considerations cover such concerns as air and water quality, historic preservation, parklands protection, habitat preservation, civil rights and social burdens of transportation investments. FTA uses the NEPA process as the overarching umbrella under which the mandates and considerations of all laws affecting transit project development are considered.

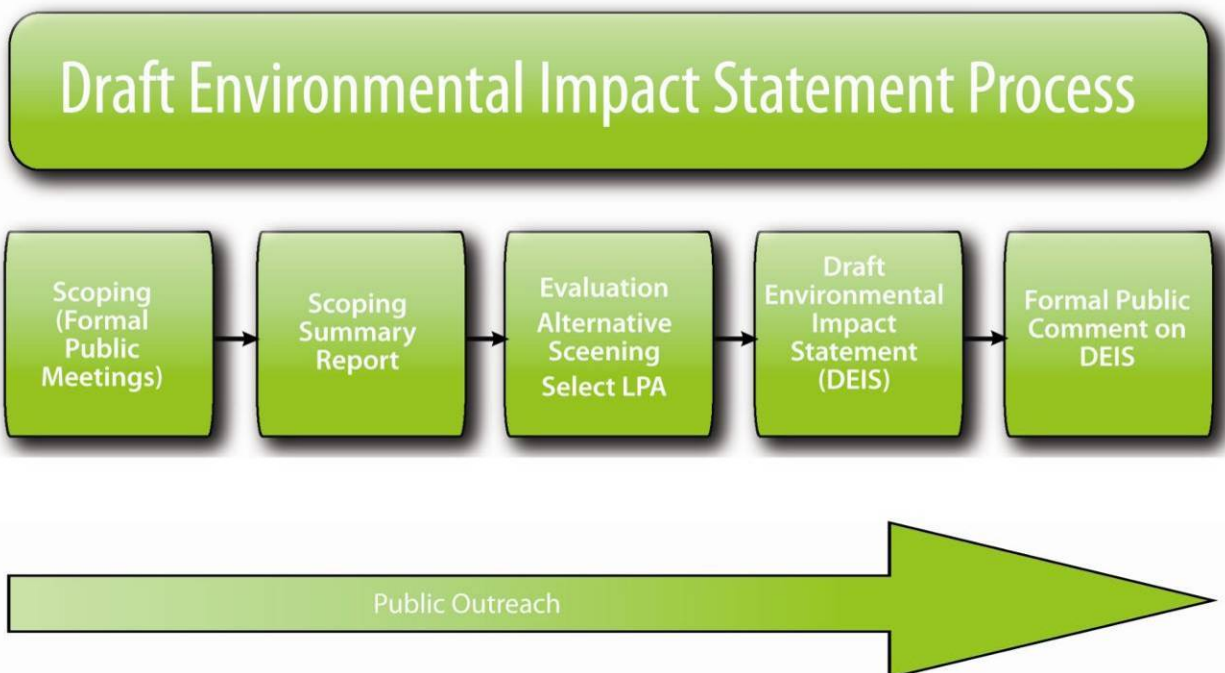
1.5 Southwest LRT Project Development Process

The Southwest LRT delivered an AA in 2007. During the AA process, a Transportation System Management (TSM) or Enhanced Bus Alternative along with ten build alternatives were evaluated. The ten build alternatives include two bus rapid transit (BRT) and eight light rail transit (LRT) alternatives. After a thorough review process and extensive public involvement, the ten build alternatives were narrowed to three LRT alternatives (LRT 1A, LRT 3A, and LRT 3C) for further evaluation during the DEIS process through which the LPA would be selected.

Although the Southwest LRT project did not conduct environmental streamlining by conducting an AA/DEIS, the project did intend to consider potential impacts to critical environmental resources prior to selecting the LPA. In addition, the Southwest LRT project intended to conduct the NEPA/MEPA Scoping process prior to selection of the LPA. The intent of proceeding in this fashion was to ensure consideration of potential impacts to critical environmental resources and allow the public and resource agencies the opportunity to officially comment on the purpose and need for the project and the proposed alternatives prior to selection of the LPA.

The DEIS process is illustrated in Figure 5. The intent was to begin the process by conducting NEPA/MEPA Scoping for the alternatives recommended for further evaluation during the DEIS process. After the NEPA/MEPA Scoping process was completed, a screening process would be conducted to further evaluate the alternatives including an assessment of the potential for impacts to critical environmental resources prior to selection of the LPA. The screening process would be conducted in a manner consistent with the FTA New Starts guidance and NEPA. After the LPA was selected, the DEIS would be completed.

Figure 5 - DEIS Process



The process for selection of the LPA will include screening of the alternatives to determine which one best meets the purpose and need for the project as documented in Chapter three of the Southwest Transitway Alternatives Analysis (AA), 2007. A preliminary LPA recommendation

will be made by the Southwest Technical Advisory Committee (TAC), a group composed of staff planners and engineers from the affected agencies. The preliminary LPA recommendation will be shared with the public and the resource agencies. A formal public hearing convened by the HCRRA on behalf of the Southwest Policy Advisory Committee (PAC) will occur to formally receive public comment on the preliminary LPA before the PAC will act to recommend a final LPA to the HCRRA. The HCRRA will then consider the final LPA recommendation at a formal HCRRA meeting and forward a request to the Metropolitan Council, acting as the Metropolitan Planning Organization (MPO), to amend the long-range transportation plan—the Transportation Policy Plan (TPP)—to include the Southwest LRT LPA.

The purpose of the DEIS process is to explore in a public setting the effects of the proposed alternatives on the physical, human, and natural environment. All potentially significant environmental, social, economic, and transportation benefits and impacts of the proposed alternatives will be evaluated and include the following topic areas:

- Ecosystems and natural resource benefits and impacts including geology and soils, air quality, water resources including hydrology and water quality, noise, and vibration;
- Land use, zoning, and economic development;
- Demographics and socioeconomic factors;
- Displacements and relocations;
- Neighborhood compatibility, community facilities and services, and environmental justice;
- Visual quality and aesthetic characteristics;
- Cultural resource benefits and impacts, including those related to historical and archaeological resources, traditional cultural resources, parklands/recreation;
- Section 4(f) impacts;
- Hazardous materials;
- Energy use;
- Construction effects; and
- Transportation benefits and impacts (including transit, roads and highways, railroads, and pedestrian and bicycle facilities).

2.0 DEFINITION OF ALTERNATIVES

2.1 Background

The Southwest Transitway AA, 2007, identified three light rail transit (LRT) alternatives (LRT 1A, 3A and 3C), as well as a Transportation System Management (TSM) alternative for further evaluation in the Draft Environmental Impact Statement (DEIS) Process, during which the LPA would be selected. The intent was to provide an opportunity for the public and resource agencies to formally comment on the alternatives through the NEPA/MEPA Scoping process and to consider potential impacts to critical environmental resources prior to selection of the LPA.

On September 8, 2008, the Hennepin County Regional Railroad Authority (HCRRA) and the Federal Transit Administration (FTA) initiated the NEPA/MEPA Scoping comment period. The comment period ended on November 7, 2008. As part of that comment period process, a Scoping booklet was drafted that included the proposed alternatives for inclusion in the DEIS process. The alternatives identified in the Scoping booklet included a No-Build Alternative, which is required under the NEPA/MEPA process, the Enhanced Bus Alternative, which serves as the TSM/Baseline Alternative required under the FTA New Starts program, and the three Light Rail Transit (LRT) alternatives from the AA, 2007. For a detailed description of the three LRT alternatives refer to Appendix A in the Southwest LRT *Technical Memorandum No. 2 Description of the Alternatives* for a copy of the Alternatives Analysis *Technical Memorandum 3: Definition of Alternatives* and Appendix B in the Southwest LRT *Technical Memorandum No. 2 Description of the Alternatives* for the Scoping information booklet in English. These materials can also be found on the project website: <http://www.southwesttransitway.org/publications.html>.

2.2 Alternatives Recommended by the AA Study

The AA was initiated in 2005 and involved the study of ten potential build alternatives including eight LRT alignments and two bus rapid transit (BRT) alignments. In addition to the build alternatives, a “No-Build Alternative”⁴ and Enhanced Bus Alternative (referred to as the Baseline Alternative⁵) were also considered among the options evaluated pursuant to FTA criteria. The HCRRA oversaw the analysis and development of the alternatives contained in the AA. The AA was intended to formally study a variety of alternatives that could address the mobility challenges and opportunities identified within the Southwest corridor.

2.2.1 Alternative Development Process

The AA identified and evaluated alternatives through a two-phase process. The first phase was the alternative selection process that identified plausible alternatives and transit technologies that best achieved the goals and objectives of the project. The second phase was the analysis of the alternatives to determine the alignments that best satisfied the intended project goals in light of the purpose and need of the project.

⁴ The No-Build Alternative is defined as the existing transportation system plus transportation enhancement projects for which funding has been committed, contained in the Metropolitan Council’s 2030 Transportation Policy Plan (TPP). The current transit facilities and services, with minimal modifications or expansions, form the basis of this alternative. A No-Build Alternative provides a benchmark against which project alternatives may be compared to one another.

⁵ The Baseline Alternative may be defined as the existing transit system plus low capital cost enhancements intended to improve operating efficiencies. This alternative serves as a basis for comparison to the build alternatives as part of the FTA’s New Starts Process, and is designed as the “best that can be done” alternative. Low capital cost infrastructure and bus transit improvements include intelligent transportation systems (ITS) techniques, travel demand management (TDM) strategies, and other system improvements.

The initial step was a review of previous plans and studies for the Southwest LRT to identify and screen potential alignment segments, identify significant planning and environmental issues, opportunities, or constraints the project would contend with, and develop a contextual background dataset and knowledge base for project planners. Several planning studies were conducted and their results adopted by a variety of governing agencies, including the Mn/DOT, Hennepin County and the HCRRA, and the Metropolitan Council. These reports and studies included the *Comprehensive LRT System Plan for Hennepin County* (1988), the *Draft Environmental Impact Statement Hennepin County Light Rail Transit System* (1988), the *Transit 2020 Master Plan* (2000), and the *Southwest Rail Transit Study* (2003), and the regional *2030 Transportation Policy Plan* (2004) among other plans and studies.

The second step involved the identification of goals and objectives to address mobility, community, and environmental needs in the Study Area. Refer to Table 1 for the Project Goals and Objectives. These goals were prioritized in a two-tiered order, with Tier One goals being those that must be achieved in order for the project to be viable, and Tier Two goals being those that should be achieved assuming the project is viable. Refer to Figure 2 for a map of the Study Area.

The third step was to define the transit technologies most capable of addressing the travel needs of the Study Area. A broad range of alternatives were considered, including conventional buses, LRT, BRT and commuter rail. Each of the alternative technologies were evaluated based on four criteria; 1) compatibility with the Study Area's transit travel demand; 2) proven technology; 3) compatible with existing infrastructure; 4) identified in the region's long-range transportation plan and other studies.

Table 1 - Project Goals and Objectives

Tier	Goals and Objectives
Tier One	Improve Mobility
	Provide a Cost-Effective and Efficient Travel Option
Tier Two	Protect the Environment
	Preserve the Quality of Life
	Support Economic Development

Source: Southwest Transitway Alternatives Analysis Final Report, 2007.

The fourth step was to identify the alignments, which involved identifying potential station locations and the routes linking them. Station location selection was based on several factors including existing and proposed land uses, accessibility, community and environmental considerations, and station spacing for transit operations. The guidelines for selecting routes between stations included minimizing travel time, capital and operating costs, and environmental and community impacts. Through this process, the initial alignment alternatives were established.

Finally, steps five and six involved the combination of alternatives and the selected transit technologies relative to the project goals for presentation to the public and agencies. The initial set of alternatives included a No-Build Alternative (required for consideration by the FTA), an Enhanced Bus Alternative, and BRT and LRT alternatives. Preliminary operating plans for the

alternatives were also developed. Public and agency comments were sought as part of this process. Following public and agency responses, the alternatives were modified into refined alternatives for evaluation during the conclusion of the AA.

2.2.2 Evaluation of Preliminary Alternatives in the AA

The second phase of the alternative selection process was to evaluate the alternatives against the project goals and objectives. As noted, ten potential build alternatives were advanced for consideration in the AA following the alternative selection process. To evaluate the alternatives equally, a set of evaluation criteria were established to provide the technical framework necessary to assess each alternative's suitability with the project goals and objectives. The Southwest Technical Advisory Committee (TAC) developed the evaluation criteria, and the Southwest Policy Advisory Committee (PAC) approved the evaluation measures. The evaluation measures included several components of the FTA's New Starts Project Justification Criteria.

The methodology and approach for screening the initial alternatives was a blend of quantitative and qualitative information. The evaluation measures were drawn from the five project goals: assessed impacts and influences on transportation systems; mobility; populations served and travel patterns; capital and operating costs; impacts to and compatibility with the natural, manmade, and social environment; and potential for and influence on economic development. Assumptions and analysis methodologies were developed for each of the criteria in order to provide a common basis of comparison for the build alternatives relative to the No-Build Alternative. The data were aggregated into ratings that indicated the performance of each alternative relative to the goals and evaluation measures. The following rating system was used:

- Alternative Strongly Supports the Goal
- Alternative Supports the Goal
- Alternative Does Not Support the Goal

Table 2 presents the summary findings from the AA for the ten build alternatives and the Baseline Alternative considered. Screening of the alternatives resulted in a "short-list" of three fixed guideway LRT alternatives to be carried forward for further consideration with the ultimate goal of identifying an LPA. These alignments satisfied the goals and deemed to best fit the purpose and need of the project. The three short-listed alternatives are the LRT 1A, LRT 3A, and LRT 3C alternatives. All three alignment alternatives would provide a dual LRT guideway with exclusive and semi-exclusive ROW. The routes would primarily run at grade, with the exception of the LRT 3C alignment, which would require the construction of a shallow cut-and-cover tunnel between the Midtown Corridor and Franklin Avenue in Minneapolis. Additional information on the ratings and analysis methods are provided in the AA.

Table 2 - Evaluation Results of the Southwest Transitway Alternatives Analysis (AA)

Alternatives	Tier 1 Goals		Results	Tier 2 Goals			Recommendation
	Goal 1: Improve Mobility	Goal 2: Provide a Cost-Effective, Efficient Travel Option		Goal 3: Protect the Environment	Goal 4: Preserve and Protect the Quality of Life in the Study Area and Region	Goal 5: Support Economic Development	
Enhanced Bus (Baseline)	Carry forward as Baseline alternative (Required)			Carry forward as Baseline alternative (Required)			Carry forward as Baseline Alternative
BRT 1 - Eden Prairie to Minneapolis, HCRRA	●	●	Does not meet Tier 1 Goals; Do not carry forward				
BRT 2¹ - Eden Prairie to Minneapolis, Golden Triangle/Opus/TH 169/HCRRA	●	●	Does not meet Tier 1 Goals; Do not carry forward				
LRT 1A - Eden Prairie to Minneapolis, HCRRA/ Kenilworth/ Royalston	◐	◐	Meets Tier 1 Goals; Carry Forward to Tier 2	◐	◐	◐	Carry forward for further analysis
LRT 2A¹ - Eden Prairie to Minneapolis, I-494/HCRRA /Kenilworth/Royalston	◐	◐	Meets Tier 1 Goals; Carry Forward to Tier 2	◐	◐	◐	Other alternatives better meet Tier 2 Goals. Do not carry
LRT 3A¹ - Eden Prairie to Minneapolis, Golden Triangle/ Opus/ HCRRA/ Kenilworth/ Royalston	◐	◐	Meets Tier 1 Goals; Carry Forward to Tier 2	◐	◐	○	Carry forward for further analysis
LRT 4A - Hopkins to Minneapolis, HCRRA/ Kenilworth/ Royalston	●	◐	Part of full alternative. Do not carry forward				
LRT 1C - Eden Prairie to Minneapolis, HCRRA/ Midtown/ Nicollet	◐	●	Does not meet Tier 1 Goals; Do not carry forward				
LRT 2C - Eden Prairie to Minneapolis, I-494/ HCRRA/ Midtown/ Nicollet	◐	●	Does not meet Tier 1 Goals; Do not carry forward				
LRT 3C - Eden Prairie to Minneapolis, Golden Triangle/ Opus/ HCRRA/ Midtown/ Nicollet	◐	◐	Meets Tier 1 Goals; Carry Forward to Tier 2	◐	◐	○	Carry forward for further analysis
LRT 4C¹ - Hopkins to Minneapolis, HCRRA/ Midtown/ Nicollet	●	●	Part of full alternative. Do not carry forward				
¹ Estimated not modeled							
Evaluation Breakpoints							
● Does not support goal				Supports goal on fewer than 4 of 6 measures	Supports goal on fewer than 7 of 10 measures	Supports goal on fewer than 3 of 4 measures	
◐ Supports goal				Supports goal on 4 of 6 measures	Supports goal on 7 of 10 measures	Supports goal on 3 of 4 measures	
○ Strongly supports goal				Supports goal on all measures	Supports goal on all measures	Supports goal on all measures	
¹ Estimated not Modeled							

Source: Southwest Transitway Alternatives Analysis Final Report, 2007.

2.3 NEPA/MEPA Scoping Process

Scoping is the first step in the NEPA process. Scoping is a two-way communication tool in which information about the proposed project is provided and input is requested from the public, interest groups, affected tribes, and government agencies. The Scoping process includes opportunities for public input through public meetings, stakeholder meetings, agency meetings, publication of notices and news articles, and acceptance and review of written and verbal comments.

The NEPA/MEPA Scoping process provides the public and government agencies with an opportunity to review and comment on the alternatives to be considered, provide comment on the purpose and need of the project, identify significant environmental issues, and suggest appropriate planning alternatives that address the purpose and need of the project. The Scoping process officially began with a notice published in Finance and Commerce on August 23, 2008, and the publication of the Notice of Intent (NOI) in the Minnesota Environmental Quality Board (EQB) Monitor on September 8, 2008 and the Federal Register on September 23, 2008. These notices announced the beginning of the Scoping comment period, which extended from September 8, 2008 to November 7, 2008. The Scoping process included three formal public meetings and one agency meeting where verbal comments were recorded and written comments received.

2.3.1 Alternatives Proposed

During the NEPA/MEPA Scoping period, two additional alternatives were proposed. These new alternatives were referred to as the LRT 3E Alternative and the LRT 3C (11th/12th Sub-Alternative). The LRT 3E alignment was exclusive to the Minneapolis end-of-line, following a similar alignment path as the LRT 3C alternative down the Midtown Corridor. Instead of following the original LRT 3C alignment down Nicollet Mall, the LRT 3E alignment would travel further east and use Park Avenue and 10th Street South to access downtown Minneapolis.

Minneapolis Councilmember Remington proposed the LRT 3C (11th/12th Sub-Alternative), as an alternate to the LRT 3C alternative for the area between the Midtown Corridor and downtown Minneapolis. The LRT 3C (11th/12th Sub-Alternative) is also exclusive to downtown Minneapolis end-of-line, proposing an alternative route through downtown. The alignment was similar to the original LRT 3C alignment, following the Midtown Corridor to the vicinity of Nicollet Avenue. At this point, the alignment would travel under Nicollet Avenue, Blaisdell Avenue, or 1st Avenue in a tunnel between the Midtown Corridor and Franklin Avenue. North of Franklin Avenue, it would operate on-street to the vicinity of 11th/12th Street where it would turn west onto 11th Street operating as a one-way pair between Nicollet Mall and Royalston Avenue. At Royalston, the alternative would use the same routing as the LRT 1A and LRT 3A alternatives, which interline with the Hiawatha and/or Central LRT lines on 5th Street.

The LRT 3C (11th/12th Sub-Alternative) would operate on the same alignment as the original LRT 3C between the West Lake Station in Minneapolis and Eden Prairie. Refer to Appendix C in the Southwest LRT *Technical Memorandum No. 2 Description of the Alternatives* for the Scoping *Technical Memorandum 1: LRT 3C (11th/12th Sub-Alternative)* and Appendix D in the Southwest LRT *Technical Memorandum No. 2 Description of the Alternatives* for the Scoping *Technical Memorandum 2: LRT 3E Alternative*.

2.3.2 Evaluation of Alternatives

Federal regulations governing the preparation of Environmental Impact Statements dictate that “The draft EIS shall evaluate all reasonable alternatives to the action and discuss the reason why other alternatives which may have been considered were eliminated from detailed study” (23 CFR 771.123). According to 40 CFR §1502.14 it “includes all reasonable alternatives which are rigorously explored and objectively evaluated, as well as those other alternatives, which are eliminated from detailed study with a brief discussion of the reasons for eliminating them” (See also 46 Fed. Reg. 18026, question 1a).

The test of “reasonableness” for alternatives is one that is determined with respect to purpose and need of project and Council on Environmental Quality (CEQ) regulations clearly state that “(w)hat constitutes a reasonable range of alternatives depends on the nature of the proposal and the facts in the case” (46 Fed. Reg. 18026, question 1b).

CEQ regulations further address reasonable alternatives as “those that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant” (46 Fed. Reg. 18026, question 2b).

For purposes of analyzing the two proposed alignments, reasonable alternatives are those that:

- Are consistent with the purpose and need for the Southwest LRT
- Are consistent with regional and local planning
- Are based on sound engineering practices and are practical and feasible

- Perform as well or better than the LRT alternatives identified for inclusion in the Southwest LRT DEIS.

Based on technical analysis that was completed on the two additional proposed alternatives, the Southwest TAC met on January 15, 2009 and the PAC met on January 21, 2009 and unanimously voted and recommended the LRT 3E alternative should be excluded from further consideration and the LRT 3C (11th/12th Sub-Alternative) (excluding Blaisdell Avenue north of Franklin Avenue) warranted more analysis and therefore should be included in the DEIS as a candidate for selection as the LPA.

For analysis conducted during the following phases of the project, the original LRT 3C alignment is referred to as LRT 3C-1 (Nicollet Mall) and the Sub-alternative is referred to as LRT 3C-2 (11th/12th Street) and henceforth are known as such. As a result, the following build alternatives were included for consideration as the LPA for the Southwest LRT project: LRT 1A, LRT 3A, LRT 3C-1 (Nicollet Mall), and LRT 3C-2 (11th/12th Street).

To eliminate redundancy, the LRT alternatives were evaluated by segment. For evaluation purposes the segments were combined into the respective alternative for final acquisition and cost comparison. Refer to Table 3 below for the segments that comprise each LRT alternative and Table 4 for a list of stations on each LRT segment. Refer to Figure 6 for a map of the LRT segments.

Table 3 - LRT Alternatives and Segments

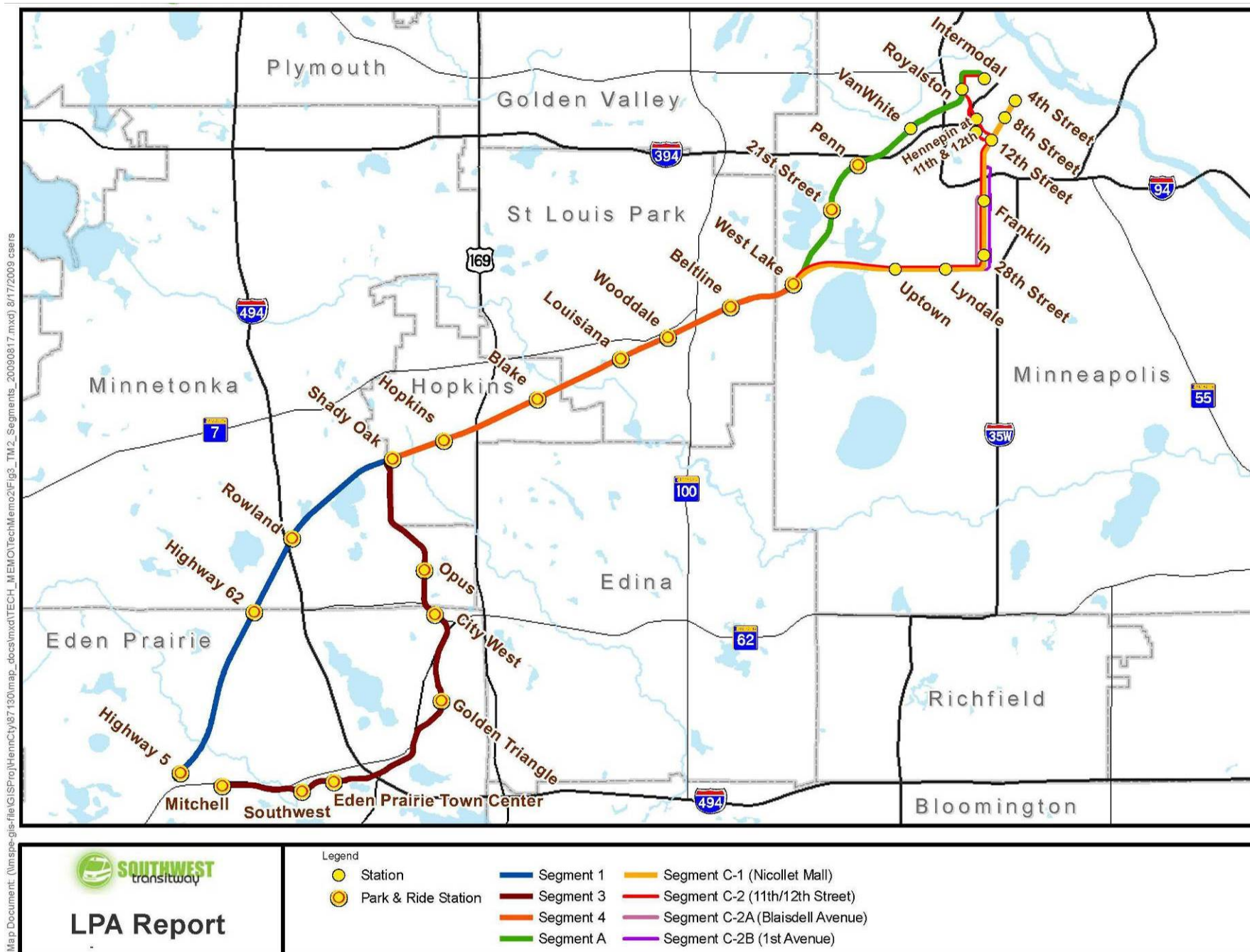
LRT Alternative	Segments
LRT 1A	Segment 1, Segment 4, Segment A
LRT 3A	Segment 3, Segment 4, Segment A
LRT 3C-1 (Nicollet Mall)	Segment 3, Segment 4, Segment C-1 (Nicollet Mall)
LRT 3C-2 (11 th /12 th Street)	Segment 3, Segment 4, Segment C-2 (11 th /12 th Street via Nicollet Avenue Tunnel between 28 th Street and Franklin Ave)
LRT 3C-2 (11 th /12 th Street) Option C-2A	Segment 3, Segment 4, Segment C-2A (11 th /12 th Street via Blaisdell Avenue Tunnel between 28 th Street and Franklin Ave)
LRT 3C-2 (11 th /12 th Street) Option C-2B	Segment 3, Segment 4, Segment C-2B (1 st Avenue Tunnel between 28 th Street and I-94)

Table 4 - LRT Stations by Segment

Segment	Stations on Segment
Segment 1	Highway 5, Highway 62 and Rowland Rd.
Segment 3	Mitchell, Southwest Station, Eden Prairie Town Center, Golden Triangle, City West and Opus
Segment 4	Shady Oak, Hopkins, Blake, Louisiana, Wooddale, Beltline and West Lake
Segment A	21st Street, Penn, Van White, Royalston, Intermodal, 5th Street and Nicollet Mall (4th Street)
Segment C-1 (Nicollet Mall)	Uptown, Lyndale, 28th Street, Franklin, 12th Street, 8th Street and 4th Street
Segment C-2 (11th/12th Street)*	Uptown, Lyndale, 28th Street, Franklin, 12th Street (Nicollet Mall), 11 th at Hennepin Ave, 12 th at Hennepin Ave, Royalston, Intermodal, 5th Street and Nicollet Mall (4th Street)

*The same stations would apply for Segment C-2 on both of the optional tunneling routes C-2A (Blaisdell Avenue Tunnel) and Segment C-2B (1st Avenue Tunnel).

Figure 6 - LRT Segment Map



2.4 Refined AA Conceptual Engineering Plans

Regional and local transportation plans were revised and refined as the input to the conceptual engineering plans for the three LRT alternatives from the Southwest Transitway AA. The engineering refinements included updating the alignments to the Central Corridor LRT design criteria, introduction of a vertical alignment to understand the trackway profile, slope limits, and updated definition of new structures, roadways, and other civil construction items. Additional engineering refinements will continue once the locally preferred alternative is chosen and the project moves into the preliminary engineering and final design phases.

2.4.1 LRT 1A

The consultant team recommended and the Southwest Technical Advisory Committee (TAC) concurred with the following refined conceptual engineering changes to LRT 1A.

2.4.1.1 Royalston Station to Van White Boulevard Station

According to the Southwest Transitway AA conceptual engineering plans the LRT line would cross the BNSF tracks east of the I-94 underpass and begin to climb out of the below grade HCRRA property just south of Glenwood Avenue. This design requires the reconstruction of Glenwood Avenue, which would be costly and made complicated by the newly reconstructed Royalston Avenue Bridge.

The consultant team recommended that the LRT cross the BNSF freight rail track just east of the Van White Boulevard Station. This design change does not require the reconstruction of the Glenwood Avenue Bridge.

2.4.1.2 21st Street Station to West Lake Street Station

According to the Southwest Transitway AA conceptual engineering plans the LRT line would cross at-grade Cedar Lake Parkway. In order to allow for more design flexibility in this sensitive area the consultant team recommended inclusion of a grade-separation at this location. Should traffic conditions and other factors allow, an at-grade crossing could be considered during preliminary engineering.

2.4.2 LRT 3A

The consultant team recommended and the Southwest Technical Advisory Committee (TAC) concurred with refined conceptual engineering changes to LRT 3A. The sections below highlight the conceptual engineering changes to segment 3 of LRT 3A. The changes noted in Section 1.3.1 (LRT 1A) also apply to LRT 3A, please refer to that discussion for more information.

2.4.2.1 Southwest Station to Golden Triangle Station

According to the conceptual engineering design included in the Southwest Transitway AA, the LRT 3A parallels TH 5 between Mitchell Road and Prairie Center Drive and turns south on Prairie Center Drive. The alignment turns east along the backside of the parcels between Technology Drive and Singletree Lane. The alignment then follows Eden Road where it turns north along Flying Cloud Drive and crosses over I-494.

To reduce the number of at-grade crossings at signalized intersections along Eden Road and avoid grade crossing conflicts at the I-494 ramps, the AA alignment has been modified to follow Technology Drive east of Prairie Center Drive. The alignment transitions onto a bridge structure over I-494 on the west side of Flying Cloud Drive. It then crosses over Flying Cloud Drive to the east side of the roadway, and descends to grade before reaching the intersection of Valley View Road.

According to the conceptual engineering design included in the Southwest Transitway AA, the LRT is grade-separated on a bridge over existing wetlands, Nine Mile Creek, and Flying Cloud Drive. The proposed LRT bridge is a 1,430 feet long curved structure, which is significant. Placing a bridge over areas classified as Waters of the U.S. requires a permit from the Army Corp of Engineers, which can be a difficult and lengthy process. The consultant team recommended that the LRT be rerouted to avoid the wetlands and Water of the U.S. this change requires the replacement of the Nine Mile Creek culvert, reconstruction of Flying Cloud Drive and construction of retaining walls adjacent to the wetlands.

2.4.2.2 Golden Triangle Station to City West Station

According to the conceptual engineering design included in the Southwest Transitway AA, the LRT would make two sharp turns, cross Shady Oak Road and Flying Cloud Drive at grade, and a complete property acquisition. The consultant team recommended that the LRT be placed in a short tunnel under Shady Oak Road and Flying Cloud Drive. The grade-separated alignment will improve LRT design speeds, avoid potential traffic and safety issues at Shady Oak Road and Flying Cloud Drive by avoiding a skewed light rail grade crossing, and reduce private property acquisition.

2.4.2.3 Opus Station to Shady Oak Road Station

According to the conceptual engineering design included in the Southwest Transitway AA, the LRT would be located at-grade through existing ponds and in a short tunnel under the Canadian Pacific Railway (CPR) freight line. Due to the presence of floodplain, ponds and concerns over groundwater and landfill leaching, the consultant team recommended that the LRT be elevated on a long structure over the ponds and the CPR freight tracks. This engineering refinement will reduce potential construction and operational issues with flooring, landfill leaching, and freight rail operations.

According to the conceptual engineering design included in the Southwest Transitway AA, the LRT was routed through the Oak Woodland Preserve. The consultant team recommended straightening the alignment to increase LRT speed and move the tracks further away from residential housing to minimize any potential noise impacts.

According to the conceptual engineering design included in the Southwest Transitway AA, the LRT would be located in a tunnel under Feltl and Smetana roads. After further analysis, the consultant team concluded that it would be more efficient and cost-effective to reconfigure Feltl and Smetana roads to create a singular at-grade LRT crossing. This design change will result in reduced LRT construction costs without a significant reduction in LRT design speed. Refer to Appendix A in the Southwest LRT *Technical Memorandum No. 2 Description of the Alternatives* for the Southwest Transitway AA, and *Technical Memorandum 3: Definition of Alternatives* for a detailed description of the alignment as developed during the Southwest Transitway AA. Refer to Appendix E in the *LPA Technical Memorandum No. 2 Description of the Alternatives* for the refined conceptual engineering plans. Finally, refer to Appendix F in the *LPA Technical Memorandum No. 2 Description of the Alternative for the Technology Drive Evaluation Memorandum*.

2.4.3 LRT 3C-1 (Nicollet Mall)

All of the refined conceptual engineering changes listed above under the LRT 3A alternative also apply to the LRT 3C-1 (Nicollet Mall) alternative.

In addition, City of Minneapolis staff informed the consultant team after the NEPA/MEPA Scoping period that the reopening of Nicollet Avenue is included in their Capital Improvement

Program (CIP) and should be assumed for the purpose of designing the Southwest LRT alternatives. During the Southwest Transitway AA, Nicollet Avenue was not assumed to be reopened.

The reopening of Nicollet Avenue will result in higher traffic volumes on Nicollet Avenue and complicates the original design for the LRT 3C-1 (Nicollet Mall) alternative. Due to the reopening of Nicollet Avenue, the consultant team recommended that the stations at 28th Street and Franklin Avenue be changed to underground rather than open air stations.

DRAFT

3.0 DEFINITION OF ALTERNATIVES FOR THE DEIS

3.1 No-Build Alternative

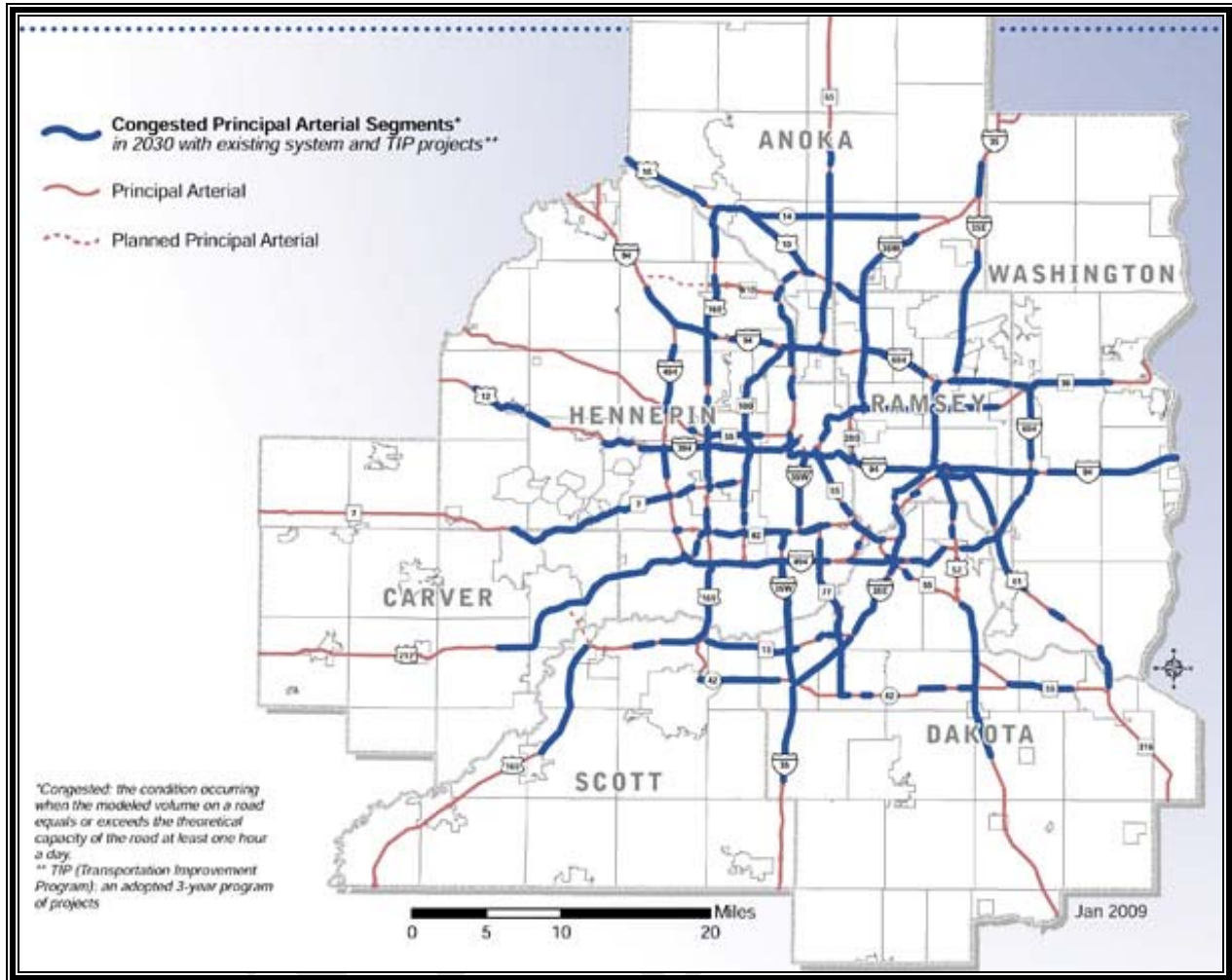
The No-Build Alternative includes all existing and committed transportation infrastructure, facilities and services contained in the region's fiscally constrained and federally-approved transportation plan, the Twin Cities 2030 Transportation Policy Plan (TPP). A No-Build Alternative provides an essential benchmark to test whether project alternatives improve future transit service compared to improvements planned to be implemented without the proposed project. The No-Build Alternative is also used in the environmental analysis phase of project development—in this case a DEIS—to compare the environmental impacts of the project to projected conditions without the proposed alternatives.

3.1.1 Highway/Roadway Network

The Metropolitan Council's *2030 Transportation Policy Plan* (TPP) (2008) provides a comprehensive inventory of the transportation infrastructure and needs for the seven-county Twin Cities metropolitan region. The regional highway and roadway system is composed of interstate and federal highways, state and county highways, toll roads, arterial roadways and city streets. To address deteriorating levels of service on area roadways, the TPP has programmed improvements intended to expand the capacity of the regional highway and roadway systems. Refer to Figure 7 for a map of the regional Congested Principal Arterial Segments.

The No-Build Alternative is included in the Metropolitan Council's adopted transportation plan and defines the roadway facilities in the regional travel demand forecasting model, which is used to forecast ridership for the Southwest LRT LPA selection process and the DEIS.

Figure 7 - TPP Congested Principal Arterial Segment Map



Source: The Metropolitan Council 2030 Transportation Policy Plan (TPP), January 2009.

3.1.2 Transit Network

The 2030 No-Build Alternative assumes the future transit service network will closely resemble the dense route structure and extensive facilities of the existing system. Transit system improvements under the No-Build Alternative include minor modifications to the existing bus services and transit facilities as specified in Metropolitan Council's 2030 *Transportation Policy Plan* (TPP) for which funding has been committed.

3.2 Baseline Alternative

As part of the Federal Transit Administration's (FTA) New Starts Program, major transit infrastructure investments must include an option that optimizes existing transit facilities and services without major capital expenditures. The Transportation System Management (TSM)/Baseline Alternative, also referred to as the Enhanced Bus Alternative, was developed as part of the AA and has been submitted to FTA for review and comment. The Baseline Alternative is intended to be a lower cost transportation solution that addresses the mobility issues defined in the Project's Purpose and Need Statement. This alternative serves as the basis of comparison between each of the build alternatives, and helps to calculate the cost effectiveness of each alternative to demonstrate whether a greater level of investment in a Build Alternative is justified. It is designed as the "best that can be done" alternative to improve transit service and mobility within the Southwest LRT Study Area without major capital investments.

Unlike the No-Build Alternative, the Baseline Alternative includes low capital cost infrastructure improvements intended to improve or modify operating efficiencies, and for certain rider amenities such as improvements to transit terminals or park and ride lots. Acceptable FTA baseline alternatives include traffic engineering actions, bus route restructuring, reserved bus lanes, and express services along with other minor roadway modifications. Other low capital cost infrastructure and bus transit improvements include intelligent transportation systems (ITS) technologies, travel demand management (TDM) strategies and other system improvements. Bus operation strategies that build upon existing transit services and facilities provide connectivity within the project study area. ITS deploys the latest technology for more effectively managing transportation systems, and TDM strategies help reduce congestion by encouraging the use of alternative modes of transportation rather than driving alone.

The Baseline Alternative is not considered a Build Alternative for discussion in the DEIS. It is solely intended to comply with FTA regulatory requirements as outlined in the FTA 5309 New Starts Report. For a detailed description of the Enhanced Bus Alternative, please refer to Appendix A Southwest Transitway Alternatives Analysis (AA), *Technical Memorandum 3: Definition of Alternatives* from the Southwest LRT *Technical Memorandum No. 2 Description of the Alternatives* for more discussion on the Highway/Roadway Network.

The Baseline Alternative includes the same highway and roadway network improvements contained in the No-Build Alternative. The Baseline Alternative is not anticipated to result in any modifications to the existing highway or roadway infrastructure in the Study Area. Both the new express and current bus routes would use the existing infrastructure, including the HOV/HOT lanes on highways and expressways, and implement regional transportation policies such as bus-only shoulder lanes to provide service to the region.

3.2.1 Enhanced Bus Alternative Description

Enhanced Bus Alternative includes two new express bus routes providing bi-directional service between Eden Prairie and downtown Minneapolis, with stops in Minnetonka, Hopkins, and St. Louis Park. The alternative also includes minor modifications to the existing express bus service along with increased service frequencies and restructured local service to provide access to stops along the new express routes. The new limited-stop routes are referred to as Limited Stop Route “A” and Limited Stop Route “B,” and are represented along with the existing primary service the SouthWest Transit Express Bus Routes using I-394 and I-35W from Eden Prairie to downtown Minneapolis in Figure 8. Please refer to Appendix A in the Southwest LRT *Technical Memorandum No. 2 Description of the Alternatives* for the Southwest Transitway Alternatives Analysis (AA), *Technical Memorandum 3: Definition of Alternatives* for more discussion on the Enhanced Bus Alternative.

3.2.1.1 Service Assumptions

Current operating plans for Limited-Stop Routes “A” and “B” indicate that bus service would be provided from approximately 4:00 AM to 2:00 AM, Monday through Friday, with no weekend or holiday service. Fares for service would be consistent with the Metropolitan Council’s fare structure policy. The Baseline Alternative assumes that parking at park and ride facilities would be free of charge.

Bus headways would be 15 minutes during peak periods and 20 minutes in off-peak periods. Where the two lines would share a similar route (between downtown Minneapolis and Shady Oak Road in Minnetonka), the combined headways would be increased to 7.5 minutes during peak hour periods and ten minutes in off-peak periods. Refer to Table 5 for operating hours from the AA.

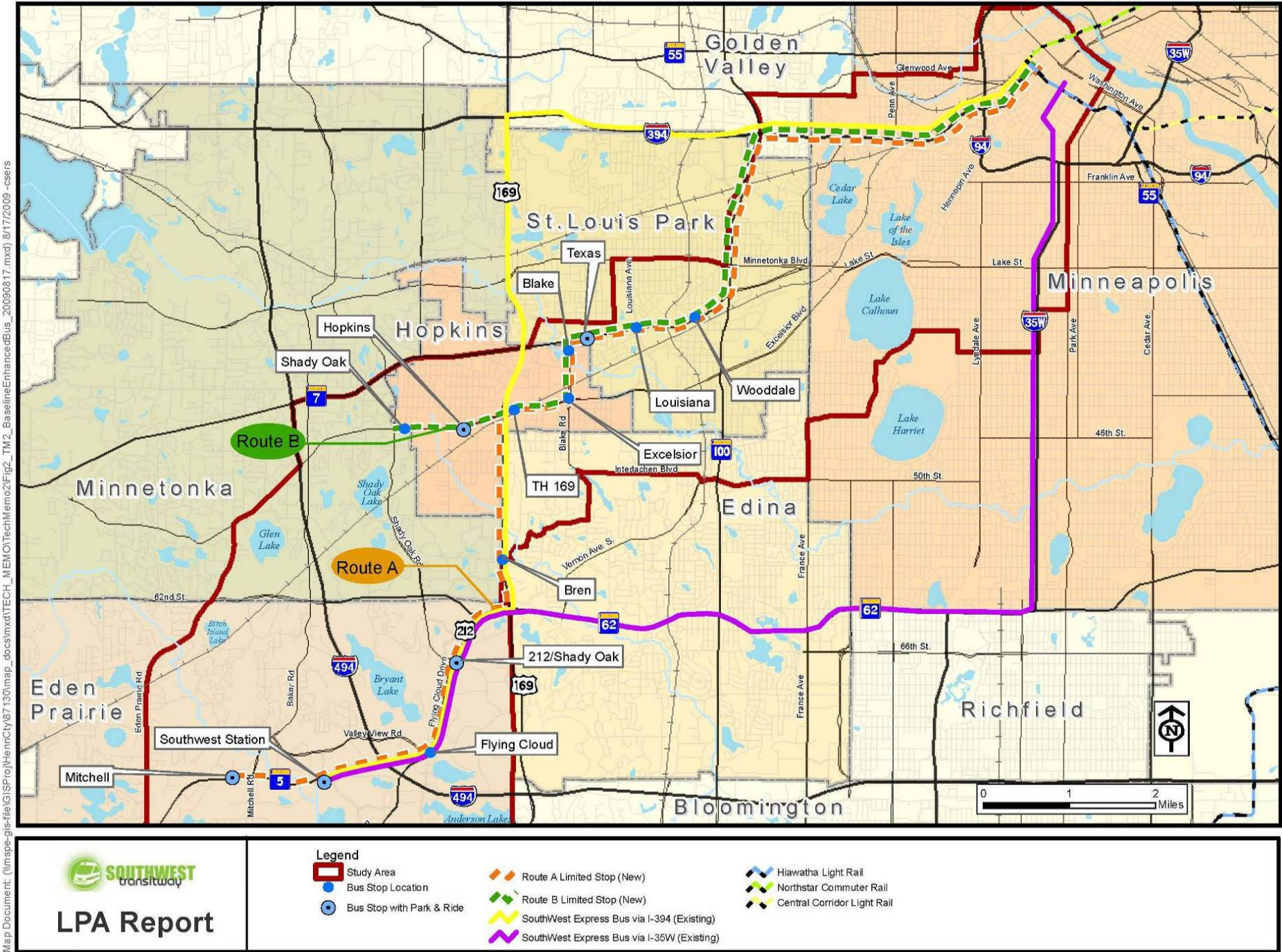
Table 5 - Enhanced Bus Service Plan Operation Hours and Frequency (in minutes)

	Early Morning (4:00-6:00AM)	AM Peak (4:00-9:00AM)	Mid-Day (9:00AM- 3:00PM)	PM Peak (3:00-6:00PM)	Evening (6:00PM- 2:00AM)
Weekday					
Route "A"	20	15	20	15	30
Route "B"	20	15	20	15	30
Composite "A" & "B"	10	7.5	10	7.5	15
Weekend	No Service				
Holiday	No Service				

Source: Southwest Transitway Alternatives Analysis Final Report, 2007.

After reviewing the bus feeder plans developed during the Southwest Transitway AA and discussions with Metro Transit and SouthWest Transit staff, the consultant team did not recommend any changes to the bus feeder networks developed during the Southwest Transitway AA. Refer to Appendix A in the Southwest LRT *Technical Memorandum No. 2 Description of the Alternatives* for the detailed bus feeder network plans for the LRT alternatives included in the Southwest Transitway AA. In addition, the consultant team did not recommend any changes to the existing and planned bus network in the geographic area of Minneapolis affected by the LRT 3C-2 (11th/12th Street) alternative.

Figure 8 - Baseline Alternative: Enhanced Bus Alternative



3.3 Build Alternative 1 (LRT 1A HCRRA – Kenilworth)

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

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

Stations are proposed at Royalston Avenue, Van White Boulevard, Penn Avenue, 21st Street, West Lake Street, Beltline Boulevard, Wooddale Avenue, Louisiana Avenue, Blake Road, downtown Hopkins, Shady Oak Road, Rowland Road, TH 62, and TH 5.

Proposed at-grade crossings include Edenvale Boulevard, West 62nd Street, Baker Road, Rowland Road, Dominick Drive, 16th Avenue (proposed extension), 11th Avenue, 8th Avenue (proposed extension), 5th Avenue, Blake Road, Wooddale Avenue, Beltline Boulevard, 21st Street, Glenwood Avenue, and the Hennepin County Energy Recovery Center (HERC) entrance.

Build alternative LRT 1A is shown in Figure 9.



3.4 Build Alternative 2 (LRT 3A) (Opus/Golden Triangle – Kenilworth)

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

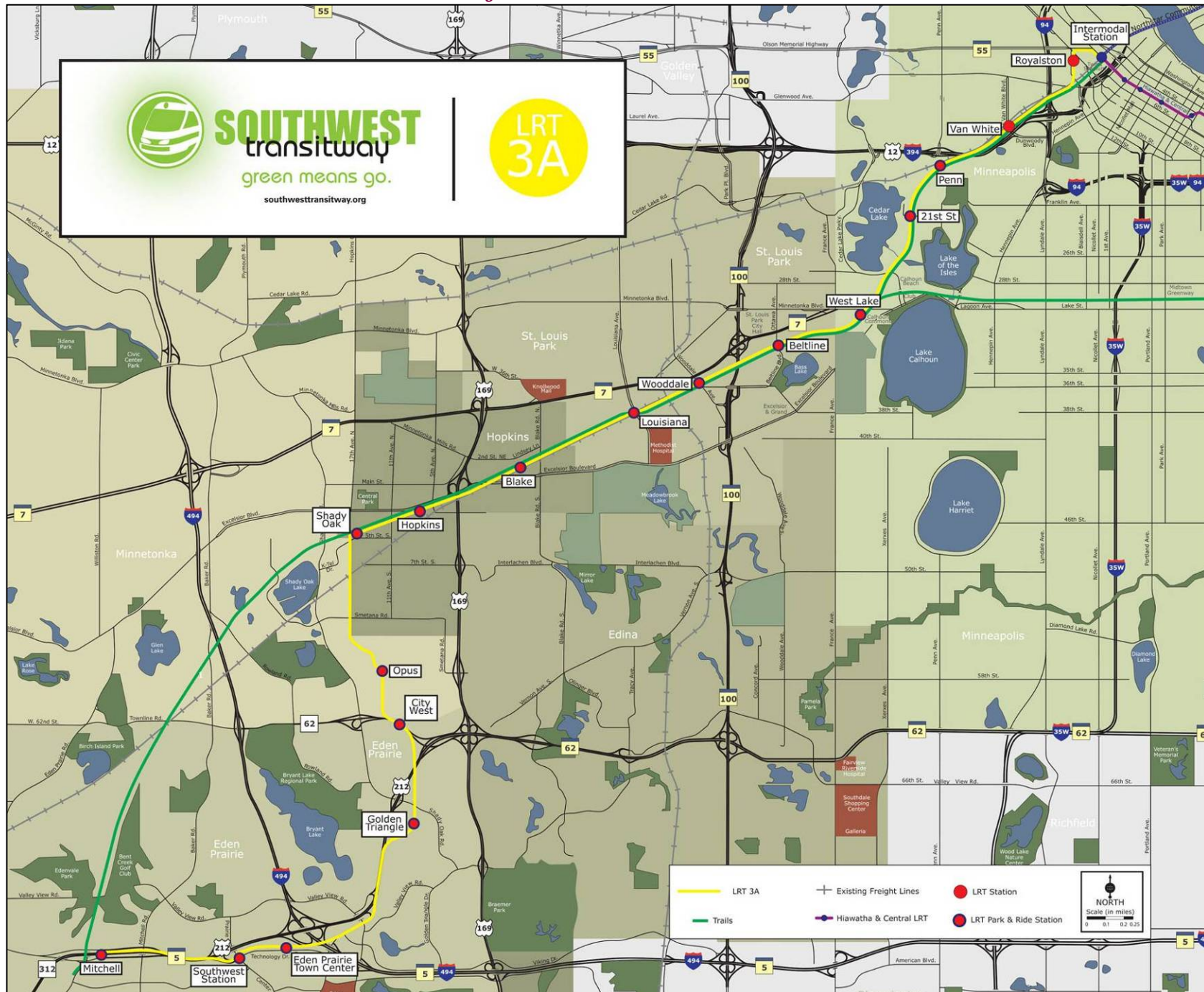
This alternative would operate from downtown Minneapolis to Eden Prairie (Mitchell Road/TH 5) via an extension of the Hiawatha LRT tracks on 5th Street, past the downtown Minneapolis Intermodal Station to Royalston Avenue, to the Kenilworth Corridor through Minneapolis and the HCRRA property through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

Stations are proposed at Royalston Avenue, Van White Boulevard, Penn Avenue, 21st Street, West Lake Street, Beltline Boulevard, Wooddale Avenue, Louisiana Avenue, Blake Road, downtown Hopkins, Shady Oak Road, Opus, City West, Golden Triangle, Eden Prairie Town Center, Southwest Station, and Mitchell Road.

Proposed at-grade crossings include Mitchell Road, the bus only ramps to/from TH5, Technology Drive, commercial property access along Technology Drive, Valley View Road, Flying Cloud Drive, West 70th Street, Bren Road East, Bren Road West, combined Feltl and Smetana Road intersection, K-Tel Drive, 16th Avenue (proposed extension), 11th Avenue, 8th Avenue (proposed extension), 5th Avenue, Blake Road, Wooddale Avenue, Beltline Boulevard, 21st Street, Glenwood Avenue, and the HERC entrance.

LRT 3A is shown in Figure 10.

Figure 10 - Build Alternative LRT 3A



3.5 Build Alternative 3 (LRT 3C-1 Nicollet Mall) (Opus/Golden Triangle – Midtown/Nicollet Mall)

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

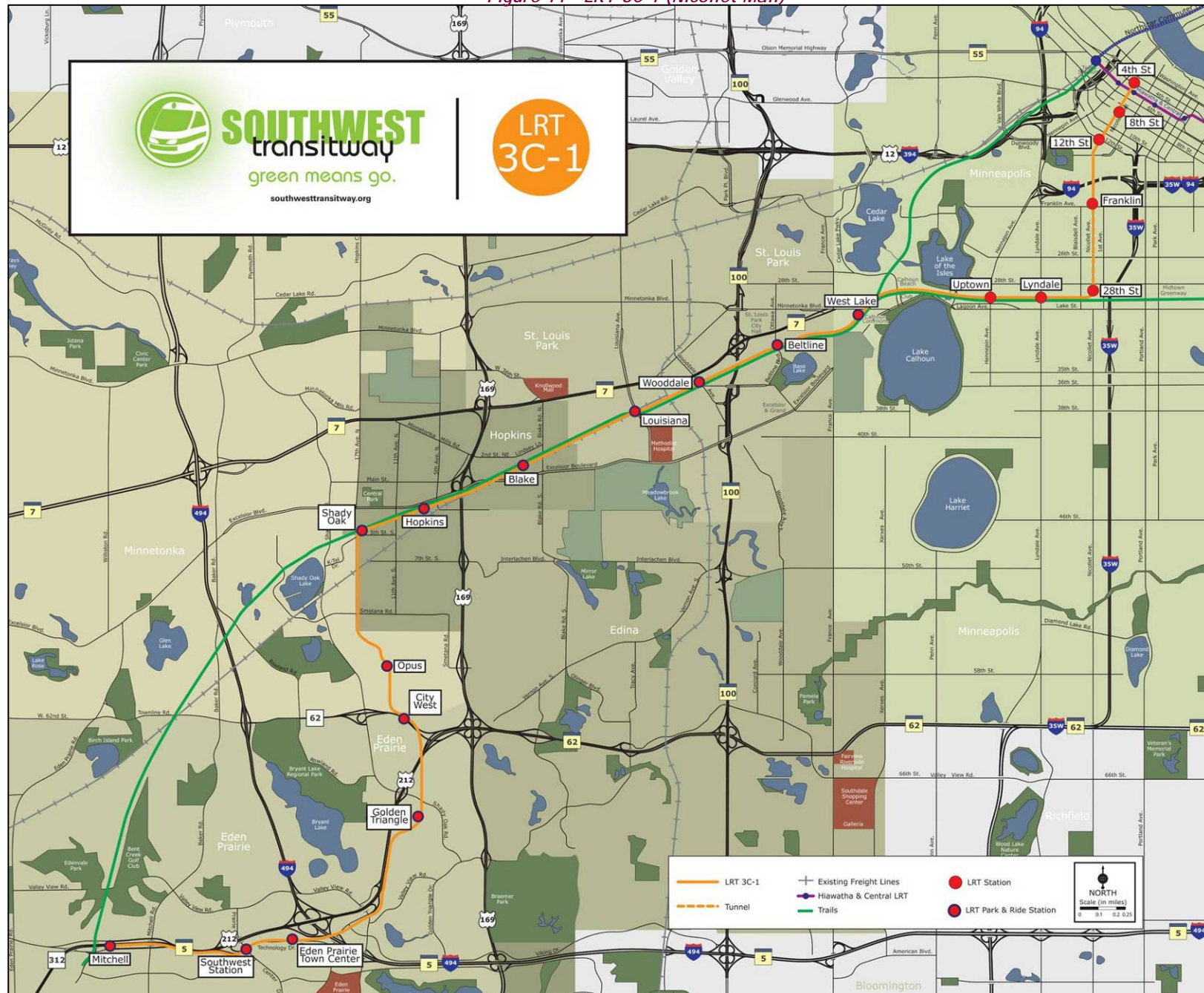
This alternative would operate between downtown Minneapolis to Eden Prairie (Mitchell Road/TH 5) via Nicollet Mall to Nicollet Avenue (tunnel from Franklin Avenue to 28th Street), the Midtown corridor through Minneapolis, the HCRRA property in St. Louis Park and Hopkins, to new ROW through the Opus/Golden Triangle areas, along Technology Drive and TH5 terminating at Mitchell Road.

Stations are proposed at 4th Street, 8th Street, 12th Street, Franklin Avenue, 28th Street, Lyndale Avenue, Hennepin Avenue (Uptown), West Lake Street, Beltline Boulevard, Wooddale Avenue, Louisiana Avenue, Blake Road, downtown Hopkins, Shady Oak Road, Opus, City West, Golden Triangle, Eden Prairie Town Center, Southwest Station, and Mitchell Road.

Proposed at-grade crossings include Mitchell Road, the bus only ramps to/from TH5, Technology Drive, commercial property access along Technology Drive, Valley View Road, Flying Cloud Drive, West 70th Street, Bren Road East, Bren Road West, combined Feltl and Smetana Road intersection, K-Tel Drive, 16th Avenue (proposed extension), 11th Avenue, 8th Avenue (proposed extension), 5th Avenue, Blake Road, Wooddale Avenue, Beltline Boulevard, James Avenue, Irving Avenue, Humboldt Avenue, Franklin Avenue, Groveland Avenue, 18th Street, 15th Street, 14th Street, Grant Street, 13th Street, 12th Street, 11th Street, 10th Street, 9th Street, 8th Street, 7th Street, 6th Street, 5th Street, 4th Street, and 3rd Street.

Build Alternative LRT 3C is shown in Figure 11.

Figure 11 - LRT 3C-1 (Nicollet Mall)



3.6 Build Alternative 4 (LRT 3C-2 11th/12th Street) (Opus/Golden Triangle – Midtown/11th/12th Street)

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

LRT 3C-2 (11th/12th Street) would operate on the same alignment as LRT 3C-1 (Nicollet Mall) between the West Lake Station in Minneapolis and Eden Prairie. At the Midtown Corridor in the vicinity of Nicollet Avenue, the alignment would travel either under Nicollet Avenue, Blaisdell Avenue, or 1st Avenue in a tunnel between the Midtown Corridor and Franklin Avenue. Generally, north of Franklin Avenue, it would operate on-street to the vicinity of 11th/12th Street where it would turn west onto 11th Street operating as a one-way pair between Nicollet Mall and Royalston Avenue. At Royalston, the alternative would use the same routing as the LRT 1A and LRT 3A alternatives, which interline with the Hiawatha and/or Central LRT lines on 5th Street.

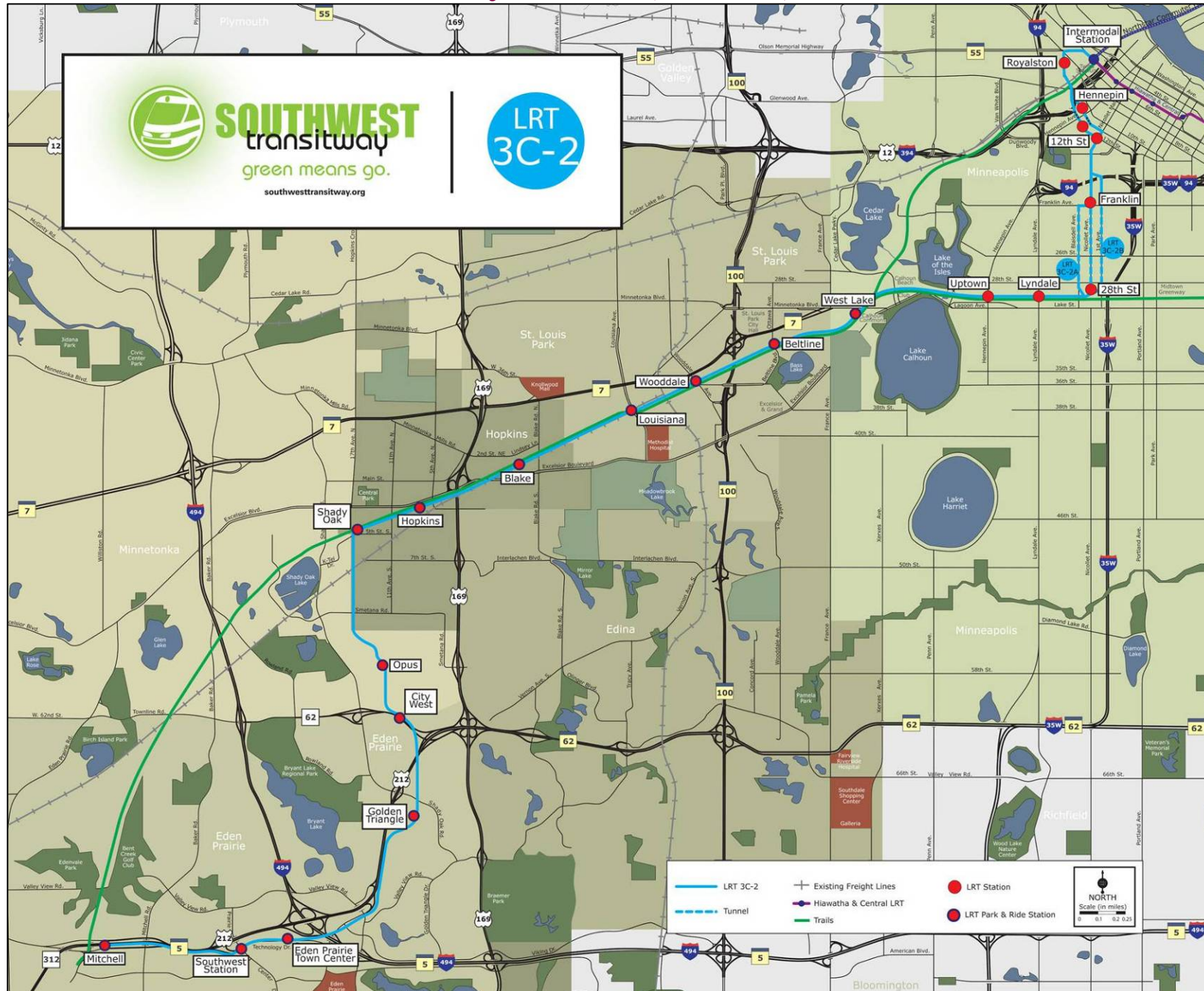
Stations are proposed at Royalston Avenue, 11th Street/Hennepin Avenue, 12th Street/Hawthorne Avenue, 12th Street/Nicollet Mall, Franklin Avenue and either Blaisdell Avenue or 1st Avenue, and 28th Street and either Blaisdell Avenue or 1st Avenue. And similar to LRT 3C-1 (Nicollet Mall), Lyndale Avenue, Uptown, West Lake Street, Beltline Boulevard, Wooddale Avenue, Louisiana Avenue, Blake Road, downtown Hopkins, Shady Oak Road, Opus, City West, Golden Triangle, Eden Prairie Town Center, Southwest Station, and Mitchell Road.

The LRT 3C-2 (11th/12th Street) alternative proposes to use either a tunnel under Nicollet Avenue with optional routes under Blaisdell or 1st Avenue between the Midtown Corridor and Franklin Avenue. For the Blaisdell Avenue option, the LRT would exit the tunnel at Blaisdell and Franklin and then transition across the Plymouth Congregational Church property to enter center running operations on Nicollet Avenue. The LRT would operate in the center of Nicollet Avenue to 12th Street. For the 1st Avenue option, the LRT would exit the tunnel north of Franklin and operate center running on 1st Avenue to 16th Street where it would transition diagonally across the City of Minneapolis meter farm entering Nicollet Avenue at 15th Street for center running operations to 12th Street. At 12th Street under all options the LRT would as a one-way couplet on 11th and 12th Street rejoining as a two-way configuration on 12th Street at Glenwood, then operating on Royalston Avenue with a short tunnel under 7th Street and through-routing on the Hiawatha/Central LRT tracks on 5th Street in downtown Minneapolis.

Proposed at-grade crossings include Mitchell Road, the bus only ramps to/from TH 5, Technology Drive, commercial property access along Technology Drive, Valley View Road, Flying Cloud Drive, West 70th Street, Bren Road East, Bren Road West, combined Feltl and Smetana Road intersection, K-Tel Drive, 16th Avenue (proposed extension), 11th Avenue, 8th Avenue (proposed extension), 5th Avenue, Blake Road, Wooddale Avenue Beltline Boulevard, James Avenue, Irving Avenue, Humboldt Avenue, Franklin Avenue, Groveland Avenue, 18th Street, 15th Street, 14th Street, Grant Street, 13th Street, 12th Street, 11th Street, LaSalle Avenue, Harmon Place, Hennepin Avenue, Hawthorne Avenue, I-394 Interchange at 12th Street, Glenwood Avenue, and 7th Street.

LRT 3C-2 (11th/12th Street) is shown in Figure 12.

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



3.7 LRT Service Assumptions

Southwest LRT would provide high frequency service (7.5 minute peak), bidirectional, line-haul, limited stop, seven days per week. The service operation hours would be from 5:00 AM to 1:00 AM on weekdays and 5:00 AM to 1:00 AM on weekends and holidays. Stations would be located $\frac{1}{4}$ to $\frac{1}{2}$ mile apart in the downtown, $\frac{1}{2}$ to one mile apart in the first ring and one to two miles apart in the second ring of service. Fares collection would be proof of payment. Stations would be high amenity with park-and-ride facilities where appropriate.

DRAFT

4.0 EVALUATION

4.1 Methodology, Criteria, and Measurements

The screening evaluation methodology builds upon information generated during the Southwest Transitway AA refining it to reflect the updated local comprehensive plans and the environmental impact analysis.

The screening evaluation includes all of the evaluation measures from the AA for the tier one goals of improve mobility and provide a cost-effective/efficient travel option. Refer to Appendix C in the Southwest LRT *Technical Memorandum No. 3 Screening Evaluation Criteria* for evaluation results of the Southwest Transitway AA.

To identify the LPA, each alternative is assessed using the measures defined in this report.

The evaluation criteria categories are:

1. Planning Compatibility
2. Performance
3. Environment
4. Other factors

The alternatives, by full alternative and by segment where appropriate, were evaluated to determine how the alternative performed relative to the evaluation criteria. The individual criteria evaluations were compiled by evaluation category which led to the recommendation of the LPA defined as the one that best meets the purpose and need for the project.

The Southwest Consultant Team generated both quantitative and qualitative data for the alternatives. The consultant team worked with the Southwest Technical Advisory Committee (TAC) to take the raw data and translate it into ratings for each alternative. The following ratings were used:

- Proceed
- Proceed with Caution
- Do not Proceed

Each of the evaluation categories is listed below with its criteria for evaluation and means of measurement, and evaluation objectives.

4.2 Criteria 1 – Planning Compatibility

This evaluation assesses the compatibility of the Southwest Light Rail Transit (LRT) alternatives with the local and regional plans of the project partner cities, Hennepin County and the Metropolitan Council. According to the Minnesota Metropolitan Land Planning Act⁶, local municipalities are required to update their comprehensive plans at a minimum every 10 years. Upon completion, municipalities in the metropolitan region are required to submit these plans to the Metropolitan Council. The Metropolitan Council is responsible for the final review to ensure consistency between the Plans and help guide regional growth. The Metropolitan Council also

⁶ State of Minnesota, Metropolitan Land Planning Act (MLPA) M.S. 473.851 to 473.871.

updated the systems plans for the region including the Transportation Policy Plan (TPP). The most recent version of the TPP was adopted in 2009.

Since the publication of the Southwest LRT Alternatives Analysis (AA) in 2006, all of the project partner cities have revised existing comprehensive plans pursuant to the Metropolitan Land Planning Act and have submitted them to the Metropolitan Council for review. These plans discuss the community vision for future development, growth, and change projected out to the year 2030. Additionally, some of the project partner cities have adopted small area or neighborhood plans that identify specific land use, housing, transportation, or natural resource management goals on a refined scale.

4.2.1 Consistency with Adopted and Local and Regional Plans

A review of the adopted local and regional plans for the study partners will be conducted to determine if LRT implementation is consistent and compatible with the policies and plans of the affected governmental units. Where preferences for a particular LRT route are specified in an adopted plan it will be noted. The adopted local plans will include the comprehensive plans for the cities of Eden Prairie, Minnetonka, Hopkins, Edina, St. Louis Park, and Minneapolis. The adopted regional plans will include the Hennepin County Transportation System Plan and the Metropolitan Council's TPP. A full description of each of the plans reviewed and the methodology used for measurement of compatibility is presented in the *Southwest LRT Technical Memorandum No. 4 Planning Compatibility Evaluation*, June 2009.

4.2.1.1 Criteria and Measurement

The criterion for evaluation was compatibility or consistency of each LRT alternative with the local and regional land use and transportation plans.

The measurement was a qualitative assessment of stated policies and documentation contained in the adopted local and regional plans of the study partners.

4.2.1.2 Evaluation

The purpose of this evaluation was to determine if each LRT alternative is compatible with the local and regional land use and transportation plans. A structured evaluation process was established beginning with the collection and review of the regional and local comprehensive land use and transportation plans—applicable to the Study Area—that have been adopted since publication of the Southwest Transitway AA.

As visionary documents, many of the plans reviewed for the analysis discuss the Southwest LRT Project in broad terms, and do not include specific discussions of alternative alignments or elements of the project. At the time of their publication, each plan recognized several options being considered. Some plans, however, are more specific in their level of support for a particular mode, alternative or segment, and provide greater detail on the local community's vision for transit.

For purposes of this report, the plans required under the Metropolitan Land Planning Act (MLPA)⁷ are discussed first followed by other relevant plans and studies.

⁷ State of Minnesota, Metropolitan Land Planning Act (MLPA) M.S. 473.851 to 473.871.

Metropolitan Land Planning Act (MLPA)

- Metropolitan Council
 - 2030 Transportation Policy Plan (TPP), 2009
- Hennepin County
 - Hennepin County Transportation Systems Plan, 2008
- City of Eden Prairie
 - City of Eden Prairie Comprehensive Plan, 2008
- City of Minnetonka
 - City of Minnetonka Comprehensive Plan, 2008
- City of Edina
 - City of Edina Comprehensive Plan, 2008
- City of Hopkins
 - City of Hopkins Comprehensive Plan, 2009 (adoption pending)
- City of St. Louis Park
 - St. Louis Park Comprehensive Plan, 2008
- City of Minneapolis
 - Minneapolis Plan for Sustainable Growth, 2008
 - Access Minneapolis, 2007

Other Relevant Adopted Plans/Policy

- Hennepin County
 - Intermodal Station Siting and Feasibility Study, 2003
- City of Eden Prairie
 - Major Center Area Study, 2006
 - Golden Triangle Study
- City of Hopkins
 - Hopkins Station Area Plan, 2007
 - East Hopkins Land Use and Market Study, 2003
 - Blake Road Corridor Small Area Plan, 2009
- City of St. Louis Park
 - Elmwood Area Land Use, Transit and Transportation Study
- City of Minneapolis
 - Bassett Creek Valley Master Plan, 2007
 - Bryn Mawr Neighborhood Land Use Plan, 2005

- Nicollet Avenue Task Force Report: The Revitalization of Minneapolis' Main Street, 2000
- Uptown Small Area Plan, 2008
- Midtown Minneapolis Land Use and Development Plan, 2005
- Midtown Greenway Land Use and Development Plan, 2007
- Midtown Corridor Historic Bridge Study, 2007

4.2.1.3 Evaluation of Metropolitan Land Planning Act (MPLA) Plans

The following sections provide a review of the compatibility of the Southwest LRT alternatives with the local and regional plans.

Metropolitan Council

The following section discusses the plans and studies of the Metropolitan Council (the Council) for transportation in the Twin Cities metropolitan region. As the regional Metropolitan Planning Organization (MPO), the Council has oversight of major transportation investments, including transitways. Refer to the Southwest LRT *Technical Memorandum No. 4 Planning Compatibility* for expanded discussions on each plan.

2030 Transportation Policy Plan (TPP). Adopted in January, 2009, the Council's 2030 *Transportation Policy Plan* (TPP) establishes the regional vision for transportation in the seven-county metropolitan region. In accordance with the Council's 2030 *Regional Development Framework*, the TPP stresses the importance of planning for and investing in a multi-modal transportation system, including investments in roadways, bridges, airports, non-motorized transportation infrastructure and public transportation systems.

The overall goal contained in the TPP is to double transit ridership by 2030 through enhancements to the bus system which will remain the backbone of the transit system and investments in a system of transitways, including the Southwest LRT. The TPP recognizes that transit investments can increase regional mobility, decrease roadway congestion, improve environmental quality, and connect major regional destinations, have environmental and development benefits. Transitways are generally defined in the TPP as bus or rail transit corridors on dedicated ROW, linking major employment centers and regional destinations.

Most of the transit service policy recommendations established in the TPP are supported by the Council's 2030 Transit Master Study (TMS) findings. The TMS serves as the basis for the transit chapter in the TPP. The TPP identifies the Southwest LRT as part of the region's future network of transitway facilities. While the TPP does not identify a specific LRT alternative or alignment configuration, it recognizes LRT as the preferred transportation mode for the Project advanced from the Southwest Transitway AA. The findings of the 2030 Transit Master study identified the Southwest LRT Project as having "high potential" in terms of ridership and cost-effectiveness, and these results are published in the TPP.

- **Evaluation:** Overall, the TPP is very supportive of transit and the Southwest LRT Project as a means of increasing regional mobility. The emphasis placed on an interconnected network of transitways in the plan suggests that LRT 1A and LRT 3A alternatives are compatible with the TPP. While the TPP does not favor a particular alignment, and therefore the LRT 3C-1 (Nicollet Avenue) and LRT 3C-2 (11th/12th Street) could be compatible with the plan, the potential disruptions to transit service

and major regional roadways suggest that these alternatives may be less compatible with the TPP as compared to the other alternatives. Refer to Figures 9 through 12 for maps of the LRT alternatives.

Hennepin County

- ***Hennepin County Transportation Systems Plan:*** Prepared in 2008, the *Hennepin County Transportation Systems Plan* (HCTSP) identifies Hennepin County's (the County) vision for transportation, updating previous planning efforts and making recommendations for transportation improvements to accommodate population and employment growth. The plan has been submitted to the Metropolitan Council for approval, and is expected to be adopted by Hennepin County Board of Commissioners in mid-2009.
- The plan identifies LRT as a desired element of the multi-modal transportation system, including the Southwest LRT as a high priority in expanding the region's light rail system. The plan recommends that the County work to implement the Southwest LRT, in addition to other LRT, commuter rail and bus rapid transit systems.⁸

Evaluation: The plan recognizes the three LRT alternatives identified in the Southwest Transitway AA, which also determined LRT as the preferred mode for serving the southwest metropolitan area. LRT 1A, LRT 3A, and LRT 3C-1 (Nicollet Avenue) and the LRT 3C-2 (11th/12th Street) are all compatible with the Hennepin County Transportation System Plan.

City of Eden Prairie

City of Eden Prairie Comprehensive Plan: As an update of the 1999 comprehensive plan, a draft of the *City of Eden Prairie Comprehensive Plan* was completed and filed with the Metropolitan Council for approval in 2009. The City of Eden Prairie has passed a resolution supporting the recommendations of the Southwest Transitway AA Study and maintains a strong preference for either the LRT 3A or LRT 3C alignments which serve the Major Center Area and the Golden Triangle Area. In further support of LRT in the transit corridor, the Comprehensive Plan Update identifies five TOD areas that align with the five LRT station areas along the LRT 3A or LRT 3C alignments.

Evaluation: The LRT 3A and LRT 3C-1 (Nicollet Avenue) are compatible with the *Eden Prairie Comprehensive Plan* because they are identified as preferred alignments that supports the city's redevelopment plans for the Major Center Area and Golden Triangle Area. The LRT 3C-2 (11th/12th Street) would serve the same area as the LRT 3A and LRT 3C-1 (Nicollet Avenue) alternatives in Eden Prairie and is considered compatible with the Plan. LRT 1A does not support the city's redevelopment plans for the MCA and GTA and is not compatible with the Plan.

City of Minnetonka

2030 Minnetonka Comprehensive Guide Plan: The *2030 Minnetonka Comprehensive Guide Plan* was approved by the City Council in 2008 and submitted to the Metropolitan Council for approval in 2009. The plan supports transit and states that the Southwest Corridor LRT includes a preferred alignment that directly serves the Opus area, as well as Hopkins and the Golden Triangle. The plan discusses the effect of land use on transit and the effect of transit on land use and economic development, especially in relation to Opus. Housing, residential growth, and

⁸ Hennepin County Transportation Systems Plan, pg. 4-18.

redevelopment, particularly in areas near proposed stations for Southwest LRT, are also discussed in the plan. The plan notes that policy changes or future planning would be necessary for the Opus region, by stating “The 2030 Comprehensive Guide Plan will likely require amendments following completion of the LRT study to accommodate TOD land uses and development criteria. Further, it is likely that a new overall master plan will be needed for Opus before completion of the LRT to reflect the potential for changing land uses and related development criteria.”⁹

Evaluation: LRT 3A and LRT 3C-1 (Nicollet Avenue) are compatible with the *2030 Minnetonka Comprehensive Guide Plan* because they serve Minnetonka and the Opus business park. The LRT 3C-2 (11th/12th Street) would serve the Opus area and is considered compatible with the Plan. LRT 1A is not compatible with the Plan because it does not provide service to the Opus area.

City of Edina

Edina Comprehensive Plan Update, 2008 (Draft): The City of Edina *Comprehensive Plan Update 2008* was revised in 2008, updating the city’s previous comprehensive plan, completed and adopted in 1999. The plan provides guidance for future development within the city between 2008 and 2030. The plan identifies the community vision, goals and objectives and implementation procedures to achieve the desired outcomes for the city. Edina’s revised comprehensive plan does not indicate a preferred alternative.

Evaluation: LRT 1A, LRT 3A, and LRT 3C-1 (Nicollet Avenue) are compatible with the *Edina Comprehensive Plan Update*. The LRT 3C-2 (11th/12th Street) would serve the same area as LRT 3A and LRT 3C-1 (Nicollet Avenue) and is also considered compatible with the Plan.

City of Hopkins

Hopkins Comprehensive Plan, 2008 (Draft): In 2008, the *Hopkins Comprehensive Plan* was developed in draft form and submitted to the Metropolitan Council for approval. The plan does not identify a preference for a specific alignment but focuses LRT with respect to development and transportation in relation to Segment 4 between the Shady Oak Station and West Lake Station along the route that all of the LRT alternatives travel.

Evaluation: LRT 1A, LRT 3A, and LRT 3C-1 (Nicollet Mall) are compatible with the *Hopkins Comprehensive Plan* because they all provide service to Hopkins. LRT 3C-2 (11th/12th Street) would serve the same area as the other alignments and is also considered compatible with the Plan.

City of St. Louis Park

City of St. Louis Park Comprehensive Plan: The *City of Saint Louis Park Comprehensive Plan* was adopted in 1999 and remains the city’s most recently approved comprehensive plan. Amendments to the plan were adopted by the City Council in 2006. The City requested and received an extension from the Metropolitan Council for the completion of their new comprehensive plan and city officials anticipate the plan will be complete by the end of May 2009.

⁹ City of Minnetonka, 2030 Minnetonka Comprehensive Guide Plan, pg. IV-32

Evaluation: LRT 1A, LRT 3A, and LRT 3C-1 (Nicollet Avenue) are compatible with the *City of St. Louis Park Comprehensive Plan* because they all provide access and service to the areas identified in the Plan for light rail transit stations. LRT 3C-2 (11th/12th Street) would provide the same access as the other alignments and is also considered compatible.

City of Minneapolis

The Minneapolis Plan for Sustainable Growth, 2008: The *Minneapolis Plan for Sustainable Growth* was approved by the Minneapolis City Council on July 11, 2008 and was sent to the Metropolitan Council for formal review and approval. This plan replaces *The Minneapolis Plan* (2000), which was the comprehensive plan for the city. The plan identifies “Transitway – Alternative Downtown Connectors” proposed for the Year 2025 on a Transitway System Map which coincide with Segment A and Segment C-1 (Nicollet Mall), however it does not specifically identify the Southwest LRT Project or endorse specific segments or a particular LRT alignment.

Evaluation: LRT 1A, LRT 3A and LRT 3C-1 (Nicollet Avenue) are compatible with the *Minneapolis Plan for Sustainable Growth* and are shown on its maps. LRT 3C-2 (11th/12th Street) is not addressed by the Plan or illustrated on its maps and is given a value of “N/A” in the summary matrix.

Access Minneapolis, 2008: In 2008, the City of Minneapolis adopted the *Access Minneapolis – Ten-Year Transportation Action Plan*, intended to identify specific actions the City of Minneapolis intends to take within the next ten years to implement the transportation policies articulated in *The Minneapolis Plan* (2000) and the *Minneapolis Plan for Sustainable Growth* (2008). The plan makes a series of transportation policy and investment recommendations. *Access Minneapolis* addresses a full range of transportation options and issues including pedestrians, bicycles, transit, automobiles and freight. The plan is divided into four sections, including *Citywide Action Plan (updated 2009)*, the *Downtown Action Plan (2007)*, and the *Streetcar Feasibility Study (2008)*. The *Citywide Action Plan* and the *Downtown Action Plan* do not identify a preferred alignment for the Project in Minneapolis. The *Streetcar Feasibility Study Final Report* proposes the implementation of a streetcar system for both the Midtown Corridor and Nicollet Avenue in the same location as Segment C-1 (Nicollet Mall) of the LRT 3C-1 (Nicollet Avenue) alignment and Segment C-2 (11th/12th Sub-alternative) of the LRT 3C-2 (11th/12th Street) alignment.

Evaluation: LRT 1A and LRT 3A are compatible with the *Access Minneapolis Plan* as discussed above. LRT 3C-1 (Nicollet Avenue) and LRT 3C-2 (11th/12th Street) are not compatible with the Plan for the reasons specified above, especially the role and function of Nicollet Mall in downtown Minneapolis and impacts to the MARQ2 project.

4.2.1.4 Evaluation of Other Relevant Plans

Downtown Minneapolis Intermodal Station Siting and Feasibility Study: Prepared in 2006, the *Downtown Minneapolis Intermodal Station Siting and Feasibility Study* outlines design concepts, rail operations and staging possibilities for a transit station in downtown Minneapolis that would facilitate the use of and transfers between various transportation modes. As addressed in the study, an intermodal station could provide access to commuter and intercity rail, buses serving the downtown area, the Central Corridor and Hiawatha LRT lines, as along with the potential for Southwest LRT and Bottineau Corridor service, through the extension of the existing LRT line. The study recognizes a Southwest Corridor LRT would likely enter the

Intermodal Station site from the west, possibly via Royalston Avenue, Sixth Avenue, and Fifth Streets where service could be integrated with Hiawatha service.

Evaluation: LRT 1A, LRT 3A and LRT 3C-2 (11th/12th Street) are compatible with the study because they directly access the proposed Intermodal Station. LRT 3C-1 (Nicollet Avenue) is not compatible with the study because it does not directly access the Intermodal Station.

Eden Prairie Major Center Area Study: The *Eden Major Center Area (MCA) Study* from 2006 states that the MCA future is based on a vision that; “Bus and light rail transit service should be completely integrated into the street network and development pattern to take advantage of concentrations of people who will choose to use transit to get around the area.” LRT service is highly recommended in the future MCA plan. The study identifies preferences for an alternative that would bring LRT into the MCA from the northeast and the Golden Triangle area and pass it through the Town Center on the south side of Lake Idlewild. The study supports LRT in the MCA area and therefore Segment 3, which is common to LRT 3A, LRT 3C-1 (Nicollet Avenue) and the LRT 3C-2 (11th/12th Street).

Evaluation: LRT 3A and LRT 3C-1 (Nicollet Avenue) are compatible with *MCA Study* because they directly access the area. LRT 3C-2 (11th/12th Street) would also serve the MCA area and is considered compatible with the Plan. LRT 1A is not compatible with the Plan because it does not provide service to the MCA area.

Golden Triangle Land Use/Multi-Modal Transportation Evaluation: The *Golden Triangle Land Use/Multi-Modal Transportation Evaluation (GTA)* was prepared for the City of Eden Prairie and the Hennepin County Department of Housing, Community Works and Transit. It was adopted in 2004 with the intent to evaluate the potential for an increased mixed land use pattern with the goal of satisfying four objectives: (1) Reduce peak period traffic congestion, (2) Maintain or improve property tax benefits, (3) Increase transit use and alternative transportation mode use in a suburban location, and (4) Explore the possibilities of creating additional development opportunities in Eden Prairie for regional commercial development. The GTA study supports transit and the Southwest LRT Project including the redevelopment area within the ½ mile area of the proposed LRT Golden Triangle Station which is located on the alignment for LRT 3A, LRT 3C-1 (Nicollet Avenue), and LRT 3C-2 (11th/12th Street).

Evaluation: LRT 3A and LRT 3C-1 (Nicollet Avenue) are compatible with *Golden Triangle Land Use/Multi-Modal Transportation Evaluation Study* because they directly access the area. The LRT 3C-2 (11th/12th Street) would also serve the Golden Triangle area and is considered compatible with the Study. The LRT 1A alternative is not compatible with the Study because it does not provide service to the Golden Triangle area.

Hopkins Station Area Plan, 2007: Completed in October 2007, the *Hopkins Station Area Plan* develops a set of station area plans for the proposed Shady Oak, Hopkins and Blake stations located on Segment 4, which is common to all of the LRT alternatives. The plan provides a “road map” to guide future growth and redevelopment of select sites through an integrated transportation and land use planning approach within the City of Hopkins.¹⁰

Evaluation: LRT 1A, LRT 3A, and LRT 3C-1 (Nicollet Avenue) are compatible with the *Hopkins Station Area Plan* because they all provide access and service to the Station Area. LRT 3C-2 (11th/12th Street) would provide the same access as the other alignments and is also considered compatible with the Plan.

¹⁰ City of Hopkins, Station Area Plan, pg. 3.

East Hopkins Land Use and Market Study, 2003: The *East Hopkins Land Use and Market Study* (EHLUM) was done in an effort to “take a more proactive look at future land use and market opportunities” in the east end of the city,¹¹ an area bounded generally by TH 7 on the north, TH 169 on the west, Excelsior Boulevard on the south, and the Blake Road “corridor” on the east. One of the study’s objectives is “to further explore non-roadway connections, through either off road trails or improved transit opportunities.”¹² The Final Land Use Concept Plan in the EHLUM recommends that the Southwest Transit Corridor become either a BRT or LRT corridor, continue to share space with a regional greenway/regional trail with various connections to the neighborhood, and would likely have a transit station at Blake Road. The EHLUM recognizes that implementation of LRT could be a major catalyst for change in East Hopkins.¹³ The study recognizes that Excelsior Boulevard and the HCRRA rail corridor are the likely routes for enhanced mass transit.

Evaluation: Because each LRT alternative would share the same alignment through East Hopkins, all of the alternatives are determined to be compatible with the East Hopkins Land Use and Market Study.

Blake Road Corridor Small Area Plan, 2009: The *Blake Road Corridor Small Area Plan* (BRCP) was prepared by Hennepin County in conjunction with the City of Hopkins to serve as a policy and vision document for the Blake Road Corridor within which an LRT station for the Southwest Corridor LRT is proposed. The affected area includes Blake Road north of the Hennepin County-owned rail corridor and south of Highway 7, and the blocks adjacent to Blake Road along Cambridge Street, Cottageville Park, Lake Street NE, 2nd Street NE, and Minnehaha Creek. The BRCP was presented to, and approved by, the Hopkins City Council on May 19, 2009.

The BRCP assumes that the station will be sited west of Blake Road and north of the existing railroad tracks. It is expected that significant redevelopment in the Blake Road corridor will occur because of favorable market conditions influenced by LRT and other large redevelopments.¹⁴ The plan recognizes that introduction of an LRT station to the study area will also have a strong influence on redevelopment patterns, especially within a quarter mile of the station itself.

Evaluation: LRT 1A, LRT 3A, and LRT 3C-1 (Nicollet Avenue) are compatible with the *Blake Road Corridor Small Area Plan* because they all provide access and service to the Blake Road Corridor of Hopkins. LRT 3C-2 (11th/12th Street) would provide the same access as the other alignments and is also considered compatible with the study.

Elmwood Land Use, Transit & Transportation Study: The *Elmwood Land Use, Transit & Transportation Study* was completed in February, 2003 as a joint effort between the city of St. Louis Park and Hennepin County. Results of the study were incorporated into the city’s comprehensive plan. The study was developed as a tool to guide decisions on future land use redevelopment, infill development, and infrastructure changes in the Elmwood neighborhood. One of the conclusions made was to support the development of LRT in the Southwest LRT project. The study calls for the development of a center platform LRT station at Wooddale Avenue and West 36th Street.

¹¹ City of Hopkins, East Hopkins Land Use and Market Study, pg. SUM-1.

¹² City of Hopkins, East Hopkins Land Use and Market Study, pg. 1-6.

¹³ City of Hopkins, East Hopkins Land Use and Market Study, pg. 7-7.

¹⁴ Hennepin County, Blake Road Corridor Small Area Plan, pg. 19.

Evaluation: LRT 1A, LRT 3A, and LRT 3C-1 (Nicollet Avenue) and LRT 3C-2 (11th/12th Street) are compatible with the *Elmwood Land Use, Transit & Transportation Study* because they and service to the area in which the study recommends specific land use and transportation development.

Bassett Creek Valley Master Plan, 2007: The *Bassett Creek Valley Master Plan* was approved by City Council on January 12, 2007. The plan envisions a system of existing and proposed parks and open space integrated with a revitalized mixed-use urban village. The plan advocates redevelopment of an industrial land use area to a mixed-use development of residential, commercial and open space land uses. The plan specifically identifies the area served by Segment A and the Van White Boulevard Station providing direct benefits such as access and redevelopment opportunities in the area.

Evaluation: LRT 1A and LRT 3A are compatible with the *Bassett Creek Valley Master Plan*. LRT 3C-1 (Nicollet Avenue) and LRT 3C-2 (11th/12th Street) do not access or provide service to the area and therefore are considered not compatible with the Plan.

Bryn Mawr Neighborhood Land Use Plan, 2005: The *Bryn Mawr Neighborhood Land Use Plan* was adopted by the Minneapolis City Council in September, 2005. The plan addresses issues and opportunities for the neighborhood revolving around land use patterns, demographics, transportation, housing, natural resource management and commercial enterprise. Although the plan provides limited references to the Southwest LRT project, the plan acknowledges the Project as having several potential benefits to the neighborhood. The plan states that the “Dan Patch Commuter Rail and Southwest Corridor Light Rail Transport (LRT) will run through the southern segment of the neighborhood.”¹⁵ The plan identifies the proposed Penn Avenue station on Segment A near the Penn Avenue and I-394 interchange, and the development potential, increased connectivity, and alternative means of travel around the Twin Cities for neighborhood residents.

Evaluation: LRT 1A and LRT 3A are compatible with the *Bryn Mawr Neighborhood Land Use Plan*. LRT 3C-1 (Nicollet Avenue) and LRT 3C-2 (11th/12th Street) do not access or provide service to the area and therefore are considered not compatible with the Plan.

Nicollet Avenue: The Revitalization of Minneapolis’ Main Street, 2000: The *Nicollet Avenue Task Force Report*, adopted by the Minneapolis City Council in May of 2000. In 1998 the Minneapolis City Council established the Nicollet Avenue Task Force to develop recommendations regarding redevelopment opportunities, locations for streetscape improvements, and transportation/roadway improvements to a lesser degree. The study area for the report extends to both sides of Nicollet Avenue between Grant Street and 62nd Street for a total length of six miles. Task Force members identified the reopening Nicollet Avenue at Lake Street as the single most important element in revitalizing Nicollet Avenue.¹⁶

Evaluation: LRT 3C-1 (Nicollet Avenue) alternative and LRT 3C-2 (11th/12th Street) are not compatible with the *Nicollet Avenue: The Revitalization of Minneapolis’ Main Street Study*. The Study does not address the LRT 1A or LRT 3A alternatives.

Uptown Small Area Plan, 2008: The *Uptown Small Area Plan* was approved by the Minneapolis City Council in February 2008. The Uptown Neighborhood is located southwest of

¹⁵ City of Minneapolis, *Bryn Mawr Neighborhood Land Use Plan*, Pg. 24.

¹⁶ City of Minneapolis, *Nicollet Avenue Task Force Report*, p. 15.

downtown Minneapolis near the Chain of Lakes. The plan promotes improved connectivity between the Midtown Corridor and the surrounding lakes and urban core. Although, the *Uptown Small Area Plan* is supportive of transit using streetcars or LRT, it does not endorse a specific mode or alignment through Uptown. The plan specifically recommends the implementation of the Southwest Transit Corridor through Uptown or extending a streetcar to connect at the future West Calhoun Transit Center.¹⁷ The plan suggests that Uptown could be a stop along the future Southwest Transit LRT corridor.

Evaluation: Both the LRT 3C-1 (Nicollet Avenue) alternative and the LRT 3C-2 (11th/12th Street) are compatible with the *Uptown Small Area Plan*. Other modes of transit, such as a midtown streetcar are also compatible with the Plan. The Plan does not address the LRT 1A or LRT 3A alignment alternatives.

Midtown Minneapolis Land Use and Development Plan, 2005: The *Midtown Minneapolis Land Use and Development Plan*, adopted in December 2005, sets out guidelines for future development and infrastructure improvements along Lake Street in Minneapolis. The report documents the planning and design process conducted to prepare land use and development plans that will inform future revision of the *Minneapolis Plan* and will be used to guide development activities. The plan states that the City should continue to move the proposed Southwest LRT and trolley concepts along by participating in studies that further investigate implementation of either of these transit technologies.

Evaluation: LRT 3C-1 (Nicollet Avenue) and the LRT 3C-2 (11th/12th Street) alternatives are compatible with the *Midtown Minneapolis Land Use and Development Plan*. Other transit modes, such as a streetcar, are also compatible with the Plan. The Plan does not address the LRT 1A or LRT 3A alternatives.

Midtown Greenway Land Use and Development Plan, 2007: The *Midtown Greenway Land Use and Development Plan*, adopted by the city in February 2007, sets forth recommendations for TOD along the Midtown Corridor and enhanced transit station areas at each potential station location in the Midtown Corridor independent of the mode chosen (LRT, BRT or streetcar). The plan does not endorse a particular transportation mode or alignment but does encourage further investigation on the city's behalf to implement these technologies.

Evaluation: Both the LRT 3C-1 (Nicollet Avenue) alternative and the LRT 3C-2 (11th/12th Street) are compatible with the *Midtown Greenway Land Use and Development Plan*. Other transit modes, such as a streetcar, are also compatible with the Plan. The Plan does not address the LRT 1A or LRT 3A alternatives.

Midtown Corridor Historic Bridge Study, 2007: The *Midtown Corridor Historic Bridge Study* was prepared in 2007 for the Public Works Department of the City of Minneapolis to assess potential repair/rehabilitation limitations, present the original construction methods and identify potential effects of bridge removal on the corridor's status as a historic district. Although the study acknowledges the AA alignments the option for using part of the Midtown Corridor for rail transit it does not specifically support or oppose any segment. It also identifies additional transit options for the corridor in the form of a modern streetcar or BRT.

Evaluation: Both the LRT 3C-1 (Nicollet Avenue) alternative and the LRT 3C-2 (11th/12th Street) are compatible with the *Midtown Corridor Historic Bridge Study* providing they do not impact the

¹⁷ City of Minneapolis, Uptown Small Area Plan, Pg. 15.

contributing features to the Midtown Corridor Historic District. Other transit modes, such as a streetcar, are also compatible with the Study. The Study does not address the LRT 1A or LRT 3A alternatives.

4.2.1.5 Summary

In summary and as documented in Table 6, below, LRT 3A is fully compatible with all regional and local land use and transportation plans. LRT 1A is compatible with the Metropolitan Council's TPP, but is incompatible with the land use plans of the local jurisdiction of Minnetonka and Eden Prairie. LRT 3C-1 (Nicollet Avenue) and LRT 3C-2 (11th/12th Street) are incompatible with the Metropolitan Council's TPP as well as the Access Minneapolis Plan adopted by the Minneapolis City Council. Therefore the alternative considered to best meet the purpose and need for the project under the Planning Compatibility evaluation measure is LRT 3A.

Table 6 - Planning Compatibility Evaluation Summary Matrix

METROPOLITAN LAND PLANNING ACT (MPLA) PLANS	2030 Transportation Policy Plan (TPP)	Hennepin County Transportation Systems Plan	City of Eden Prairie Comprehensive Plan	City of Minnetonka Comprehensive Plan	City of Edina Comprehensive Plan	City of Hopkins Comprehensive Plan	St. Louis Park Comprehensive Plan	Minneapolis Plan for Sustainable Growth	Access Minneapolis	MPLA Compatibility Total (+) and (-)	OTHER RELEVANT PLANS/STUDIES	Intermodal Station Siting and Feasibility Study	Major Center Area Study (Eden Prairie)	Golden Triangle Land Use/Multi-Modal Transportation Study(Eden Prairie)	Hopkins Station Area Plan	East Hopkins Land Use and Market Study	Blake Road Corridor Small Area Plan	Elmwood Area Land Use, Transit and Transportation Study (St. Louis Park)	Bassett Creek Valley Master Plan	Bryn Mawr Neighborhood Land Use Plan	Nicollet Avenue Task Force Report: The Revitalization of Minneapolis' Main Street	Uptown Small Area Plan	Midtown Minneapolis Land Use and Development Plan	Midtown Greenway Land Use and Development Plan	Midtown Corridor Historic Bridge Study	Other Plans Total (+) and (-)
	LRT 1A	+	+	-	-	+	+	+	+	7 (+) 2 (-)		+	-	-	+	+	+	+	+	+	NA	NA	NA	NA	NA	7 (+) 2 (-)
	LRT 3A	+	+	+	+	+	+	+	+	9 (+) 0 (-)		+	+	+	+	+	+	+	+	+	NA	NA	NA	NA	NA	9 (+) 0 (-)
	LRT 3C-1 (Nicollet Mall)	-	+	+	+	+	+	+	-	7 (+) 2 (-)		-	+	+	+	+	+	+	-	-	-	+	+	+	+	10 (+) 4 (-)
	LRT 3C-2 (11 th /12 th Street)	-	+	+	+	+	+	NA	-	6 (+) 2 (-)		+	+	+	+	+	+	+	-	-	-	+	+	+	+	11 (+) 3 (-)

Note: Refer to the Evaluation of the plans in Section 2.2 and Section 2.3 in the LPA Technical Memorandum No. 4 for the qualitative assessment of stated policies and documentation contained in the adopted local and regional plans of the study partners for the evaluation discussion and results.

4.3 Criteria 2 – Performance

This section discusses performance elements for each LRT alternative; these elements include system integration, transit trips, transit service and accessibility. Refer to *Technical Memorandum No. 3 Screening Evaluation Criteria* for a detailed discussion of performance measures relative to FTA's "New Starts Program."

4.3.1 System Integration

System integration is defined as an LRT alternative's ability to provide seamless connectivity to existing and proposed high capacity transitways identified in the Metropolitan Council's TPP with special emphasis on integration with the existing and planned LRT system.

4.3.1.1 Criteria and Measurement

One criterion for system integration was integration into the existing and planned LRT system and regional transitway system. The measurement was an assessment of the ability of the LRT alternatives to provide connectivity among LRT lines and other high-demand transit corridors. Performance indicators used to evaluate system connectivity include physical connection, passenger movement/convenience, and minimizing non-revenue service miles.

Transportation and rail system operation planners generally prefer to fully interline or integrate guideway systems whenever possible and where travel demand warrants the additional costs associated with the design and construction of switches and track crossovers, typically required to allow full integration. The primary advantages of fully interlining a system are the following:

- Minimize the need for passengers to transfer between lines, helping to improve ridership and increase travel time savings.
- Allows for efficient movement of LRVs between various lines to balance fleet requirement with demand across the entire system.
- Requires fewer LRVs to operate on the line.
- Responds to changes in travel patterns and demands over time.

4.3.1.2 Evaluation

The LRT 1A, LRT 3A and the LRT 3C-2 (11th/12th Street) alternatives are fully integrated with both the Hiawatha and Central Corridor LRT lines. All three alternatives could physically connect to the western terminus of the combined Hiawatha and Central Corridor LRT guideway at the Intermodal Station on 5th Street North, adjacent to the new Minnesota Twins baseball stadium, Target Field. This connection would allow trains from the Southwest LRT to operate on either the Hiawatha or Central Corridor LRT guideway through downtown Minneapolis and on the individual guideways of either LRT line. The LRT 3C-1 (Nicollet Avenue) alternative is not integrated with either the Hiawatha or Central Corridor LRT guideway for daily operations.

The LRT 1A, LRT 3A, and the LRT 3C-2 (11th/12th Street) alternatives are assumed to operate as extension or through routes providing passengers with a one-seat ride to destinations along either LRT line. This configuration allows for unlimited operational flexibility between these lines, providing the opportunity for LRVs to move easily from one line to another, decrease passenger travel times, and minimize non-revenue service. Alternative LRT 3C-1 (Nicollet Mall) would operate as a stand alone LRT line requiring all passengers destined for locations along the Hiawatha and Central Corridor LRT lines to transfer. This alternative has no connectivity to the Hiawatha and Central Corridor guideway on 5th Street. The LRT 3C-1 (Nicollet Mall) alternative

has limited operational flexibility and sets up a configuration that substantially restricts system integration. Detailed text and tables for each topic can be found in the Southwest LRT *Technical Memorandum No. 5 Transit Mobility, Integration, and Access*. A summary of the transit integration analysis is provided in Table 7, below.

Table 7 - Summary of Transit Integration by LRT Alternative

Criteria	Alternative			
	LRT 1A	LRT 3A	LRT 3C-1 (Nicollet Avenue)	LRT 3C-2 (11 th /12 th Street)
Ability of the LRT alternatives to provide connectivity among LRT lines and other high-demand transit corridors	Fully integrated with Hiawatha and Central Corridor LRT lines	Fully integrated with Hiawatha and Central Corridor LRT lines	Not integrated with the Hiawatha or Central Corridor LRT for daily operations	Fully integrated with Hiawatha and Central Corridor LRT lines
Physical connection	Physically connects to combined Hiawatha and Central Corridor LRT at the Intermodal Station	Physically connects to combined Hiawatha and Central Corridor LRT at the Intermodal Station	Physical connection to Hiawatha or Central Corridor would require one turnout, two crossovers, and ten trackway switches.	Physically connects to combined Hiawatha and Central Corridor LRT at the Intermodal Station
Passenger movement/convenience	One-seat ride possible	One-seat ride possible	Stand alone LRT line	One-seat ride possible
Minimizing non-revenue service miles	No additional non-revenue service miles	No additional non-revenue service miles	Requires additional non-revenue service miles to transfer vehicles between lines	No additional non-revenue service miles

4.3.2 Transit Trips (Ridership)

Transit mobility is defined as the estimated number of transit riders and new riders attracted to the system in the forecast year of 2030 using the Metropolitan Council's travel demand model (TDM).

4.3.2.1 Criteria and Measurement

One criterion was the level of linked transit trips by LRT alternative. The measurement for this criterion was transit utilization by LRT alternative defined as total LRT linked trips in year 2030, total transit system trips in year 2030, trips by zero car households, reverse commute LRT trips in year 2030, new transit trips in year 2030 and transportation system user benefits.¹⁸

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

¹⁸ Transportation system user benefits (TSUB) represent the changes in mobility for individual travelers that are induced by a project. TSUB estimates are required by the FTA for projects being considered for Section 5309 New Starts discretionary funding provided through the FTA. TSUB are used by the FTA to compare projects throughout the U.S. They are measured in hours of travel time savings and summed over all travelers.

The forecast year for the model is 2030.

The primary inputs used in the model are the study area population, employment, household and socioeconomic characteristics, parking costs, transit fares, automobile operating costs, tolls and highway and transit levels of service. The model set simulates travel on the entire transit and highway system within the Twin Cities metropolitan area, and it contains all the existing and planned rail and bus lines. The model contains service frequency, routes, travel time, and fares for all these lines. In the highway system, all express highways and principle arterial roadways and many minor arterial and local roadways are included.

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

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

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

4.3.2.2 Evaluation

The analysis results indicate that in general, in all the alternatives the areas receiving most of the benefits from the project are the same areas that have been identified as having a strong transportation need in the Purpose and Need Statement.

The ridership analysis indicates all the build alternatives would generate approximately the same level of transit ridership—24,500 to 27,500 boardings a day. More than 50 percent of the projected riders would use the rail service for work related trips. Most of the trips would be destined to Minneapolis downtown, but there would also be some reverse commute trips in the order of about 5,000 for LRT 1A and about 7,000 for LRT 3A, LRT 3C-1 and LRT 3C-2.

Among the three LRT alternatives that serve the Golden Triangle/Opus areas, LRT 3A is the only one that offers much faster travel time between West Lake and downtown Minneapolis. The difference in travel time in that section between LRT 3A and other two alternatives (LRT 3C-1 (Nicollet Mall) and LRT 3C-2 (11th/12th Street)) is eight to nine minutes. This faster travel time is the main reason why LRT 3A generates the highest user benefits among all the other LRT alternatives.

A summary of the results of the Transit Mobility evaluation is provided in Table 8, below.

Table 8 - Summary of Transit Mobility by LRT Alternative

Criteria	Alternative			
	LRT 1A	LRT 3A	LRT 3C-1 (Nicollet Mall)	LRT 3C-2 (11 th /12 th Street)
Transit utilization defined as total LRT ridership in year 2030 (regional transit mode share)	2.04%	2.05%	2.04%	2.04%
Total transit system ridership in year 2030	338,830	340,349	339,605	339,810
Trips by zero car households	19,550	19,950	20,500	20,700
Reverse commute Southwest LRT ridership in year 2030	5,650	7,000	7,000	7,200
New transit trips in year 2030	4,987	6,506	5,761	5,967
Transportation system user benefits	4,995 43 percent due to trips attracted to Minneapolis downtown, south and east Minneapolis. 20 percent are due to trips attracted to Saint Louis Park. 62 percent due to trips produced in communities along the LRT alignment	6,412 18 percent due to trips attracted to Eden Prairie. 40 percent due to Minneapolis downtown, south and east Minneapolis area. 32 percent due to trips attracted to Saint Louis Park and Minnetonka. Similar to LRT 1A, 66 percent due to trips produced in communities along the LRT alignment.	5,657 33 percent due to trips attracted to Eden Prairie, Bloomington, Richfield and Minnetonka. 42 percent due to trips to Minneapolis downtown, south and east Minneapolis area. 18 percent due to trips attracted to Saint Louis Park. 70 percent due to trips produced in communities along the LRT alignment.	5,993 Distribution similar to LRT 3C-1 (Nicollet Mall)

4.3.3 Transit Service

Transit service evaluates the quality and quantity of existing and programmed transit services within the Study Area.

4.3.3.1 Criteria and Measurement

The criteria for transit service was the quantity and quality of the existing and programmed transit services within the Study Area compared with and without implementation of LRT service. The measurement of transit service was the frequency of LRT and bus transit service, ability of LRT to enhance transit service in the corridor, duplication of transit service, and overall transit system efficiency.

4.3.3.2 Evaluation

LRT 1A – Transit accessibility in proximity to the exclusive segment of LRT 1A alternative may be characterized as low to moderate. Implementation of the LRT 1A alternative would result in providing a new transit service to regions either not served by transit or potentially underserved,

and the risk of duplicating existing transit service would be minimal. Analyses of this region, however, suggest that it is unlikely to generate more transit trips in the near future.

LRT 3A – Accessibility to transit services and facilities in proximity of the LRT 3A alternative is considered to be moderate. Implementation of the LRT 3A alternative would result in providing a new high-frequency transit service to regions principally served by express bus service, and the risk of duplicating existing transit service would be minimal.

LRT 3C-1 (Nicollet Avenue) and LRT 3C-2 (11th/12th Street) – Transit accessibility within proximity of both the LRT 3C-1 (Nicollet Mall) and LRT 3C-2 (11th/12th Street) alternatives are considered high. As compared to the LRT 1A and LRT 3A alternatives, the LRT 3C-1 (Nicollet Mall) alternative has the greatest interaction and duplication with the existing transit network. Construction and operation of either alternative would likely pose several challenges to the existing transit services, along with operational challenges to planned service improvements.

Detailed text and tables can be found in the Southwest LRT *Technical Memorandum No. 5 Transit Mobility, Integration, and Access*. See Table 9, below, for a summary of the evaluation.

Table 9 - Summary of Transit Service by LRT Alternative

Criteria	Alternative			
	LRT 1A	LRT 3A	LRT 3C-1 (Nicollet Mall)	LRT 3C-2 (11 th /12 th Street)
Frequency of LRT and bus transit service	Moderate to low. Least amount of existing transit service and supportive infrastructure.	Moderate. The availability of transit service throughout the day and on weekends is relatively mixed.	High. A mixture of express, local, and circulating loop services. Midtown and downtown are considered to be transit-saturated markets.	High. A mixture of express, local, and circulating loop services. Midtown and downtown are considered to be transit-saturated markets.
Ability of LRT to enhance transit service in the corridor	New service or improved service to underserved regions.	Would provide a new high-frequency transit service to regions principally served by express bus service,	Would likely challenge existing transit services, and planned service improvements	Would likely challenge existing transit services, and planned service improvements
Duplication of transit service	Minimal	Minimal	High interaction with and duplication of existing transit network	High interaction with and duplication of existing transit network
Overall transit system efficiency	Increasing the number of buses or frequency of buses will not improve travel times, but may lead to excessive costs without sufficient gain. Western region is not a high transit trip generator	Direct connection to major employment destinations and connects with other major regional destinations.	Two or three high-frequency routes serving the same area would be a highly inefficient use of resources	Two or three high-frequency routes serving the same area would be a highly inefficient use of resources

4.3.4 Access for People, Housing, and Jobs

Accessibility is based on the updated local comprehensive plans including updated socioeconomic data reflecting planned growth by 2030. The assumed growth patterns in the Study Area directly affect the performance of the LRT alternatives. The cities of Minneapolis, St. Louis Park, Minnetonka, Edina, Hopkins and Eden Prairie have revised and updated their

estimates of 2030 population, household and employment based on their most current comprehensive plans. These estimates are pending approval by the Metropolitan Council and therefore can not be considered 'official' values. They are, however, the best available information and therefore have been utilized to evaluate the accessibility provided by the Southwest LRT alternatives.

4.3.4.1 Criteria and Measurement

The criterion for accessibility was access of population (people), housing (households), and jobs (employment). The measurement of accessibility was the number of people, households and employment within one-half mile of stations for each LRT segment.

Refer to Table 3 in Section 2.0 for a list of segments that comprise each LRT alternative and Table 4 in Section 2.0 for a list of the stations included on each LRT segment.

4.3.4.2 Evaluation

For this evaluation, a one-half mile radial buffer was established around the proposed stations for each LRT alignment to determine accessibility by calculating the population, households and employment in the vicinity. Refer to the tables below for the segments that comprise each LRT alternative and the stations included on each segment. Refer to Figure 6 for a map of the LRT Segments.

Assumptions and methods used to determine the population, households, and employment within one-half mile of each station, detailed text and table for each topic can be found in Section 2.4 of the Southwest LRT *Technical Memorandum No. 5 Transit Mobility, Integration, and Access*. A summary is provided in Table 10, below.

Table 10 - Summary of Access for People, Housing and Jobs by Alternative, Years 2010 and 2030

Criteria	Alternative							
	LRT 1A		LRT 3A		LRT 3C-1 (Nicollet Mall)		LRT 3C-2 (11 th /12 th Street)	
Year	2010	2030	2010	2030	2010	2030	2010	2030
Population within ½ mile of stations	67,000	91,000	66,000	104,000	111,000	153,000	115,000	166,000
Households within ½ mile of stations	32,000	45,000	33,000	53,000	60,000	78,000	62,000	85,000
Employment within ½ mile of stations	186,000	222,000	213,000	259,000	233,000	278,000	99,000	288,000

4.3.5 Capital Costs

This evaluation is based upon the advanced conceptual engineering plans dated March 2009. The advance conceptual engineering plans used the AA conceptual engineering plans and applied the Central Corridor LRT Design Criteria dated July 2008. At this stage of project development, assumptions are made to establish costs for project elements that have not been designed or quantified in engineering plans. The Southwest LRT capital cost estimates assumptions, base year unit price comparisons (for site work and special conditions, systems (crossing protection, signals, fare collection, etc.), vehicles, stations, support facilities such as park-and-rides, and professional services for each LRT alternative can be found in *Technical Memorandum No. 7A Capital Cost Evaluation*.

A comparison to the AA cost estimate is included as part of this analysis.

Capital costs are defined as the one-time costs to construct the LRT, including the guideway (ballast, track and catenary system), stations, structures, right-of-way (ROW), engineering/design, administrative costs and contingencies. Capital cost estimates have been prepared using the FTA's format and procedures, as required for all FTA New Starts applications. The FTA methodology includes the use of standard cost category (SCC) and groupings for organization of the data, and detailed spreadsheets for development of forecast year estimates and annualized capital costs. Appendix A of Southwest LRT *Technical Memorandum No. 7A Capital Cost Evaluation* includes the list of the FTA SCC categories and definitions and unit prices for the SCC Workbooks.

4.3.5.1 Criteria and Measurement

The criterion for capital costs was the capital cost for each LRT alternative reported in year of expenditure dollars (YOE 2015/\$). The measurement for capital costs was the total capital cost and cost per mile.

4.3.5.2 Evaluation

Table 11 compares the total alignment costs of each LRT alternative against those reported in the AA cost estimate. Southwest LRT *Technical Memorandum No. 7A Capital Cost Evaluation* contains tables that compare the SCC costs between the current estimate and the AA estimate for each alternative.

Table 11 - Summary of Total Capital Cost Estimates

Alternative	Alternatives Analysis (thousands \$)		LPA Analysis (thousands \$)	
	Base Year Total (2006)	YOE (2015)	Base Year Total (2008)	YOE (2015)
LRT 1A	680,143	864,438	749,417	915,416
LRT 3A	910,611	1,157,355	989,658	1,209,510
LRT 3C-1 (Nicollet Mall)	1,106,326	1,406,103	1,408,732	1,720,977
LRT 3C-2 (11 th /12 th Street)	-	-	1,473,062	1,799,104

4.3.6 Operating and Maintenance (O&M) Costs

Operating and Maintenance Costs (O&M) are defined as the ongoing annual costs to operate and maintain each LRT alternative. The O&M costs are presented for the operation of the Southwest LRT Build alternatives as a stand alone estimate and for the total transit system. All costs are stated in 2008 dollars. The System Wide O&M costs are based on 2030 transit service levels and assume that peak service is six hours in length and off-peak service is 13 hours in length. The O&M was done Year 2015 and estimates were developed consistent with FTA guidelines for each LRT alternative. These costs typically include the following items:

- Labor costs
- Fuel and electricity
- Parts and materials

- Non-labor operating costs to maintain support facilities (stations, bus stops, transit centers, maintenance facilities, etc.)
- Administrative costs including labor, supplies, building operations, communications, etc.
- Insurance

Assumptions and methodology used for O&M costs, as well as detailed tables of fixed and variable costs can be found in Southwest LRT *Technical Memorandum No. 7B Operation and Maintenance Costs Evaluation*.

4.3.6.1 Criteria and Measurement

The criteria for the evaluation included; Southwest LRT O&M costs, Southwest LRT cost per mile, system-wide O&M costs, and system-wide transit O&M costs.

Another criterion was the operating cost of the LRT line. The measurement for the operating cost was operating cost/revenue hour, operating cost/revenue mile, operating cost/passenger hour, and operating cost/passenger mile.

4.3.6.2 Evaluation

Table 12, below, presents the results of the analysis of O&M costs estimates for the Southwest LRT alternatives.

Table 12 - Southwest LRT 2008 O&M Costs (\$)

Alternatives	2008 O & M Cost	Cost per train mile of Service	Cost per train revenue mile of service
LRT 1A	\$19,554,571	\$18.18	\$501.94
LRT 3A	\$22,751,917	\$21.15	\$482.04
LRT 3C-1 (Nicollet Mall)	\$26,740,560	\$20.51	\$451.81
LRT 3C-2 (11 th /12 th Street)	\$28,820,236	\$21.69	\$471.43

Table 13, below, summarizes the System Wide O&M costs for the Baseline or TSM and four Build alternatives.

Table 13 - Summary of System-Wide Operating and Maintenance Cost Estimates (\$)

Criteria	LRT Alternative			
	LRT 1A	LRT 3A	LRT 3C-1	LRT 3C-2
System Wide Bus O&M 2008	\$ 414,656,902	\$ 415,027,446	\$ 413,887,626	\$ 414,279,517
System Wide Rail O&M 2008	\$ 66,669,163	\$ 69,767,047	\$ 72,836,108	\$ 73,529,255
Total System O&M 2008	\$ 481,326,066	\$ 484,794,493	\$ 486,723,734	\$ 487,808,772
System Wide Rail O&M Cost per Train Revenue Mile	\$ 20.07	\$ 20.06	\$ 20.60	\$ 20.51
System Wide Cost per Passenger Mile	\$ 188.95	\$ 188.59	\$ 190.45	\$ 189.45
System Wide Rail Operating Cost per Revenue Hour	\$ 393.81	\$ 393.47	\$ 384.69	\$ 384.43
Total System Operating Cost per Passenger Hour	\$ 3,727	\$ 3,731	\$ 3,756	\$ 3,737

4.3.7 Cost Effectiveness Index (CEI)

The preliminary CEI for the project will be refined in the next phase of the project.

4.3.7.1 Criteria and Measurement

The criteria for the evaluation will be the CEI and the measurement will be the FTA Fiscal Year (2011) CEI. The CEI considers incremental capital and O&M costs as well as user benefits. The current FTA cost effectiveness rating ranges are shown in Table 14 below.

Table 14 - FTA Cost Effectiveness Rating *

Cost Effectiveness Rating	Cost Effectiveness Value
High	\$12.49 and under
Medium-High	\$12.50 - \$15.99
Medium	\$16.00 - \$24.99
Medium-Low	\$25.00 - \$30.99
Low	\$31.00 and over

Source: New Starts Criteria thresholds FTA will use in FY 2011 for assigning a High, Medium-High, Medium, Medium-Low or Low cost effectiveness rating for each proposed project. FTA publishes updates to these breakpoints annually to reflect the impact of inflation.

4.3.7.2 Evaluation

Because an FTA-approved TSM/Baseline alternative has not been developed, the CEI values reported in Table 15 are preliminary and serve only as an indicator of the potential for each alternative to compete successfully for federal funding. As such, LRT 1A and LRT 3A alternatives could likely be optimized to produce a project capable of qualifying for federal funds. Conversely, LRT 3C-1 (Nicollet Mall) and LRT 3C-2 (11th/12th Street) would require substantial redefinition in order to qualify for federal funding.

Table 15 - Summary of Preliminary FTA Cost Effectiveness by LRT Alternative

Criteria	Alternative			
	LRT 1A	LRT 3A	LRT 3C-1 (Nicollet Mall)	LRT 3C-2 (11 th /12 th Street)
Cost effectiveness	Medium/Medium-Low	Medium-Low	Low	Low

4.4 Criteria 3 – Environmental Issues

Seven environmental issues have been identified as “critical” because the presence of these critical issues or resources, as well as the potential for impacts to each one, could substantially alter the ability of the project sponsor to implement the project in a timely manner and within the financial resources available.

Four environmental resource areas; historic properties, natural resources, water resources and Section 4(f) properties; are protected by federal and/or state laws and regulations. These regulations provide one or more agencies the authority to protect each resource. Typically, regulatory agencies have a key role in determining the extent of resource impacts by the proposed undertaking, evaluating the effectiveness of the proposed mitigation(s) for identified impacts to the resource, and managing the issuance of permits or approvals that allow projects to alter or affect a resource.

Resource regulations and the authority granted to the resource agencies range from effectively prohibiting the disruption of the resource to allowing the agency to permit alterations to the resource. Independent of the extent of control granted to the resource agencies, the cost in time and money for a project proponent to deal with the issues can be substantial. Therefore, it is imperative that decision makers have an understanding of the extent of potential conflicts between the proposed undertaking and these resources.

The remaining three critical environmental issues; hazardous/contaminated materials, geological conditions, and noise/vibration, have the potential to substantially increase project costs and result in project delays. Therefore, it is imperative that decision makers understand the relative risk associated with the presence of these resources.

The assessment of the alternatives by resource area during the screening process focuses on the identification of the presence of the resource, the extent of the resource within or adjacent to each alternative, the relative value or importance of the resource, and the complexity of addressing impacts to the resource. The assessment conducted for the LPA selection process documents the presence and extent of the seven critical resources and the likely impacts to these resources from implementation of the build alternatives. During the preparation of the DEIS, however, more details will be available regarding proposed construction limits; and a more complete assessment of existing conditions, resource impacts, and potential mitigation will be provided.

4.4.1 Historic Properties

Section 106 of the National Historic Preservation Act (NHPA) of 1966, revised as “Protection of Historic Properties: (36 CFR Part 800), became effective on January 11, 2001 and requires federal agencies, or designees to consider the effects of their actions on historic properties before undertaking a project. The Southwest LRT Project is applying for FTA funding and, therefore, must comply with Section 106 of the NHPA of 1996, 1992 as amended, and with

other applicable federal and state mandates including the Minnesota Field Archeology Act, the Minnesota Historic Sites Act and the Minnesota Private Cemeteries Act. An historic property is defined as any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in the National Register of Historic Places (NRHP). The Section 106 process consists of steps for: 1) identifying and evaluating historic properties; 2) assessing the effects of an undertaking on historic properties; and 3) consultation for methods to avoid, minimize or mitigate any adverse impacts.

The Section 106 process is currently being formally initiated between the FTA (the Responsible Federal Agency) and the MN SHPO. The FTA has designated the Minnesota Department of Transportation (Mn/DOT) as their local representative for the Section 106 process. For purposes of this technical memorandum and the LPA selection process, readily available existing information has been collected and is presented below. It should be noted that the information contained in this chapter is subject to revision or expansion once the Section 106 process is formally initiated and the consultation process with the MN SHPO begins. This is required as part of the DEIS process.

Draft APEs have been recommended for the various alternative segments (see Southwest LRT *Technical Memorandum No. 9 Environmental Evaluation* Section 3.1). These recommendations are subject to review and modification as part of the formal Section 106 process which is required under the DEIS. The APE for each alternative segment is designed to address the potential for the following types of impacts to historic property, if present:

- ROW acquisitions
- Changes in access to properties
- Noticeable traffic volume increases or alterations in traffic patterns
- Perceptible increases in noise
- Visual effects from changes in grade
- Increases in vibrations
- Changes in air quality
- Impacts to land use and a property's setting

4.4.1.1 Criteria and Measurement

The criteria for the historic properties evaluation was the potential effects upon historic properties. The measurement was a compilation of the number of historic properties based upon existing data for an assumed Area of Potential Effect (APE)¹⁹ for each LRT alternative

4.4.1.2 Evaluation

Generally, the Southwest LRT project will have few direct effects because the alternatives, with a few notable exceptions, follows existing streets, former railroad corridors, and is proposed to be constructed in a manner that avoids existing buildings and structures. In addition, the project will not include substantive street widening or the demolition of numerous buildings. Some

¹⁹ Note that the Section 106 process requires the lead federal agency, in this case the FTA, to determine the APE. The FTA has delegated responsibility for portions of the Section 106 process to the Minnesota Department of Transportation Office of Environmental Services (Mn/DOT OES); the Mn/DOT OES has not yet determined the APE for the project alternatives. Therefore the LPA screening methodology will use the term "preliminary project limits" to identify the area that would likely be defined as the APE.

visual effects are anticipated, which include overhead catenary systems (poles and wires) and the location of stations along the route.

Based upon existing data the following information was compiled for the Area of Potential Effect (APE)²⁰ for each LRT alternative:

- Number of historic properties;
- Number of historic properties potentially effected;
- The extent or severity of the potential effects;
- Opportunities to avoid and/or reduce adverse effects;
- Project cost and schedule implications for mitigating potential adverse effects.

Existing information on historic properties, either listed or previously determined eligible for listing, was obtained from the MN SHPO for each segment of the recommended APE. These previously determined historic properties are included for each segment of the recommended project APE. Information was also gathered from the Office of the State Archaeologist and the Minnesota State Historic Preservation Office on previously recorded archaeological properties within each segment of the recommended APE.

It should be noted that some segments appear to contain very few historic properties, whether buildings, structures, or archaeological sites. This may simply be because some of the segments have not been completely surveyed at present. However, based on available information on site location in general, some portions of these segments have a very high potential for archaeological sites based on the presence of uplands that overlook lake and stream basins along Minnehaha Creek, Purgatory Creek and Nine Mile Creek drainages. In general, such locations have often been found to contain archaeological sites when surveyed because locations near water that are high enough not to routinely flood make good settlement locations. These conditions are particularly prevalent along Segment 3, which would be placed on all new ROW that skirts wetlands and other bodies of water. These conditions may also be a factor in Segment 1 to the extent that new construction would expand beyond the existing railway embankments. See *Southwest LRT Technical Memorandum No. 9 Environmental Evaluation* Section 3.1.

4.4.1.3 Evaluation

Table 16 presents a summary of the known historic property by alternative. It is important to note that this is only a representation of the known resources adjacent to the alternatives; it does not address properties that have not been surveyed, and does not necessarily indicate that the project would have an adverse effect on any properties.

Insufficient information is available at the present time to precisely identify all the long-term effects to historic property within the recommended project APE. It is important; however, to note that potential impacts do not equate to adverse effects. Determination of adverse effects to the resources, as noted, has not yet been made. Consultation with Mn/DOT-CRU, SHPO, the FTA, the Advisory Council on Historic Preservation (ACHP), other relevant resource agencies,

²⁰ Note that the Section 106 process requires the lead federal agency, in this case the FTA, to determine the APE. The FTA has delegated responsibility for portions of the Section 106 process to the Minnesota Department of Transportation Office of Environmental Services (Mn/DOT OES); the Mn/DOT OES has not yet determined the APE for the project alternatives. Therefore the LPA screening methodology uses the term "preliminary project limits" to identify the area that would likely be defined as the APE.

and identified consulting parties will be conducted once the Section 106 process is formally initiated. It is anticipated that adverse effects to historic property will be addressed through the development and execution of a Programmatic Agreement (PA).

Table 16 - Summary of Known Historic Properties by Alternative

Criteria	Alternative			
	LRT 1A	LRT 3A	LRT 3C-1 (Nicollet Mall)	LRT 3C-2 (11 th /12 th Street)
Listed or Eligible Properties within Recommended APE ^a	8	9	52	53+

^a These numbers are preliminary estimates. The extent of the unsurveyed property within the recommended APE makes the estimate of the number of resources present and the potential for impacts to them provisional pending completion of the Section 106 process.

Southwest LRT *Technical Memorandum No. 9 Environmental Evaluation* presents details about Cultural Resources in Section 3.1.

4.4.2 Natural Resources

There are several federal and state laws that require proposed projects to evaluate and avoid adverse impacts on valued natural resources. The following is a brief overview of the predominate laws.

Section 7 of the Endangered Species Act (ESA) of 1973 (16 USC 1531-1544) requires that all federal agencies consider and avoid, if possible, adverse impacts to federally listed threatened or endangered species or their critical habitats, which may result from their direct, regulatory, or funding actions. The United States Fish and Wildlife Service (USFWS) is responsible for compiling and maintaining the federal list of threatened and endangered species. Section 7 of the ESA also prohibits the taking of any federally listed species by any person without prior authorization.

The State of Minnesota's endangered species law (MN Statute 84.0895) and associated rules (MN Rules 6212.1800–.2300) regulate the taking, importation, transportation and sale of state endangered or threatened species. The DNR administers the state listed rare, threatened and endangered (RT&E) species.

The Migratory Bird Treaty Act of 1918 (16 USC 703-712) governs the taking, killing, possession, transportation and importation of migratory birds, their eggs, parts and nests. Such actions are prohibited unless authorized under a valid permit.

Aquatic habitat is protected by the DNR through the public waters permit. The DNR Protected Water Permit and Crossing License reviews ensure that bridge construction or reconstruction is not detrimental to significant fish and wildlife habitat (including but not limited to obstruction the movement of game fish or disrupting fish spawning) or protected vegetation. Any anticipated adverse effects require implementation of feasible and practical measures to mitigate.

4.4.2.1 Criteria and Measurement

The evaluation criteria was potentially impacted natural resources within one mile of each LRT alternative. The measurement was an inventory of critical habitat for threatened or endangered

species, presence for threatened or endangered species, vegetation restoration areas, and wetlands or bodies of water that provide habitat for flora and fauna of interest based on existing data for each LRT alternative.

4.4.2.2 Evaluation

The urban setting is generally comprised of scattered trees, mowed bluegrass, and non-native vegetation (weeds). Wildlife in these areas includes species adapted to an urban environment. Most of the affected wetlands are smaller, lower-quality wetlands of types relatively common in the area. Construction of the 1A alignment, in particular Segment 1, would affect ecosystem conditions and functions because of the number of higher quality wetlands adjacent to the route (see Table 17, below); such as Minnetonka and Shady Oak Lakes. Segment 3 also contains a higher number of wetlands. Some of the effects would be beneficial, some, such as filling or shading wetlands, would be negative.

Methodology, summary tables of species, and more details about potential impacts along each segment have been provided in Section 3.2 of the Southwest LRT *Technical Memorandum No. 9 Environmental Evaluation*.

Table 17 - Summary of Known Habitat, and Threatened and Endangered Species, by LRT Alternative

Criteria	Alternative			
	LRT 1A	LRT 3A	LRT 3C-1 (Nicollet Mall)	LRT 3C-2 (11 th /12 th Street)
Critical habitat for threatened or endangered species	4 DNR Regionally Significant Ecological Areas. 1 State Listed Native Plant Community	3 DNR Regionally Significant Ecological Areas. 1 State Listed Native Plant Community	2 DNR Regionally Significant Ecological Areas.	2 DNR Regionally Significant Ecological Areas.
Presence of threatened or endangered species	12 occurrences: 1 federal-listed, 8 state-listed species	13 occurrences: 1 federal-listed, 8 state-listed species	11 occurrences: 8 state-listed species Within 1 mile of State Listed bat colony	11 occurrences: 8 state-listed species Within 1 mile of State Listed bat colony
Vegetation restoration areas	None known	Oak woodland preservation area City of Minnetonka	None known	None known
Wetlands or bodies of water that provide habitat for flora and fauna of interest	0.8 acres of wetlands plus: Minnehaha Creek, Cedar Lake, and Lake of the Isles	3.5 acres of wetlands plus: Minnehaha Creek, Cedar Lake, Lake of the Isles, and Idlewild Lake	3.5 acres of wetlands plus: Minnehaha Creek, Cedar Lake, Lake of the Isles, and Idlewild Lake	3.5 acres of wetlands plus: Minnehaha Creek, Cedar Lake, Lake of the Isles, and Idlewild Lake

4.4.3 Water Resources

Water is a closely regulated resource. The key agencies and regulations for water resources are identified below.

United States Army Corps of Engineers (USACE)

Navigable waters are regulated under Section 10 of the Rivers and Harbors Act (RHA) of 1899 (33 USC 403) and Section 404 of the Clean Water Act (CWA) (33 USC 1344). The RHA regulates work involving a change in the course, current, or cross-section of navigable waters,

including wetlands. Impacts to wetlands are regulated by several agencies under the CWA if they are connected or adjacent to “navigable waters” of the United States. Section 404 of the CWA requires a permit to be issued by the USACE prior to the placement of any dredged or fill material into any waters of the United States, including wetlands. Section 401 of the CWA requires the affected state to issue a water quality certification, or a waiver, for each Section 404 permit.

Minnesota Pollution Control Agency (MPCA)

The MPCA establishes water quality standards and conducts periodic water quality monitoring for surface water, groundwater and wastewater. Water quality standards are implemented primarily through National Pollution Discharge Elimination System (NPDES) permits issued to dischargers by the member states (MN Statute 115; MN Rule 7050). The MPCA and the City of Minneapolis review draft NPDES permits. The MPCA reviews COE permits and is responsible for issuing Section 401 water quality certification.

Minnesota Department of Natural Resources (DNR)

Wetlands are regulated by the DNR if they are identified as public waters or public waters wetlands. Public waters are all water basins and water courses that meet the criteria set forth in Minn. Stat., Section 103G.005, subd. 15, and that are identified on Public Water Inventory (PWI) maps and lists authorized by Minn. Stat., Section 103G.201. Proposed impacts to these types of wetlands would require a permit from the DNR.

Federal Emergency Management Agency (FEMA)

Floodplains are regulated under EO 11988. This EO requires all federal agencies to evaluate and, to the extent possible, avoid adverse impacts to the floodplain areas, which may result from actions they administer, regulate or fund. This EO specifically requires floodplain impacts to be considered in the preparation of an EIS for major federal actions. FEMA, under the national Flood Insurance Program (NFIP), has the authority to regulate floodplains and floodways. The City of Minneapolis administers these regulations, including activities such as construction, excavation, or deposition of materials in, over, or under waters which any affect flood stage, floodplain, or floodway boundaries.

The 100-year flood is used by the NFIP as the standard for floodplain management and to determine the need for flood insurance. The boundary of this floodplain is defined by the flood elevation that has a one-percent chance of being equaled or exceeded each year.

Rivers or streams where FEMA has prepared detailed engineering studies may have a designated floodway, which is defined as the area where floodwaters are likely to run deepest and fastest (FEMA 2007). It is the area of the floodplain that should be reserved (free from obstruction) to allow floodwaters to move downstream. Placing fill or buildings in a floodway may block the flow of water and increase flood elevations. Such activities in the floodway are generally restricted and require mitigation in the form of compensatory volume to offset lost floodway storage.

Minnesota Wetland Conservation Act (WCA)

To maintain and protect wetlands the Minnesota Legislature approved and the Governor signed the Wetland Conservation Act (WCA) in 1991 (as amended). Cities, counties, watershed management organizations, soil and water conservation districts and townships implement the act locally. The Minnesota Board of Water and Soil Resources administers the act statewide and the DNR enforces it.

Minnehaha Creek Watershed District (MCWD)

The Minnehaha Creek Watershed District (MCWD) is the regional governmental unit responsible for managing and protecting the water resources of the Minnehaha Creek Watershed. The District covers 181 square miles that ultimately drain into the Minnehaha Creek. The district includes all or part of 27 cities and two townships in Hennepin and Carver Counties. The cities of Hopkins, St. Louis Park and Minneapolis are within the district. MCWD is responsible for construction permitting as it pertains to Projects that effect erosion, floodplains, wetlands, dredging, shoreline or streambank improvements, stream and lake crossings, stormwater management and ensuring that new construction projects meet the goals and requirements established by the watersheds. The agency will ensure that BMPs, as outlined in the NPDES Permit, are used to limit sediment and particulate runoff during construction activities.

Bassett Creek Watershed Management Commission (BCWMC)

The Bassett Creek Watershed Management Commission (BCWMC) manages surface water within the boundaries of the BCWMC, which exceeds 40 square miles and is divided into four major subwatersheds. The cities of Minnetonka, St. Louis Park, and Minneapolis are represented by the BCWMC to facilitate the management of the watershed's water resources. The BCWMC is responsible for regulating flooding, and to maintain and enhance the quality of the surface and ground water resources in the watershed. In 1989, a permit program was required for appropriations from small watercourses. The BCWMC developed a policy establishing standards and criteria defining when water could be appropriated from public water courses and wetlands, and included a draft permit application form. Permit applications are evaluated by the cities and permits are issued by the cities. The BCWMC also reviews applications to the DNR for public waters work permits.

Nine Mile Creek Watershed District (NMCWD)

The Nine Mile Creek Watershed District (NMCWD) is a special purpose unit of government established in accordance with Minnesota State Statute 103D. The responsibility of the Nine Mile Creek Watershed District is to protect and manage the water resources within the District's legal boundaries. The Nine Mile Creek Watershed District is approximately 50 square miles in surface area and encompasses the land area tributary to Nine Mile Creek. The District is located in Hennepin County. Portions of the cities of Eden Prairie, Edina, Hopkins, and Minnetonka are located within the Nine Mile Creek watershed. The Nine Mile Creek Watershed District NMCWD has had a regulatory and permit program since 1963. The NMCWD established a permitting program to protect the natural resources of the NMCWD by establishing minimum requirements for the grading, water quality, water quantity, floodplain protection, and wetlands.

Riley/Purgatory/Bluff Creek Watershed District (RPBCWD)

The Riley/Purgatory/Bluff Creek Watershed District (RPBCWD) works with other government bodies to regulate stormwater runoff, improve water quality, and provide recreation. The District also works with developers on any project that proposes to alter floodplains, wetlands or streams. The RPBCWD requires permits for such projects to ensure that land use changes do not negatively impact water quality and flood protection. District review of permits provides an opportunity for citizen input on water related issues. With the newly approved Water Management Plan, the District now may pursue projects that improve water quality. These

projects, like past flood control projects, will be conducted in full cooperation with municipalities. Regulatory authority of the RPBCWD was transferred to LGUs in 2008.

4.4.3.1 Criteria and Measurement

The criteria for evaluation was to identify resources within ¼ mile of each LRT alignment and assess the potential of the project to adversely affect those resources. The measurement was an inventory based on existing information to measure Designated Waters of the US subject to US Corp of Engineers 404 permitting requirements, wetlands, riparian areas, floodplains, watershed management resources, areas of shallow groundwater, and ground water recharge areas. Utilizing the inventory an estimate was created for; the area of potential disturbance of each resource, the character or extent of disturbance, and the issues associated with, or complexity of securing the necessary permits.

4.4.3.2 Evaluation

The Study Area is mostly urbanized and highly altered compared to pre-settlement conditions. The land is characterized by commercial, industrial, or residential development with some parkland and other open space (golf courses, for example) adjacent to the corridor. A number of wetlands or public waters are located within the Southwest LRT Study Area, so impacts to these resources may occur.

Due to the developed nature portions of the Study Area, limited surface water resources exist in segments A, C, and 4. Historic wetlands have been modified or eliminated and natural stream courses have been rerouted into a network of channels, culverts, and storm sewers. In Segments 1 and 3 there are wetlands and open space areas remaining. Existing conditions for each alignment can be found in Section 3.3.3 of the Southwest LRT *Technical Memorandum No. 9 Environmental Evaluation*. Table 18, below, summarizes the existing water resources and the potential effects from the proposed LRT project.

Table 18 - Summary of Known Water Resources by LRT Alternative

Criteria	Alternative			
	LRT 1A	LRT 3A	LRT 3C-1 (Nicollet Mall)	LRT 3C-2 (11 th /12 th Street)
Designated Waters of the US subject to US Corp of Engineers 404 permitting requirements	0.8 acres wetlands Crossing 4 creeks Potential restoration of Basset Creek surface water	3.5 acres wetlands Crossing 4 creeks Potential restoration of Basset Creek surface water	3.5 acres wetlands Crossing 4 creeks	3.5 acres wetlands Crossing 4 creeks
Wetlands	0.8 acres	3.5 acres	3.5 acres	3.5 acres
Riparian areas	Crossings: Purgatory Creek, Nine Mile Creek in two locations, unnamed channel between Cedar Lake and Lake of the Isles Proximity to Shady Oak Lake, Minnehaha Creek (future green way corridor)	Crossings: Purgatory Creek; Nine Mile Creek-two locations channel between Cedar and Lake of the Isles. Proximity to Minnehaha Creek	Crossings: Purgatory Creek; Nine Mile Creek-two locations channel between Lake Calhoun and Lake of the Isles Proximity to Minnehaha Creek	Crossings: Purgatory Creek; Nine Mile Creek-two locations channel between Lake Calhoun and Lake of the Isles Proximity to Minnehaha Creek

Criteria	Alternative			
	LRT 1A	LRT 3A	LRT 3C-1 (Nicollet Mall)	LRT 3C-2 (11 th /12 th Street)
Floodplains	6 areas within 100 feet 1.5 acres	6 areas within 100 feet 1.8 acres	6 areas within 100 feet 1.8 acres	6 areas within 100 feet 1.8 acres
Watershed management resources	5 management agencies	5 management agencies	5 management agencies	5 management agencies
Areas of shallow groundwater	1	5	5	5
Ground water recharge areas	0 sandy areas	5 sandy areas	4 sandy areas	4 sandy areas
Utilizing the inventory described above, estimate the area of potential disturbance of the resource, the character or extent of disturbance, and the issues associated with, or complexity of securing the necessary permits	With mitigation: No net loss in wetlands; restoration of riparian habitat; and floodplains will meet FEMA and local requirements;	With mitigation: No net loss in wetlands; restoration of riparian habitat; and floodplains will meet FEMA and local requirements;	With mitigation: No net loss in wetlands; restoration of riparian habitat; and floodplains will meet FEMA and local requirements;	With mitigation: No net loss in wetlands; restoration of riparian habitat; and floodplains will meet FEMA and local requirements;

Methodology, summary tables of existing conditions, and more details about potential impacts along each segment have been provided in Section 3.3 of the Southwest LRT *Technical Memorandum No. 9 Environmental Evaluation*.

4.4.4 Hazardous/Regulated Materials

Locations containing hazardous/regulated materials can create risks in the form of project delay and costs associated with remediation. Typically projects prefer to avoid sites that represent a potential for substantial remediation costs and/or an on-going liability to manage the site. Therefore, the objective of the criteria is to assess the exposure that each alternative could present to the project associated with environmental remediation. This evaluation consisted of two major parts: identification of contaminated sites and development of a cost estimation model to estimate the potential “risk” associated with each alternative.

4.4.4.1 Criteria and Measurement

The criteria for evaluation was identifying the occurrence of properties with known or the potential of producing hazardous or contaminated materials that could be encountered by the project. The measurement was an inventory of the number of contaminated sites in proximity to each LRT alternative corridor based on existing data. The measurement also included cost estimates of remediation for known and potential contaminated sites as a result of the construction of each of the LRT alternatives.

4.4.4.2 Evaluation

A limited evaluation of the project was conducted by a national regulatory information vendor. This evaluation consisted of a review of databases for sites within 1,000 feet of the Southwest

LRT alignment alternatives. This is a preliminary assessment of the presence of known contaminated sites.

This assessment developed a system to allow objective comparison of the expected range of costs to address the environmental remediation that may be required along each alignment alternative during construction. This evaluation consisted of two major parts: identification of contaminated sites and development of a cost estimation model. For the purposes of this assessment, the databases were used to identify contaminated sites within 500 feet of the construction alignment, and is summarized in Table 19, below.

As the environmental review process progresses, a preferred alignment is selected, and the project moves forward into preliminary engineering. At this point, a Phase I Environmental Site Assessment (ESA) for the preferred alignment should be conducted. Follow-up Phase II ESAs to identify the extent and magnitude of contamination within proposed ROW and/or construction limits should be conducted based on the results of the Phase I ESA.

The long-term effects of hazardous materials and contaminated properties primarily consist of the potential to shift all or a portion of environmental liability to the project. These effects can be minimized or eliminated under the following conditions:

- Where possible, avoid the acquisition or properties that are significantly contaminated
- Obtain assurances (e.g., letters of no association or no further actions letters) from the state for any contaminated properties that are acquired
- Avoid contractual obligations to operate or maintain remedial actions on acquired properties

Table 19 - Summary of Known Hazardous/Regulated Material sites and Potential Remediation Costs by LRT Alternative

Criteria	Alternative			
	LRT 1A	LRT 3A	LRT 3C-1 (Nicollet Mall)	LRT 3C-2 (11 th /12 th Street)
Based on existing data, inventory number of contaminated or hazardous materials or sites in proximity to each LRT alternative corridor	99	98	144	176
LUST	55	54	85	103
CERCLA	2	2	2	2
VIC	29	30	44	58
AgChem	7	8	8	8
Dump	4	3	5	4
Other	2	1	0	1
Conceptual cost estimates for remediation of known and potential contaminated sites as a result of the construction of each of the LRT alternatives ^{a, b}	\$893,000	\$874,000	\$1,311,000	\$1,615,000

^a Estimated costs are expressed as a probability of cost not to exceed, that is, the probability that the actual costs will be less than or equal to the amount indicated in the table.

^b Costs are for a not-to-exceed probability of 50 percent. See Section 3.4.4 of the Southwest LRT *Technical Memorandum No. 9 Environmental Evaluation* for details and methodology.

Methodology, summary tables, and more details about potential impacts along each segment have been provided in Section 3.4 of the Southwest LRT *Technical Memorandum No. 9 Environmental Evaluation*.

4.4.5 Section 4(f) Properties

The US Department of Transportation (USDOT) prohibits the use of public parks, recreation areas, wildlife/waterfowl refuges or significant historic sites from being used for transportation uses unless there is no feasible and prudent alternative.

Section 4(f) of the Department of Transportation Act of 1966 (49 USC 303) requires that federal transportation projects consider the effects of a project on certain protected resources. A Section 4(f) resource is a publicly owned park, recreation area, wildlife/waterfowl refuge, or significant historic site. Regulations prescribing procedures for implementing the Section 4(f) process are found in 23 CFR 771.135.

4.4.5.1 Criteria and Measurement

To determine if any 4(f) property is located within the Study Area, parks and public land within 0.25 mile of the corridor were identified, documented, mapped, and analyzed for potential impacts and avoidance by the project. These steps are described in Section 3.5 the Southwest LRT *Technical Memorandum No. 9 Environmental Evaluation*. Those parks and public lands that qualify as 4(f) properties and are found within 500 feet of the project corridor were evaluated in greater detail for their potential to be used by the proposed project.

The criteria for evaluation was to identify Section 4(f) properties within 500 feet of each LRT alternative and assess the potential for impacts to those resources. The measurement was an inventory of 4(f) properties, potential impacts, the potential to avoid, and opportunities to reduce impacts to properties based on existing data.

4.4.5.2 Evaluation

Table 20, below, summarizes the number of 4(f) properties within 500 feet of the segments, the potential for using 4(f) properties (impacts), and the potential to avoid or reduce impacts by alternative for the proposed project. This table includes public parks and recreation areas and historic districts. Individual historic property is not included at the present time because the Section 106 process has not yet been initiated for this project.

This summary is very preliminary in nature because design is not sufficiently advanced to determine actual use for the majority of these properties. Therefore, no efforts can be made at this time to avoid or minimize the use of any of these 4(f) properties.

Table 20 - Summary of 4(f) properties by LRT Alternative

Criteria	Alternative			
	LRT 1A	LRT 3A	LRT 3C-1 (Nicollet Mall)	LRT 3C-2 (11 th /12 th Street)
Inventory of 4(f) properties excluding historic	17	15	21	21

Criteria	Alternative			
	LRT 1A	LRT 3A	LRT 3C-1 (Nicollet Mall)	LRT 3C-2 (11 th /12 th Street)
properties				
Potential for use ^a	Cedar Lake Parkway	Cedar Lake Parkway	Grade Separation Historic District	Grade Separation Historic District
Potential to avoid use	Avoidance alternatives will be evaluated during the Section 4(f) process for the immediate vicinity around those Section 4(f) properties when a use has been identified	Avoidance alternatives will be evaluated during the Section 4(f) process for the immediate vicinity around those Section 4(f) properties when a use has been identified	Avoidance alternatives will be evaluated during the Section 4(f) process for the immediate vicinity around those Section 4(f) properties when a use has been identified	Avoidance alternatives will be evaluated during the Section 4(f) process for the immediate vicinity around those Section 4(f) properties when a use has been identified
Opportunities to reduce use	Design is not sufficiently advanced to determine actual use for the majority of 4(f) properties; therefore, no efforts can be made at this time to reduce impacts	Design is not sufficiently advanced to determine actual use for the majority of 4(f) properties; therefore, no efforts can be made at this time to reduce impacts	Design is not sufficiently advanced to determine actual use for the majority of 4(f) properties; therefore, no efforts can be made at this time to reduce impacts	Design is not sufficiently advanced to determine actual use for the majority of 4(f) properties; therefore, no efforts can be made at this time to reduce impacts

^a The Section 106 process has not yet been initiated; therefore, such a determination may be premature.

Methodology, summary tables, and more details about potential use to 4(f) properties along each segment have been provided in Section 3.5 of the Southwest LRT *Technical Memorandum No.9 Environmental Evaluation*.

4.4.6 Geological Evaluation

Geological conditions could present special conditions during construction and potentially require special construction techniques or methods to mitigate.

4.4.6.1 Criteria and Measurement

The criteria for the geologic evaluation was identifying near surface geological conditions. The measurement was an evaluation, based on existing data, of construction suitability, soil stability, tunneling activities, and near surface or shallow ground water.

4.4.6.2 Evaluation

Table 21, presents a summary of the potential effects of the geologic resources in the project area.

Table 21 - Summary of Geologic Resources by LRT Alternative

Criteria	Alternative			
	LRT 1A	LRT 3A	LRT 3C-1 (Nicollet Mall)	LRT 3C-2 (11 th /12 th Street)
Construction suitability (number of sites with differential settlement potential and number of sites needing dewatering during construction)	11 peat/muck areas 1 dewatering sites	8 peat areas 5 dewatering sites	8 peat areas 5 dewatering sites	8 peat areas 5 dewatering sites

Criteria	Alternative			
	LRT 1A	LRT 3A	LRT 3C-1 (Nicollet Mall)	LRT 3C-2 (11 th /12 th Street)
Tunneling and cut areas ^b	3	5	4	4
Soil stability (tunnel construction using cut and cover methods ^b)	NA	NA	3	3
Near surface or shallow ground water ^a	1	5	5	5

^a Permanent dewatering locations (possible and probable)

^b Benching or shoring required

Methodology, summary tables, and more details about potential geological/soils impacts along each segment have been provided in Section 3.6 of the Southwest LRT *Technical Memorandum No. 9 Environmental Evaluation*.

4.4.7 Noise and Vibration

For the purposes of this evaluation noise and vibration emission characteristics associated with the existing Hiawatha LRT were used to evaluate potential noise and vibration emissions associated with the proposed Southwest LRT. The noise and vibration screening procedures for the Southwest LRT are based on methodologies presented in the FTA manual, *Transit Noise and Vibration Impact Assessment* (May, 2006). For the DEIS, corridor-wide General Noise and Vibration assessment models will be performed in accordance with the FTA Transit Noise and Vibration Impact Assessment Guidelines. Where residential development density is greatest, detailed Noise and Vibration Assessments may be performed per FTA methods (2006) to refine the assessment of potential noise and vibration effects associated with the proposed project.

LRT 3C-1 (Nicollet Mall) and 3C-2 (11th/12th Street) includes operating in a tunnel between 29th Street and Franklin Avenue along Blaisdell Avenue, Nicollet Avenue, or 1st Avenue. Noise screening distances were assumed to be minimal during tunnel operation.

4.4.7.1 Criteria and Measurement

An appropriate noise screening distance was selected and adjusted to suit the particular operational parameters of this project. In absence of detailed and finalized design information on grade crossing and pedestrian crossing locations, the adjusted noise level accounts for unrestricted bell use and horn use. The noise screening distance was applied to either side of the centerline for each LRT alignment alternative to determine the noise study area, and, potentially noise-sensitive properties within the area of noise influence.

Vibration screening distances were selected and adjusted to account for potentially efficient LRT-induced, ground-borne vibration propagation characteristics, as indicated by the soil survey. The noise and vibration screening distances were applied to either side of the centerline of each LRT alignment alternative to determine the noise study area and vibration study area respectively, where potentially noise- or vibration-sensitive properties fall within an area of influence.

The measurement for noise and vibration was an inventory the number of potentially noise-sensitive properties within the area of noise influence and an inventory the number of potentially vibration-sensitive properties within the area of vibration influence.

4.4.7.2 Evaluation

Potentially affected receptors were estimated along each alignment using the screening level methodology described in Section 3.7.3 of the Southwest LRT *Technical Memorandum No. 9 Environmental Evaluation*. Table 22 presents the number of potentially affected noise-sensitive receptors along each project alignment. Vibration impacts were estimated along each alignment using the screening level methodology described in Section 3.8.3 of the Southwest LRT *Technical Memorandum No. 9 Environmental Evaluation*. Table 22 also provides a conservative estimate of vibration impacts predicted for the project.

Table 22 - Summary of Potential Noise and Vibration Impacts by LRT Alternative

Criteria	Alternative			
	LRT 1A	LRT 3A	LRT 3C-1 (Nicollet Mall)	LRT 3C-2 (11th/12th Street)
Number of potentially noise-sensitive properties within the area of noise influence (total)	3,510	3,301	7,133	6,939
Number of potentially vibration-sensitive properties with the area of vibration influence (total)	1,130	1,049	2,401	3,508
Category 1a	2	1	19	23
Category 2b	1,122	1,042	2,362	3,454
Category 3c	6	6	20	31

^aLand Use Category 1 – High Vibration Sensitivity. This category includes buildings where low ambient vibration is essential for operations within the building that may be well below levels associated with human annoyance. Typical Category 1 land uses include vibration-sensitive research and manufacturing facilities, hospitals with vibration-sensitive equipment, and university research operations. Category 1 also includes special land uses, such as concert halls, television and recording studios, and theaters.

^bLand Use Category 2 – Residential: This category includes all residential land uses and any building where people sleep, such as hotels and hospitals.

^cLand Use Category 3 – Institutional: This category includes schools, churches, other institutions, and quiet offices that do not have vibration-sensitive equipment, but still have the potential for activity interference.

Methodology, summary tables, and more details about potential noise and vibration impacts along each segment have been provided in Section 3.7 of the Southwest LRT *Technical Memorandum No. 9 Environmental Evaluation*.

4.5 Criteria 4 – Other Factors

Other factors are implementation factors that typically contribute substantially to the cost and or feasibility of the proposed project are:

- The extent of property acquisition and displacements of residents or commercial occupancy;
- The overall constructability of the alternative;
- The disruption or modification of the proposed alternatives to existing transportation facilities and capacity; and
- Permitting.

4.5.1 Right-of-Way (ROW) Acquisition

Factors that typically contribute substantially to the cost and or feasibility of the proposed project include the extent of property acquisition and displacements of residents or commercial occupancy.

Preliminary right-of-way acquisitions were identified in order to develop a conceptual right-of-way cost estimate for each LRT alternative. Actual property acquisitions will not be determined until the project progresses forward into Preliminary Engineering and Final Design.

4.5.1.1 Criteria and Measurement

The criterion was an estimate of property acquisition for each LRT alternative. The measurement was a calculated estimate of full and partial property acquisitions for each LRT alternative in acres. The measurement also included a cost estimate using a set of assumptions and county assessor records of estimated market values of the potential property acquisition and relocation costs in dollars for each LRT alternative.

4.5.1.2 Evaluation

The extent of the proposed acquisitions and relocations were identified using the conceptual engineering plans and approximate right-of-way (ROW) requirements for construction limits. Where a property parcel is intersected by the proposed LRT alternative and its potential construction limits, further analysis was conducted to determine if the property needs to be acquired entirely (full take) or if only a portion of the property needs to be acquired for the project (partial take).

To eliminate redundancy, the LRT alternatives were evaluated by segment. For evaluation purposes the segments were combined into the respective alternative for final acquisition and cost comparison. Refer to Table 3 for the segments that comprise each LRT alternative and Table 4 for a list of the stations included on each LRT segment.

Assumptions used for the evaluation and a detailed discussion of the methodology applied in developing the estimates are available for reference in the *Southwest LRT Technical Memorandum No. 8A Right-of-Way*.

Based on the results of the analysis the total acreage required for property acquisition and total cost for each LRT segment was used to determine an estimate for each LRT alternative. Total costs, including acquisition, relocation, and administration costs were used to calculate the estimated cost for property acquisition. Refer to Table 23 for the final summary of costs and acreage per LRT Alternative. Acreage values are rounded to the nearest tenth and dollar values are rounded to the nearest 10 million by each LRT alignment.

Table 23 - Summary Property Acquisition Takes and Costs by LRT Alternative

LRT Alternative	Partial Takes (Acres)	Full Takes (Acres)	Total Cost (\$2008)	Total Cost (\$2015)
LRT 1A	10	40	\$40,000,000	\$47,000,000
LRT 3A	30	60	\$90,000,000	\$115,000,000
LRT 3C-1 (Nicollet Mall)	20	60	\$100,000,000	\$128,000,000
LRT 3C-2 (11 th /12 th Street)	20	60	\$100,000,000	\$128,000,000

Note: Total cost is based on property values in the Estimated Market Value (EMV) total from Hennepin County (September, 2008). A compounding annual escalation factor of 3.06% was applied to inflate the 2008 dollars to year 2015.

4.5.2 Constructability

Constructability is a measure by which the challenges, complexities, risks, and flexibilities for design and construction are considered. Each of these issues affects the scope, schedule, and cost estimate of each alternative.

4.5.2.1 Criteria and Measurement

The criteria was constructability of each LRT alternative based on; construction site accessibility, capacity of work site to accommodate construction activities (size and configuration), and the availability of materials storage and stockpile space in proximity to project.

Detailed explanations of the methods used to calculate constructability, text describing the major construction challenges, and maps illustrating the areas where construction is expected to be complex for each alternative can be found in Southwest LRT *Technical Memorandum No. 8B Construction Complexity*.

4.5.2.2 Evaluation

In the FTA SCC workbooks, an allocated contingency is applied to each cost item. The allocated contingency is entered by the project's sponsor as a measure of uncertainty of each item. The cost associated with the constructability of each LRT alternative is included in the allocated contingency of each SCC category. A higher allocated contingency for a specific item indicates that the item's constructability is subject to more risk than typically expected.

For projects in the conceptual engineering phase, a base allocated contingency of 25-30 percent is applied to each SCC item. Based on the assessment made of the conceptual engineering plans at this stage of project development, an allocated contingency adjustment of five percent to 15 percent above standard contingencies will accommodate cost and schedule risks associated with design and construction challenges. Table 24, below, summarizes the results of the analysis by alternative.

Table 24 - Summary of Constructability by LRT Alternative (risk as a percent of construction cost)

Criteria	Alternative			
	LRT 1A	LRT 3A	LRT 3C-1 (Nicollet Mall)	LRT 3C-2 (11 th /12 th Street)
Construction site accessibility	27%	29%	33%	33%
Capacity of work site to accommodate construction activities (size and configuration)	25%	25%	28%	28%
Availability of materials storage and stockpile space in proximity to project.	31%	31%	31%	31%

4.5.3 Transportation Capacity

Transportation capacity examines each LRT alternative relative to the existing and planned transportation capacity in the Study Area.

4.5.3.1 Criteria and Measurement

The criteria includes a qualitative assessment of the potential impacts to several factors, including the changes to highway and roadway capacity (number of lanes affected), intersection capacity (at-grade crossings, access modifications), bridges, driveways, parking facilities, and bicycle/pedestrian trails.

4.5.3.2 Evaluation

Southwest LRT *Technical Memorandum No. 8C Transportation Capacity* contains details on methodology and a full description of the evaluation.

LRT 1A

Although implementation of LRT 1A is not anticipated to adversely affect highway capacity within the Study Area, it would include multiple at-grade roadway crossings, as well as changes to existing intersections. Of the at-grade roadway crossings, a few crossings have the potential to affect traffic operations at nearby intersections. Beyond the at-grade crossings, the reconfiguration of Royalston Avenue in downtown Minneapolis is the most significant roadway modification along the LRT 1A alternative. The modifications would include a street closure (Holden Street), and removal of the center median, which would change access in two areas. At points where the LRT would cross bridge or water viaduct structures, these structures would need to be modified for the LRT trackway. In Minneapolis, the alignment currently proposed includes the construction of a grade-separated structure for LRT over Cedar Lake Parkway, between the West Lake and 21st Street Stations in response to community concerns regarding traffic impacts and concerns regarding the status of Cedar Lake Parkway as a designated parkland. A roadway and traffic impact analysis will be included as part of the Draft Environmental Impact Statement (DEIS) for the project, and will determine impacts to all at-grade roadway crossings and intersections.

Proposed bridge enhancements or new construction are not anticipated to result in long-term impacts to associated transportation facilities. Preliminary Engineering and Final Design will determine the exact specifications and design requirements for all bridge, grade, and grade-separated structures and crossings.

Implementation of the LRT 1A alternative is not anticipated to result in severe or adverse impacts to driveways or parking facilities along the alignment. A parking lot next to 11th Avenue in Hopkins may need to have one of three access driveways from 11th Avenue removed. In Minneapolis, access to facilities along Royalston Avenue will be limited to right-in, right-out access. The driveway entrance to the Hennepin Energy Resource Center will also be crossed by the LRT alignment. All impacts and potential mitigation to property access changes and parking will be identified in the DEIS.

The majority of the LRT 1A alignment would be located on existing HCRRA property. Currently, bicycle and pedestrian trails are located within the HCRRA's right-of-way (ROW). Conceptual engineering indicates that existing bicycle and pedestrian trails could be relocated within the HCRRA right-of-way to accommodate the addition of LRT. Impacts to trails would be limited to short-term construction impacts. At roadway crossings and around stations, walkways and bicycle lanes would be improved to allow access to and from stations. All impacts and potential mitigation to bicycle and pedestrian facilities would be identified during the DEIS.

LRT 3A

Implementation of alignment Alternative LRT 3A will require the LRT to cross several roadways at-grade, which may potentially impact traffic operations. The LRT will cross multiple roadways at-grade between the Mitchell Station and the Intermodal Station in downtown Minneapolis. Roads of particular concern are Mitchell Road, Valley View Road, Bren Road East, Bren Road West, and Smetana Road. As with LRT 1A, the reconfiguration of Royalston Avenue in downtown Minneapolis is the most significant roadway modification along the LRT 3A. A roadway and traffic impact analysis will be included as part of the Draft Environmental Impact Statement (DEIS) for the project, and will determine impacts to all at-grade roadway crossings and intersections.

LRT 3A would require the construction of four new bridge structures that would allow LRT vehicles to cross I-494, TH 62, and TH 212 in Eden Prairie and Minnetonka. Preliminary Engineering and Final Design will determine the exact specifications and design requirements for all bridge, grade, and grade-separated structures and crossings.

LRT 3A would cross several business driveways and parking lots, particularly in Eden Prairie and Minnetonka, where the LRT would not be located along current ROW owned by HCRRA. The grade crossings of select driveways could result in the full closure of the driveways, resulting in the need to create new access points. However, conceptual engineering has identified an alignment that would minimize driveway crossings or entrances to parking facilities, reducing the risk of needing to relocate access entrances. Between the Mitchell Station and the Shady Oak Station, several grade crossings would have implications for access. At the Southwest Station, the LRT would cross the exclusive bus lane entrance from TH 5. Along Technology Drive, the location of the Eden Prairie Town Center Station would close a short portion of a driveway running adjacent to the Costco Wholesalers building with access to a parking lot facility. As part of the stations construction, the portion of driveway closed would be re-routed to connect with another driveway access point to Technology Drive.

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

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

Impacts at locations where the bicycle lanes and multi-use paths cross the LRT alignment are anticipated, but are expected to be short-term construction impacts, and are not anticipated to affect the future use of the trail system. Current design standards will require traffic signals with pedestrian indicators at all locations where the multi-use paths cross the LRT alignment. Trails along Technology Drive and Flying Cloud Drive may need to be relocated to the opposite sides of each street to accommodate the LRT. All impacts and mitigation to bicycle and pedestrian facilities would be identified during the DEIS.

LRT 3C-1 (Nicollet Mall)

Implementation of LRT 3C-1 (Nicollet Mall) would share the same impacts to roadways between the Mitchell and West Lake stations as those discussed for LRT 3A. In the midtown and downtown areas of Minneapolis, LRT 3C-1 (Nicollet Mall) would likely result in several roadway impacts. East of the West Lake Station, the alignment would travel down the Midtown Corridor with at-grade crossings at James, Irving, and Humboldt Avenues between the West Lake Station and the Uptown Station. These roads carry mostly residential traffic at low vehicle volumes, and are not anticipated to experience significant impacts to traffic operations.

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

In Minneapolis, LRT 3C-1 (Nicollet Mall) would likely require the reconstruction and retrofitting of existing bridges along the Midtown Corridor. In addition to these bridges, the LRT 3C-1 (Nicollet Mall) alternative would require the retrofitting of the existing Nicollet Avenue Bridge over I-94 to accommodate the LRT guideway. Preliminary Engineering and Final Design will determine the exact specifications and design requirements for all bridge, grade, and grade-separated structures and crossings.

Driveway access and parking facility modifications between the Mitchell Station and the West Lake Station are the same as those described for LRT 3A. On Nicollet Avenue between 29th and 27th streets, on-street parking will be removed to accommodate the 28th Street Station and alignment where LRT transitions from an at-grade alignment into a tunnel running below Nicollet Avenue. Left turns from the travel lanes to driveways will not be possible due to the sunken corridor in the center. Similar on-street parking and access changes will occur between 22nd Street and Groveland Avenue to accommodate the Franklin Avenue Station and the transition of LRT from a tunnel alignment to an at-grade alignment. North of Groveland Avenue, parking spaces would have to be removed to accommodate left-turn lanes at 18th Street, 15th Street and Grant Street.

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

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

Impacts to the bicycle and pedestrian trail systems between the Mitchell Station and the West Lake Station are the same as discussed for LRT 3A. Construction of LRT in the Midtown Corridor would require modifications to this trail, including re-routing the trail out of the corridor and over the LRT tunnel entrance on Nicollet Avenue. LRT on Nicollet Mall would likely result in several impacts to the bicycle and pedestrian network in downtown. LRT would likely displace bicycles from Nicollet Mall entirely. In order for bicycles and LRT to be collocated on Nicollet Mall, portions of the pedestrian walkway would need to be removed. All impacts and mitigation to bicycle and pedestrian facilities would be determined during Preliminary Engineering and Final Design.

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

Potential impacts to transportation facilities for the LRT 3C-2 (11th/12th Street) are similar to the potential impacts identified for the LRT 3A and LRT 3C-1 (Nicollet Mall) alternatives from the Mitchell Station to the West Lake Station. Both the Blaisdell Avenue (Option C-2A) and 1st Avenue (Option C-2B) options would travel under and eventually on roadways classified as collector streets. Implementing either of these options would reduce the number of travel lanes

on Blaisdell Avenue or 1st Avenue, thereby reducing each street's traffic capacity. Implementing the LRT 3C-2 (11th/12th Street) assumes a single-track LRT guideway replacing at least one traffic lane on both streets, which will reduce each street's capacity for bus and automobile traffic. The turns from Nicollet Avenue onto 11th Street and from 12th Street onto Nicollet Avenue would result in a full red intersection—all vehicle travel directions stopped—whenever a train moves through the intersection. LRT 3C-2 (11th/12th Street) operating on Nicollet Avenue would affect approximately two blocks of Nicollet Mall, between Grant Street and 11th Street in downtown Minneapolis. The trackway and station at 13th Street would require reconstruction of the curb lines, through traffic lanes, and sidewalk.

Between the Mitchell Station and the West Lake Station, modifications to bridge structures would be similar to those described for LRT 3A. In Minneapolis, both the Blaisdell Avenue (Option C-2A) and 1st Avenue (Option C-2B) options would have an impact on the existing roadway bridges spanning the Midtown Corridor. LRT 3C-2 (11th/12th Street) would require two new LRT bridge crossings over I-394.

Between the Mitchell Station and the West Lake Station, impacts to driveways and parking facilities are similar to those described for LRT 3A. In midtown and downtown Minneapolis, LRT 3C-2 (11th/12th Street) would likely have several operational impacts to driveways and parking facility access points. To remain within the existing ROW between the Midtown Corridor and Franklin Avenue, the twin-track LRT guideway would likely eliminate both parallel parking lanes on Blaisdell Avenue, Nicollet Avenue, and 1st Avenue near the vicinity of the tunnel's entrance and exit points. On-street parking would also be removed to allow for left-turn lanes near Franklin Avenue, 15th Avenue and Grant Street under any of these alternatives. Parking spaces would have to be removed near 18th Street to accommodate left-turn lanes under the Nicollet Avenue and 1st Avenue alternatives. On each of these streets, on-street parking would be eliminated for a half-block north and south of Franklin Avenue at the tunnel's portal entrance and exit points, and an entire block between 12th Street and 13th Street. These actions would result in the removal of approximately 50 percent of the on-street parking along Nicollet Avenue, Blaisdell Avenue, and 1st Avenue.

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

Between 11th and 12th Streets, access to alleyways and driveways would be restricted by the LRT trackway. To maintain access, vehicles would need to be allowed to cross the trackway or a frontage road would likely need to be installed.

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

LRT would likely force delivery trucks onto side streets that may also be incapable of handling large vehicles. All impacts and potential mitigation to property access changes and parking will be identified in the DEIS.

Potential impacts to bicycle and pedestrian facilities are similar to those described for the previous alternatives. The LRT 3C-2 would require removal of portions of the existing bicycle and pedestrian trail in order for the train to weave around the bridge piers, which do not always align exactly with one another.

Methodology and detailed tables are available for reference in Southwest LRT *Technical Memorandum No. 5 Transit Mobility and Integration Evaluation*. Table 25 presents a summary of transportation capacity.

Table 25 - Summary of Transportation Capacity by LRT Alternative

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

*Note: Assumes mixed use trails in the Midtown Corridor remain.

4.5.4 Permitting

While it is too early in the project development process to have a detailed understanding of all the permits and approvals required for the Southwest LRT Project, a review of the likely permits and approvals can help inform the LPA decision-making process. The table on the following page summarizes the major permits and approvals anticipated for the project by each LRT alternative. In most cases, each given permit or approval applies to all LRT alternatives. However, the complexity associated with obtaining the permit or approval may vary between

alternatives. These potential differences in complexity between each LRT alternative are noted in Table 25.

4.5.4.1 Criteria and Measurement

The criteria was the identification of potential permitting requirements for each LRT alternative. The measurement was a matrix that illustrates potential permitting requirements for each LRT alignment.

4.5.4.2 Evaluation

It is important to note that detailed analyses associated with the Environmental Impact Statement (EIS) process and further project engineering will likely result in the identification of additional permits and approvals. Also, the complexity of obtaining permits and approvals as noted in the table will likely change as more is understood about the corridors and design details are developed. Refer to Table 26 for the Preliminary List of Permits and Approvals.

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Table 26 - Preliminary List of Permits and Approvals

Level of Government	Agency	Permit or Approval	LRT 1A	LRT 3A	LRT 3C-1 (Nicollet Mall)	LRT 3C-2 (11 th /12 th Street)
Federal	FTA	Section 106 Approval	Required	Required	Required - likely greater complexity due to density of historic property	Required - likely greater complexity due to density of historic property
	Advisory Council on Historic Preservation	Section 106 Approval	Required	Required	Required - likely greater complexity due to density of historic property	Required - likely greater complexity due to density of historic property
	FTA	Section 4(f) Approval	Likely	Likely	Probable - likely greater complexity due to density of historic property	Probable - likely greater complexity due to density of historic property
	Department of the Interior	Section 4(f) Approval	Likely	Likely	Probable - likely greater complexity due to density of historic property	Probable - likely greater complexity due to density of historic property
	FHWA	Interstate Access Request Approval	Required on Segment A near Intermodal Station	Required on Segment 3 crossing of I-494, TH 212, TH 62; required on segment A near Intermodal Station	Required on Segment 3 crossing of I-494, TH 212, and TH 62	Required on Segment 3 crossing of I-494, TH 212, and TH 62; required near Intermodal Station
	USACE	Section 404 Permit	Required on Segments 1 and 4; and potentially on Segment A near lakes	Required on Segments 3 and 4; and potentially on Segment A near lakes	Required on Segments 3 and 4	Required on Segments 3 and r
State	MnDNR	Protected Waters Work Permit	Required on Segments 1 and 4	Required on Segments 3 and 4	Required on Segments 3 and 4	Required on Segments 3 and 4
	Mn/DOT	Bridge Plan Review	Required	Required	Required	Required
	Mn/DOT	Utility Permits	Likely	Likely	Likely	Likely
	MPCA	Section 401 Water Quality Certification	Required	Required	Required	Required
	MPCA	NPDES Construction Stormwater Permit	Required	Required	Required	Required
	MPCA	Voluntary Investigation and Cleanup Program Approvals	Preferable – would limit environmental liability	Preferable – would limit environmental liability	Preferable – would limit environmental liability	Preferable – would limit environmental liability
	MDH	Water Well Abandonment Documentation	Required if wells are encountered	Required if wells are encountered	Required if wells are encountered	Required if wells are encountered
City/Local	Cities	Utility Permits	Required	Required	Required – tunnel utility relocations may increase complexity	Required – tunnel utility relocations may increase complexity
	Cities	Building Permits	Required for traction power substations and signal bungalows	Required for traction power substations and signal bungalows	Required for traction power substations and signal bungalows	Required for traction power substations and signal bungalows
	Cities	Driveway Access Permits	Required	Required	Required	Required
	Cities/Watershed Districts/WMOs	Wetland Conservation Act Approval	Required for likely impacts to Segments 1 and 4	Required for likely impacts to Segments 3 and 4	Required for likely impacts to Segments 3 and 4	Required for likely impacts to Segments 3 and 4
	Cities/Watershed Districts/WMOs	Sediment/Erosion Control Permits/ Approvals	Required	Required	Required	Required

5.0 FINAL SCREENING EVALUATION RESULTS

The results of the evaluation for each evaluation criteria category was documented and presented in individual technical memoranda. Below is a list of each Technical Memorandum and its subject:

- Technical Memorandum No. 1 Project Development Process
- Technical Memorandum No. 2 Description of the Alternatives
- Technical Memorandum No. 3 Screening Evaluation Criteria
- Technical Memorandum No. 4 Planning Compatibility
- Technical Memorandum No. 5 Transit Service
- Technical Memorandum No. 6 Ridership
- Technical Memorandum No. 7A Capital Costs
- Technical Memorandum No. 7B Operating Costs
- Technical Memorandum No. 8 Other Factors
 - 8A Right-of-Way (ROW)
 - 8B Constructability
 - 8C Transportation Capacity
 - 8D Permitting
- Technical Memorandum No. 9 Environmental Evaluation

Each alternative was assessed utilizing all of the criteria and the strengths and weakness of each alternative evaluated. If any alternative is determined to have unavoidable adverse impacts that do not occur in other alternative such conditions will be documented and the severity of the issue assessed.

Typically, the screening of alternatives and the selection of the LPA involves a series of trade offs in order to answer the question; “Which alternative provides the greatest mobility improvement, is the most cost-effective/efficient while minimizing environmental impacts?”

The results for each of the evaluation criteria are summarized in Section 5.1 matrix by LRT alignment. The results of the evaluation will be employed to select the LPA.

After the LPA is selected the DEIS will proceed into a detailed analysis of the impacts and potential mitigation for the LPA. The environmental areas that will be assessed include the following:

- Groundwater and Soil Resources
- Water Resources
- Biota and Habitat
- Threatened and Endangered Species

- Air Quality
- Noise and Vibration
- Hazardous/Regulated Materials
- Electromagnetic Fields and Utilities
- Energy Use
- Land Use, zoning and economic development
- Demographics and socioeconomic factors
- Neighborhood compatibility
- Environmental Justice
- Visual quality and aesthetics
- Construction effects
- Transportation
- Cultural and historic resources

The combined impacts identified during the evaluation and potential mitigation measures will be identified in the DEIS.

5.1 LPA Evaluation Results by Criteria

The LPA evaluation measures, used in the evaluation of alternatives for the Southwest LRT, are consistent with *Federal Transit Administration's (FTA) New Starts Evaluation* and the *National Environmental Policy Act (NEPA) Guidance*. A summary of the results from the analysis is presented in Tables 27 through 30 below.

5.1.1 Criteria 1: Planning Compatibility

Table 27 - Planning Compatibility Summary

A review of the adopted local and regional plans for the study partners will be conducted to determine if LRT implementation is consistent and compatible with the policies and plans of the affected governmental units.	
LRT 3A	Compatible in all communities.
LRT 1A	Compatible on east end, but not west end.
LRT 3C-1 (Nicollet Mall)	Compatible on west end, but not east end.
LRT 3C-2 (11 th /12 th Street)	Compatible on west end, but not east end.

5.1.2 Criteria 2: Performance (System Integration, Transit Service, Access)

Table 28 - Performance Summary

A review and analysis of LRT system integration, transit service impacts, span and frequency of service improvements, and service duplication/competition.	
LRT 3A	Provides for service expansion to areas difficult to serve by bus transit. Some potential duplication/competition of service with SouthWest Metro.
LRT 3C-2 (11 th /12 th Street)	Provides limited service expansion (frequency and span of service) and likely to result in substantial service duplication/competition in Minneapolis and with SouthWest Metro. Potential conflict with the Nicollet Mall, Nicollet Ave. and MARQ2 bus operations.
LRT 3C-1 (Nicollet Mall)	Provides limited service expansion (frequency and span of service) and likely to result in substantial service duplication/competition in Minneapolis and with SouthWest Metro. Potential conflict with the Nicollet Mall, Nicollet Ave. and MARQ2 bus operations.
LRT 1A	Provides for service expansion to areas difficult to serve by bus transit in Minneapolis.

5.1.3 Criteria 3: Environmental Issues

Table 29 - Environmental Summary

Defined as hazardous/contaminated properties, geologic conditions, natural resources, water resources, historic & cultural resources, 4(f) resources, and noise & vibration.	
LRT 1A	Relatively low number of known environmental resources; presents less environmental risk.
LRT 3A	Relatively low number of known environmental resources; presents less environmental risk.
LRT 3C-1 (Nicollet Mall)	Relatively high number of known environmental resources; presents greater environmental risk.
LRT 3C-2 (11 th /12 th Street)	Relatively high number of known environmental resources; presents greater environmental risk.

5.1.4 Criteria 4: Other (Implementation Factors)

Table 30 - Environmental Summary

An analysis of ROW, construction complexity, transportation capacity impacts, and permitting requirements.	
LRT 1A	Estimated acquisition cost is approximately \$50 million. Structure: TH62, Shady Oak Lake, Excelsior Blvd., Cedar Lake Parkway and at Glenwood. Limited environmental permitting.
LRT 3A	Estimated acquisition cost is approximately \$115 million. Structure: I-494, TH 212, TH 62, Excelsior Blvd., Cedar Lake Parkway and at Glenwood Ave. Water resource permitting required; MnDOT/FHWA permits/approval required.
LRT 3C-1 (Nicollet Mall)	Estimated acquisition cost is approximately \$130 million. Structure: I-494, TH 212, TH 62, Excelsior Blvd., tunnel under Blaisdell/Nicollet/First Ave., and reconstruction of Nicollet Mall. Water resource permitting required, maximum cultural resource/4(f) approvals.
LRT 3C-2 (11 th /12 th Street)	Estimated acquisition costs is approximately \$130million. Structure:I-494, TH 212, TH 62, Excelsior Blvd., tunnel at Blaisdell/Nicollet/First Ave., and I-94. Water resource permitting required, maximum cultural resource/4(f) approvals, MnDOT/FHWA permits/approval required.

5.2 Conclusions

As shown in the series of summary tables above the four LRT alternatives considered for selection as the LPA have varying performance, compatibility, implementation, and environmental characteristics. Based on preliminary travel demand modeling, all four LRT alternatives have strong ridership and show significant user benefits over the baseline alternative. Therefore, the selection of the LPA must focus primarily on criteria other than ridership.

Capital cost is clearly a key differentiator between the alternatives. LRT 3C-1 (Nicollet Mall) and LRT 3C-2 (11th/12th Street) would cost approximately \$500 million more than LRT 3A, and approximately \$800 million more than LRT 1A. The differences in ridership and user benefits between the “C” alternatives and the “A” alternatives is insufficient to offset the greater capital cost; therefore the “C” alternatives are unlikely to qualify for federal funding without major revisions.

Planning compatibility is another differentiator between the alternatives. LRT 1A is compatible with land use and transportation plans in the eastern and central segments of the corridor, but is incompatible with comprehensive plans at its western end. Conversely, the “C” alternatives are compatible with land use and transportation plans on the western and central segments, but are incompatible with Minneapolis, Hennepin County, and Met Council transportation plans along their eastern segments. LRT 3A is compatible with all applicable land use and transportation plans.

The LRT’s projected performance relative to the existing and future transit service indicates that each alternative would have different benefits and drawbacks. The LRT 1A, LRT 3A and the

LRT 3C-2 (11th/12th Street) alternatives are capable of fully integrating with both the Hiawatha and Central Corridor LRT lines, while the LRT 3C-1 (Nicollet Mall) alternative is not. The LRT 3C-1 (Nicollet Mall) and LRT 3C-2 (11th/12th Street) alternatives would both result in providing duplicate transit service to saturated transit markets in the midtown region of Minneapolis. Service duplication has several consequences including higher operating costs and sub-optimal resource allocation and utilization. LRT 3C-1 (Nicollet Mall) and LRT 3C-2 (11th/12th Street) could not replace the existing bus service operating in midtown Minneapolis because this would be detrimental to the existing service levels and disenfranchise current transit riders. While the LRT would increase the span and frequency of service in other regions of the corridor, the LRT would operate at a lower service frequency than the current bus service in the midtown region. The LRT 3C-1 (Nicollet Mall) alternative operating on Nicollet Mall would result in the displacement of all local bus service from Nicollet Mall and disrupt bus operations on alternate streets. The LRT 3C-2 (11th/12th Street) alignment in downtown Minneapolis would likely result in efficiency impacts to the Marquette and 2nd Avenue South Transit Project (MARQ2). Outside of Minneapolis along the western alignment of the LRT 1A alternative in Minnetonka and Eden Prairie, the existing service characteristics, land use patterns, and socioeconomic characteristics suggest that this region is not a high transit trip generator, and unlikely to generate more transit trips in the future. Of the four LRT alternatives, the numbers of people, households, and jobs within a one-half mile radius of the proposed stations is highest along the LRT 3C-1 (Nicollet Mall) and LRT 3C-2 (11th/12th Street) alternatives. Generally, accessibility is greatest along the LRT “3” alternatives, aided by connectivity to the major employers and denser residential areas in the regions of Minnetonka and Eden Prairie. In sum, the “A” alternatives may have less interaction with the current transit network, but are less disruptive to the current transit network and provide enhanced transit service to regions underserved by the network currently.

Implementation factors; including ROW costs, construction complexity, and permitting; favor LRT 1A and LRT 3A over LRT 3C-1 (Nicollet Mall) and LRT 3C-2 (11th/12th Street). Simpler construction, less ROW, and generally simpler permitting requirements reduce approval and construction schedule risk for LRT 1A and LRT 3A.

Finally, a preliminary review of environmental resources indicates that fewer resources are present along LRT 1A and LRT 3A, therefore these alternatives pose less environmental risk than LRT 3C-1 (Nicollet Mall) and LRT 3C-2 (11th/12th Street). The “C” alternatives have significantly greater numbers of known historic resources, contaminated properties, and potential noise and vibration receptors than the “A” alternatives.

These results indicate that the LPA selection should focus on LRT 1A and LRT 3A. Both of these LRT alternatives are likely to be cost competitive, easier to implement, and better align with overall transit planning for the Metro area. However, the ability of LRT 3A to serve and enhance the planned commercial and mixed use development in the Opus/Golden Triangle area is a significant differentiator. Therefore, LRT 3A is recommended for selection as the LPA because this alternative best meets the Southwest LRT project's Purpose and Need Statement as expressed by the goals of improving mobility, providing a cost-effective and efficient travel option, preserving the environment, protecting quality of life, and supporting economic development.