
# RIVERVIEW CORRIDOR

## Report #8:
## Riverview Corridor Pre-Project Development Study

RAMSEY COUNTY
Regional Railroad Authority

**FINAL**
**February 2018**

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## Table of Contents

## List of Exhibits

## List of Appendices

Note: The Riverview Corridor Pre-Project Development Study began in July 2014. The definition and evaluation of alternatives began in 2015, and concluded with the Policy Advisory Committee (PAC) approval of the locally preferred alternative (LPA) in December 2017. As such, some of the terms originally presented to the PAC and public may have changed over the course of the Study, and may not be consistent among Study documents. Please refer to the following Glossary of Terms and List of Abbreviations and Acronyms for clarification.

## Glossary of Terms

Following are select terms used in the Study. Some of them are used interchangeably.

| Term | Definition |
|---|---|
| Alignment | Route of a transit line/alternative |
| Alternative | Proposed transit mode and alignment combination |
| Capital Cost | Cost to construct |
| Capital Investment Grant (CIG) program | CIG is a FTA program that administers New Starts and Small Starts |
| Connection (to Blue, Green Line) | New transit service joining to existing transit service, also tie-in, interline |
| Dedicated transit | Type of operating environment where transit operates in its own lane (example: Green Line) |
| Hwy 5 alternatives | Alternatives that cross the Mississippi River at Hwy 5 |
| Ford Parkway alternatives | Alternatives that cross the Mississippi River at Ford Parkway, also Ford Site alternatives |
| Mode | Vehicle (example: modern streetcar) |
| O&M Cost | Annual operating and maintenance cost |
| Operating environment | The type of roadway configuration in which an alternative would run (example: dedicated or shared use, center-running or side-running) |
| Right-of-Way | Legal definition of property ownership (e.g. where your property ends and some else's starts). |
| Shared use | Type of operating environment where transit operates in mixed traffic (examples: buses or rail vehicles share a lane with cars) |
| Travel demand | Ridership estimated for a transit line/alternative |

## List of Abbreviations and Acronyms

Following are select terms used in the Study. Some of them are used interchangeably.

| Term | Definition |
|---|---|
| ABRT | Arterial bus rapid transit |
| ACS | American Community Survey |
| ADA | Americans with Disabilities Act |
| AMI | Area medium income |
| APE | Area of potential effect |
| BRT | Bus rapid transit |
| CBD | Central business district |
| CIG | Capital Investment Grant |
| CP Spur | Canadian Pacific Railway Spur |
| CWR | Continuous welded rail |
| DBRT | Dedicated bus rapid transit |
| DF track | Direct fixation track |
| EJ | Environmental justice |
| FAST | Fixing America's Surface Transportation Act |
| FHWA | Federal Highway Administration |
| Ford Parkway bridge | Intercity Bridge, 46th Street bridge |
| FTA | Federal Transit Administration |
| Hwy 5 | Trunk Highway 5, TH 5, Highway 5 |
| Hwy 5 Bridge | Fort Road Bridge, W. 7th Street, Trunk Highway 5 |
| Hwy 55 | Trunk Highway 55, TH 55, Highway 55, Hiawatha Avenue |
| Ford Pkwy | Ford Parkway |
| Ford Parkway alternatives | Ford Site alternatives |
| Ford Site | Ford Plant |
| GIS | Geographic Information Systems |
| LOS | Level of service |
| LPA | Locally preferred alternative |
| LRT | Light rail transit |
| MnDOT | Minnesota Department of Transportation |
| MnHPO | Minnesota Historic Preservation Office |

| Term | Definition |
|---|---|
| MOA | Mall of America |
| MPA | Most promising alternative(s) |
| MRCCA | Mississippi River Corridor Critical Area |
| MSP | Minneapolis-St. Paul International Airport |
| NEPA | National Environmental Policy Act |
| NHL | National Historic Landmark |
| No Build | No-Build alternative, Route 54 |
| NRHP | National Register of Historic Places |
| O&M | Operating and maintenance |
| OMF | Operations and maintenance facility |
| PAC | Policy Advisory Committee |
| PD | Project Development |
| PMT | Project Management Team |
| RCRRA | Ramsey County Regional Railroad Authority |
| SCC | Standard Cost Category |
| TAC | Technical Advisory Committee |
| TAZ | Transportation Analysis Zone |
| TCP | Traditional cultural properties |
| TOD | Transit-oriented development |
| TPSS | Traction power substation |
| TSP | Traffic signal priority |
| TVM | Ticket vending machine |
| W. 7th Street | West Seventh Street, W. 7th, W. 7th St., Fort Road |

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# EXECUTIVE SUMMARY

## Document Purpose

The purpose of this report is to summarize the Study's process, technical findings, and policy decisions. It includes supporting graphics and tables for ease of reference and comprehension of key project drivers. Other Study technical memoranda and reports are referenced throughout the document, and are available under separate cover.

## Overview of the Project

The Ramsey County Regional Railroad Authority (RCRRA) is leading the Riverview Corridor Pre-Project Development Study (Study) to research, analyze, and identify opportunities to improve transit within the Riverview Corridor. This study will review the viability of transit modes, transit location, engineering issues, community needs and preferences, and estimated costs.

The Riverview Corridor connects neighborhoods, businesses, thriving commercial districts, historic districts, and downtown Saint Paul to the regional transportation network. It includes Union Depot and Lowertown, downtown Saint Paul, Upper Landing, West Seventh Neighborhood, Highland Park Neighborhood, Minneapolis-Saint Paul International Airport (MSP), Bloomington's South Loop District and the Mall of America.

**Exhibit 1: Riverview Corridor**

The Riverview Corridor is defined by the Mississippi River on the south, Interstate 35E (I-35E) and Ford Parkway on the north, Lowertown and Union Depot on the east, and MSP Airport and Mall of America on the west.

Both the eastern end and the western end of the corridor are connected by light rail (METRO Green Line and METRO Blue Line) to downtown Minneapolis. The only transit between downtown Saint Paul and MSP Airport or Mall of America is the Metro Transit Route 54 bus. Other Metro Transit routes provide partial service within the corridor.

The corridor communities include the following cities and areas within Ramsey and Hennepin counties:

- Saint Paul
- Minneapolis
- Bloomington
- Fort Snelling (unincorporated area of Hennepin County)
- MSP Airport (unincorporated area of Hennepin County)

Following a multi-phase, iterative alternative development and evaluation process that is supported by extensive public engagement activities, the Riverview Corridor Policy Advisory Committee (PAC) will recommend the Locally Preferred Alternative (LPA). The LPA will be the transit investment alternative that best meets the Purpose and Need for the project and is competitive for funding through the Federal Transit Administration's (FTA) Capital Investment Grant (CIG) program under New Starts or Small Starts.

## Decision-Making Process

Following is a summary of the decision-making process and relationships between policy, technical information, and public input.

**Exhibit 2: Riverview Decision Making Process**

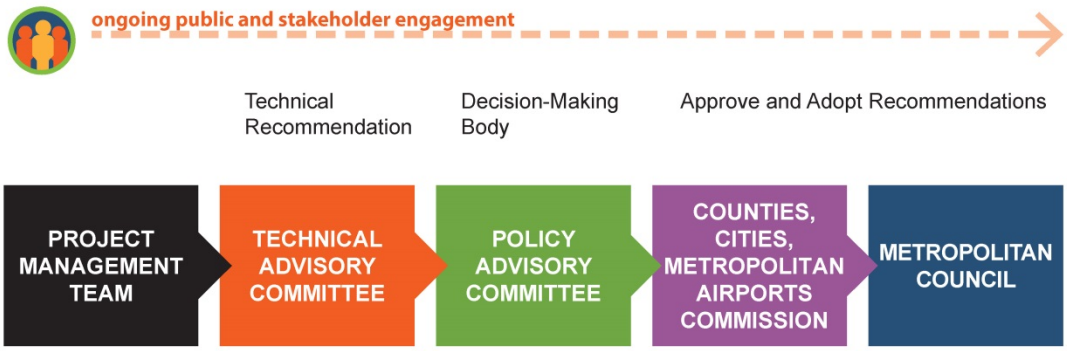
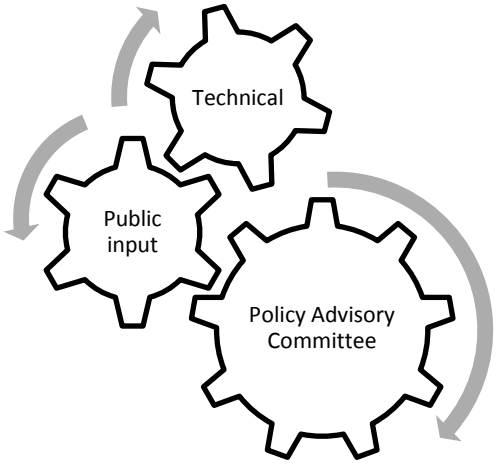


**Exhibit 3: Relationship between Policy, Technical, and Public Input**




## Advisory Committees

The Study was guided by a Policy Advisory Committee (PAC), with input from a Technical Advisory Committee (TAC).

The PAC represented a cross-section of the communities most directly served by the Riverview Corridor. As the project's decision-making body, the PAC guided the direction of the Study by viewing long-term transportation needs of the community and region along with technical information.

The TAC is made up of professional transit planners and community representatives who provided input on planning and design issues needed for any new transit development in the corridor. The TAC assisted in the preparation and review of technical data and reports to advise the PAC.

## Public Engagement

The project decision-making process is informed by ongoing public and stakeholder engagement. Opportunities for public input included PAC and TAC meetings, public meetings, Study updates to various community and business organizations, website, e-mail, and social media. A detailed description of activities and comments received are documented under separate cover.

## Technical Work

The Project Management Team (PMT) is responsible for guiding the Study and providing oversight of all technical work. The PMT is comprised of project management staff from government and transportation agencies serving the Riverview Corridor, including Ramsey County Regional Railroad Authority, the agency leading the Study, as well as the consultant team. The PMT develops technical Study recommendations that the TAC reviews and makes recommendations to the PAC, and the PAC approves.

# Stages of the Study

Exhibit 4 presents the three stages of the Study: Corridor Vision, Alternatives Analysis, and the LPA. The Corridor Vision stage established the Purpose and Need and goals and objectives of the Study.

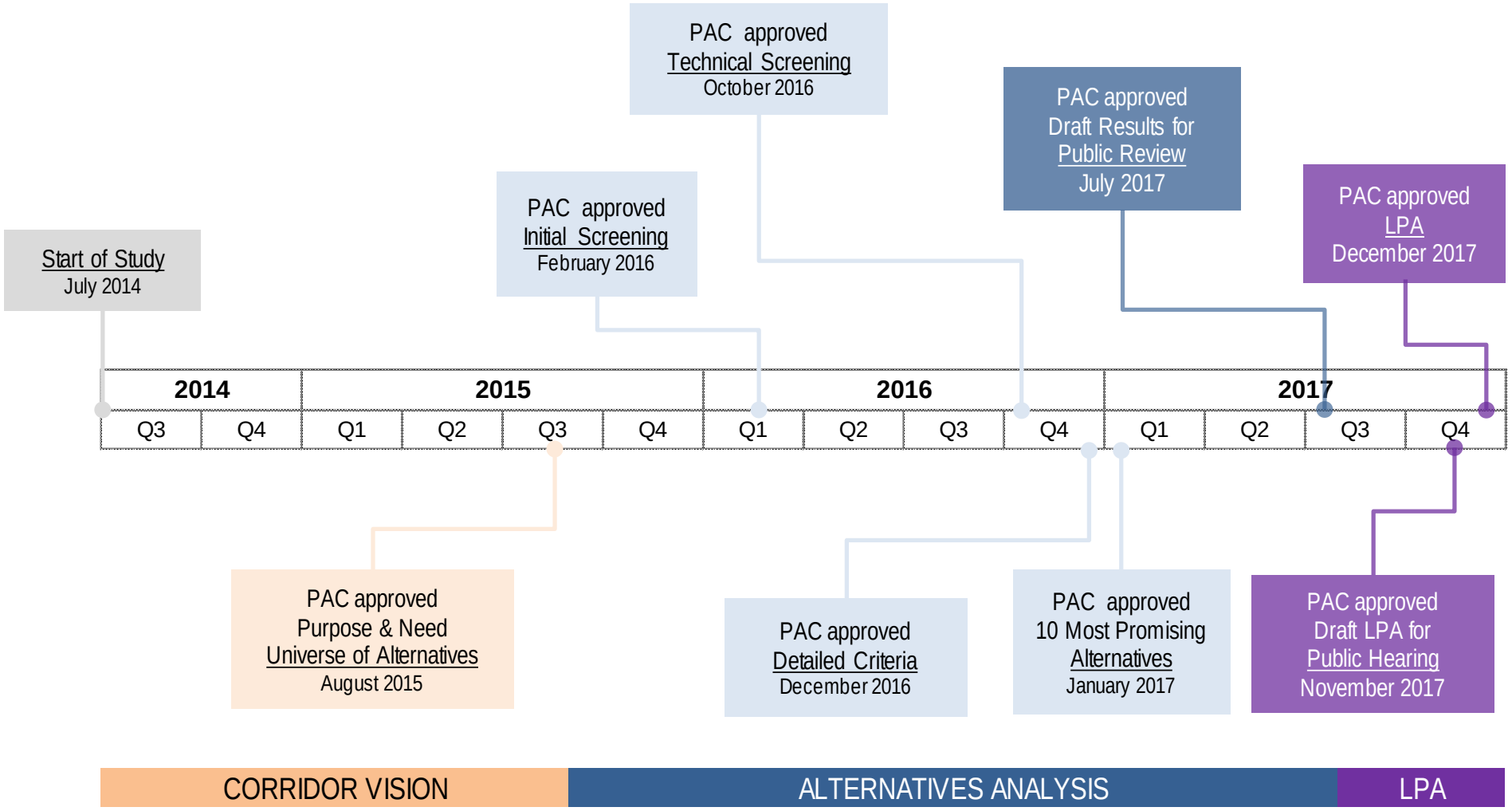
The Purpose and Need and goals and objectives form the bases of the evaluation criteria used in the Alternatives Analysis stage of the Study, and ultimately paved the way to the selection of the LPA.

**Exhibit 4: Study Stages**


## Timeline of Decisions

The Study began in July 2014, and progressed as the public reviewed material, and the PAC made key decisions. Exhibit 5 illustrates the timeline as well as the intricate relationship between the technical work, public engagement, and decision-making by Study stage. The Corridor Vision stage was approximately a 12-month process. The Alternatives Analysis stage was approximately a two-year process (from September 2015 to July 2017). Finally, the LPA stage was a five-month stage.

**Exhibit 5: Timeline of Key PAC Decisions**



## Summary: Corridor Vision

The Corridor Vision entailed assessment of the corridor's existing conditions, review of findings of previous studies, and definition of the Purpose and Need, and goals and objectives. The cornerstone of the Corridor Vision is the Purpose and Need. They established the issues to address and the means for evaluating the potential benefits and costs of alternative solutions. The Corridor Vision also shaped the "Universe of Alternatives," which encompassed the transit modes and alignments for consideration in the Alternatives Analysis stage of the Study.

The purpose the Riverview Corridor is to provide transit service that would:

- Enhance mobility and access to opportunities for residents, businesses, and the region through connections to employment, education, and economic development throughout the Twin Cities; and
- Support goals to cultivate economic prosperity and to invest in all neighborhoods in the corridor, with special attention given to neighborhoods with areas of concentrated poverty.

The needs of the Riverview Corridor are shown in Exhibit 6.

**Exhibit 6: Riverview Corridor Needs**


## Summary: Alternatives Analysis

The Alternatives Analysis begins with the "Universe of Alternatives," or all of the transit modes and alignments under consideration for the Riverview Corridor outlined in the Corridor Vision. Exhibit 7 presents the three parts of the Alternatives Analysis stage that narrowed the Universe of Alternatives down to a Locally Preferred Alternative.

**Exhibit 7: Alternatives Analysis Sub-Stages**

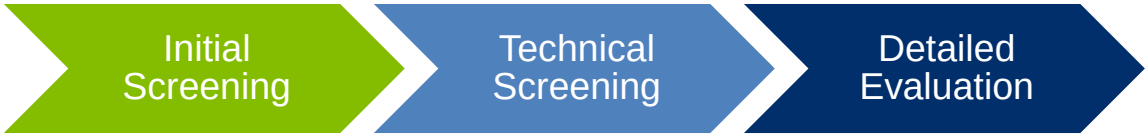


Exhibit 8 illustrates the development of the alternatives over the course of the Alternatives Analysis stage. The 60 alternatives evaluated correspond with the Initial Screening (PAC action in February 2016), while the 10 alternatives (PAC action in January 2017) align with the Detailed Evaluation.

**Exhibit 8: Alternatives Analysis Stage, Decisions and Timeline**

| | Timeline | Description | Findings |
|---|---|---|---|
| Initial Screening | August 2015-February 2016 | Qualitative assessment of Universe of Alternatives (total of 60 modes and alignments) | Carried forward 30 of 60 alternatives |
| Technical Screening | March 2016-October 2016 | Generally, still a qualitative assessment of 30 alternatives to identify Most Promising Alternatives for detailed evaluation<br><br>Applied six technical criteria to determine how well a transit mode or alignment could meet each criterion. | Carried forward 10 Most Promising Alternatives, including bus, Arterial BRT, Dedicated BRT, LRT, modern streetcar, and alignments that cross at Hwy 5 or serve the Ford Site (cross at Ford Parkway) |
| Detailed Evaluation | November 2016-November 2017 | Applied 27 total criteria, both qualitative and quantitative.<br><br>Quantitative criteria included costs and ridership forecasts | Dismissed 100 percent dedicated transit alternatives (Dedicated BRT and LRT)<br><br>Defined, evaluated, and dismissed six additional BRT alternatives that mirrored the station locations of their equivalent rail alternatives<br><br>Entailed focused evaluation of river crossing options<br><br>Entailed preliminary assessment of Project Justification as part of FTA's Capital Investment Grant program |

## Summary: LPA and Next Steps

Approved by the PAC in December 2017, the LPA is modern streetcar from Union Depot in downtown Saint Paul to Minneapolis/St. Paul Airport and the Mall of America along W. 7th Street and crossing the Mississippi River near the Hwy 5 Bridge (see Exhibit 9).

Some alignment sub-options are retained for future environmental review and engineering phases of the selected Riverview LPA. They include the Green Line connection, Smith Avenue concepts, CP Spur, Hwy 5 river crossing concepts, Blue Line connection, and Bloomington South Loop concepts.

Additionally, operating environment decisions will be made in future phases to determine which segments will be dedicated vs. shared use.

The Riverview LPA implementation plan entails several steps before initiating FTA coordination and the Project Development phase. The implementation plan is detailed in Report #9: Implementation Plan, under separate cover. It describes a range of methods to fund, finance, construct, and/or operate the Riverview Modern Streetcar. It also includes preliminary conceptual project schedules based on implementation method, agency roles and responsibilities, and a preliminary list of anticipated project agreements that may be required. The conclusions of the Implementation Plan include recommended activities to address during the environmental review and engineering phases of the selected Riverview LPA.

**Exhibit 9: Riverview Locally Preferred Alternative**

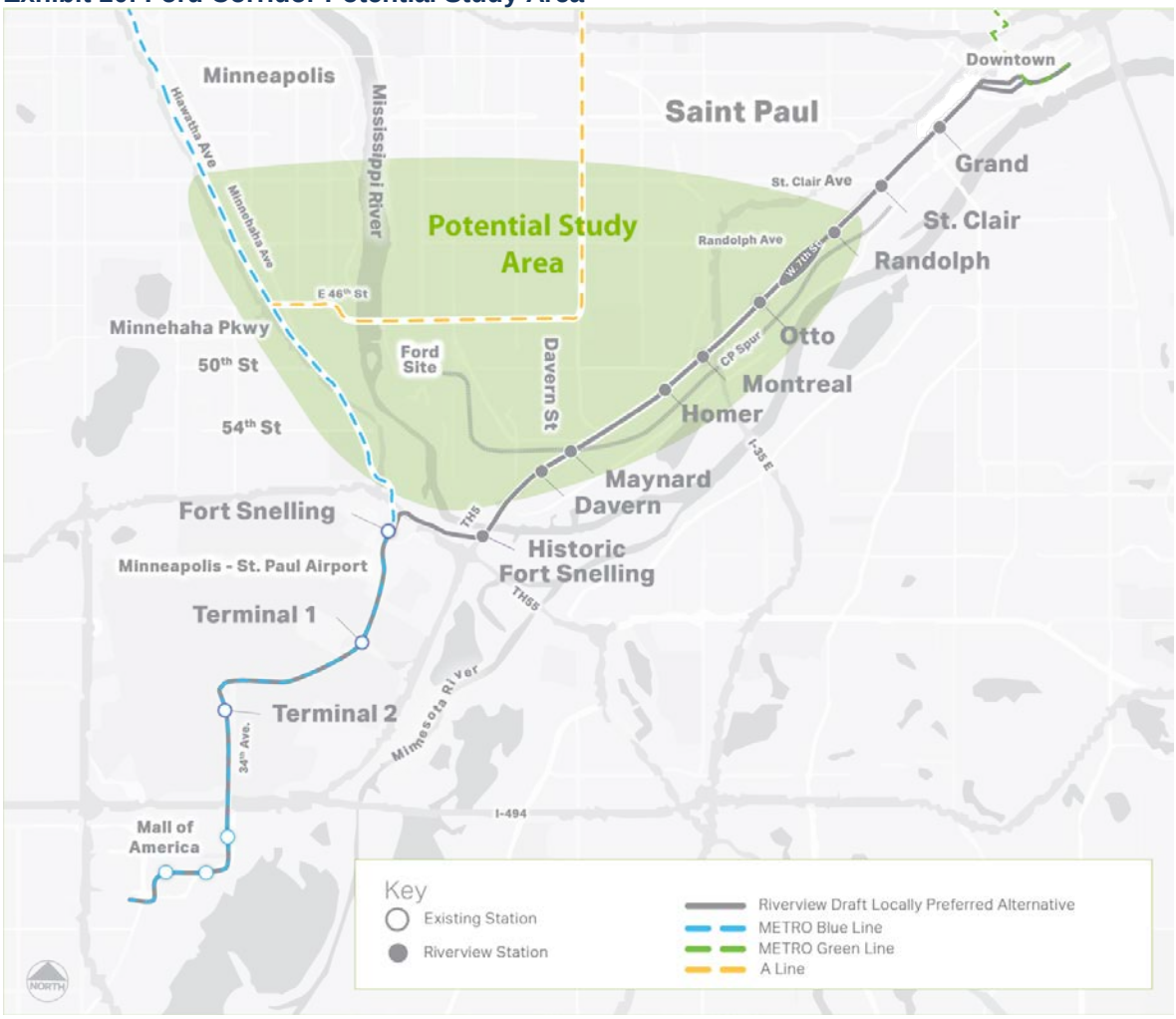

The PAC decision to support the initiation of two separate transit studies to serve the Ford Corridor entails an implementation plan with a broad view of potential transit solutions. The PAC has requested the completion of a study of near-term transit improvements in the Highland Park neighborhood, as well as a study of medium to long-term transit improvements to serve the future Ford Site development (see Exhibit 10). Whereas, by selecting a Hwy 5 alternative as the Riverview

Corridor LPA, the PAC has recognized the need for the City of Saint Paul, Metro Transit, and the Ramsey County Regional Railroad Authority to work in consultation with Hennepin County Regional Railroad Authority and the City of Minneapolis to develop and deliver separate transit, livability, and economic development investments to the Ford Corridor as soon as possible.

The next steps for the Ford Corridor studies are summarized as follows:

- Identify funding partners
- Identify study lead/co-leads
- Develop and execute necessary inter-agency agreements
- Develop work plan, schedule, and budget
- Establish distinct advisory committees
- Identify and adopt locally preferred alternative and determine next steps

**Exhibit 10: Ford Corridor Potential Study Area**



# 1.0 CORRIDOR VISION


The Study began with the Corridor Vision phase, where its Purpose and Need and goals and objectives were defined. The Study rooted its Purpose and Need and goals and objectives on analyses of existing and future travel and development markets, findings of related studies, and public and stakeholder input. In summary, the Study's Corridor Vision was the basis of the criteria used to evaluate the 60 alternatives and narrow them down to the LPA.

## 1.1 Project Purpose

The purpose the Riverview Corridor is to provide transit service that would:

- Enhance mobility and access to opportunities for residents, businesses, and the region through connections to employment, education, and economic development throughout the Twin Cities; and
- Support goals to cultivate economic prosperity and to invest in all neighborhoods in the corridor, with special attention given to neighborhoods with areas of concentrated poverty.

## 1.2 Project Need

The need for transit investment in the Riverview Corridor is based on the following considerations:

**Growing and Changing Travel Demand**

- Growth in population and employment
- Growth in the number of trips traveling to, from, and within the corridor and the Twin Cities Region
- Ability to serve different travel markets
- Demand for frequent all-day transit service

**Needs of People Who Rely on Transit**

- Zero-car households
- Population in poverty
- Areas of concentrated poverty
- Affordable housing

**Local and Regional Objectives for Growth**

- Recent and ongoing reinvestment and redevelopment in the corridor
- Local and regional plans support sustainable growth and development patterns that encourage transit-oriented development and protect corridor diversity

**Constrained Access within the Corridor and to the Regional Transportation System**

- Physical constraints limit the ability to enhance connections and create alternative routes
- Limited opportunities for multi-modal travel in the corridor

## 1.3 Goals and Objectives

Based on the Purpose and Need, the project goals and objectives guide the process of developing and evaluating transportation solutions for the corridor, starting with the Universe of Alternatives, or all of the transit modes and alignments under consideration. The goals and objectives are the foundation of the evaluation criteria that the Study will use to assess the potential of each alternative to address the stated goals and objectives. Exhibit 11 lists the Study's preliminary goals and objectives.

**Exhibit 11: Project Goals and Objectives**

| Goals | Objectives |
|---|---|
| **Improve transit connections to jobs, education, health care, activity centers, cultural resources, and to the regional and national transit network** | • Provide high-quality service for local trips along the corridor<br>• Increase frequency, reliability, and attractiveness of existing transit services and facilities<br>• Provide competitive transit travel times in the Riverview Corridor<br>• Provide additional transportation capacity to meet current and future travel demand<br>• Increase transit share of travel in the corridor<br>• Serve transportation needs of transit-dependent population |
| **Support development and employment in the corridor and Twin Cities region** | • Provide right-sized transit facilities at locations where existing and future land uses make the mutually supportive, in order to maximize public and private investment<br>• Support community development and redevelopment initiatives<br>• Support a mix of housing choices, including affordable housing |
| **Support, protect, and enhance high-quality connections of corridor resources, neighborhoods, businesses, and the Mississippi River** | • Improve connections to the Mississippi River<br>• Minimize negative impacts to the natural environment<br>• Minimize negative impacts to existing businesses and neighborhoods<br>• Balance impacts to existing traffic operations<br>• Contribute to improving local and regional equity, sustainability, and quality of life |
| **Provide additional transportation choices in the corridor to support community health and regional sustainability goals** | • Support regional planning for a more balanced, multi-modal transportation network<br>• Increase opportunities for safe bicycling and walking to improve public health and the environment<br>• Increase the comfort, connectivity, and attractiveness of bicycle and pedestrian networks to and along the corridor<br>• Provide accessible pathways to and from transit service and local destinations |
| **Develop and select an implementable project with local and regional support** | • Define transit improvement with public, stakeholder and agency support<br>• Identify transit improvements that are financially feasible and competitive for federal funding<br>• Develop transit improvements that allow for phased implementation |

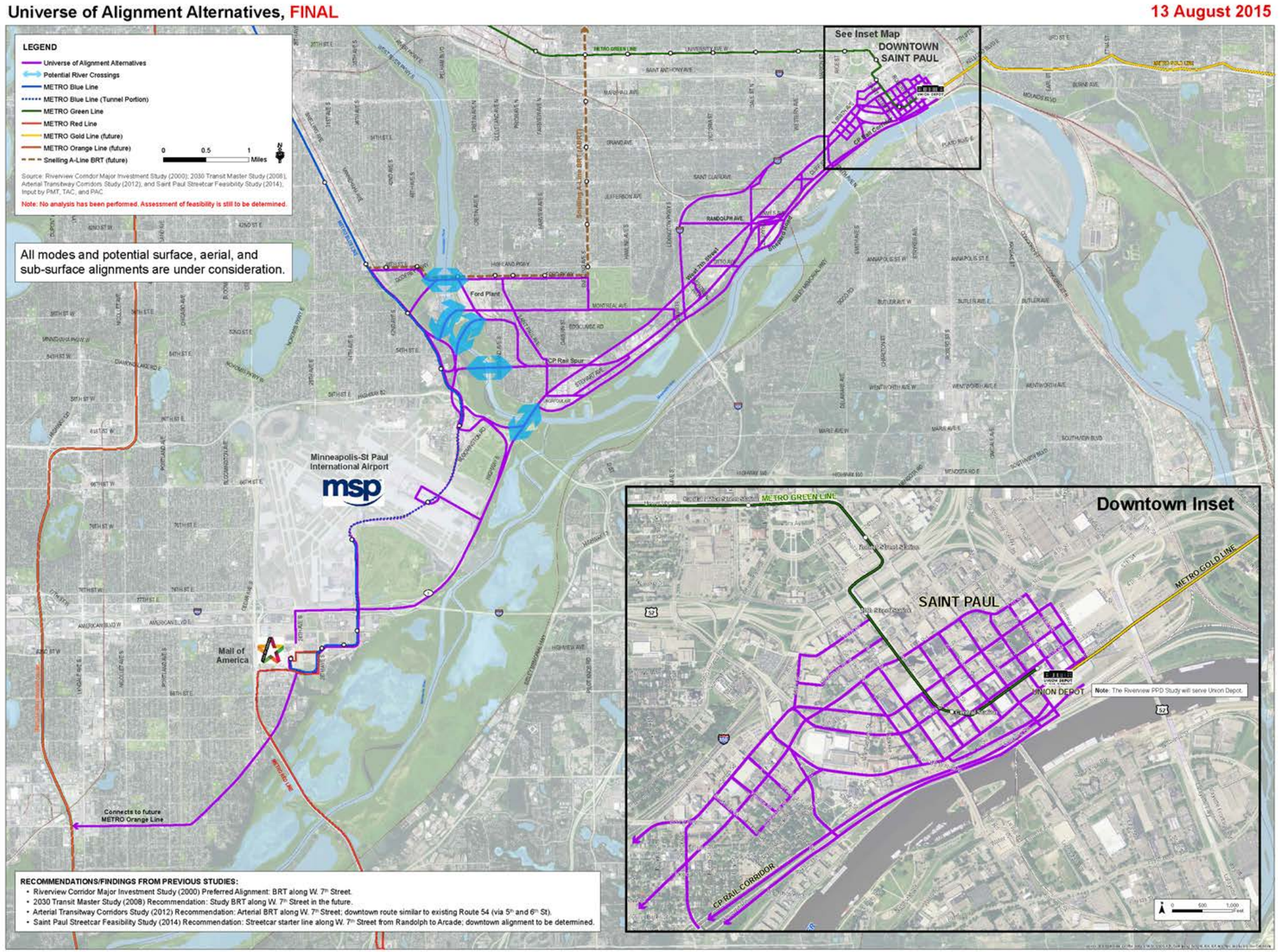
## 1.4 Universe of Alternatives

The Universe of Alternatives encompasses the transit modes and alignments identified with PMT, TAC, PAC, and the public for consideration in the Alternatives Analysis stage. See Exhibit 12 for the transit modes and Exhibit 13 for the alignments.

**Exhibit 12: Universe of Alternatives (Modes)**

| Local Bus | Bus Rapid Transit | Modern Streetcar |
|---|---|---|
|  |  |  |
| **Light Rail Transit** | **Diesel Multiple Unit** | **Commuter Rail** |
|  |  |  |

## Exhibit 13: Universe of Alternatives (Alignments)



## 2.0 ALTERNATIVES ANALYSIS


The Alternatives Analysis stage of the Study is an evaluation process that narrows down the Universe of Alternatives to a Locally Preferred Alternative. Additionally, this stage has three parts, as shown in Exhibit 14. Each part generally decreased the number of alternatives (Exhibit 15) as evaluation criteria increased in number and level of detail.

**Exhibit 14: Alternatives Analysis Sub-Stages**

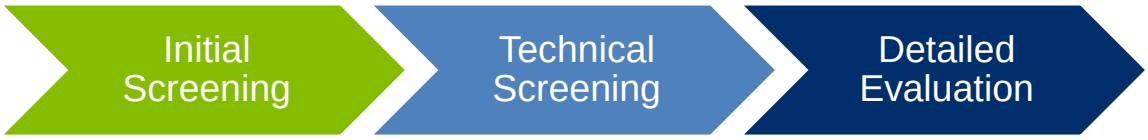
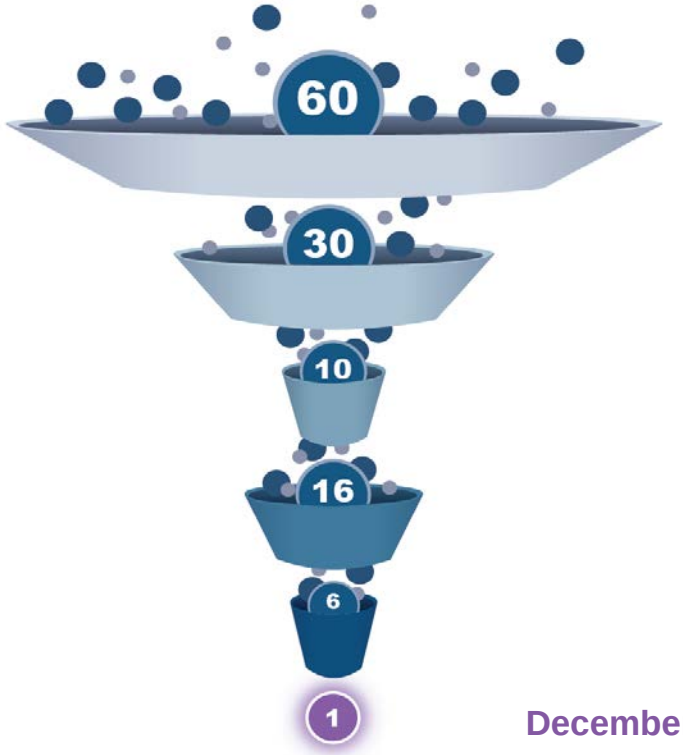



**Exhibit 15: Alternatives Analysis vs. Timeline of PAC Decisions**




**PAC Action**

*February 2016*

*October 2016*

*January 2017*

*February 2017*

*July 2017*

**December 2017: PAC approval of LPA**

## 3.0 INITIAL SCREENING: RESULTS

Initial Screening entailed the assessment of transit modes and alignments relative to overall implementation viability (*Technical Memorandum #5: Executive Summary Initial Screening, March 4, 2016)*. The Initial Screening phase applies fewer and broader measures, including information from previous corridor/area studies, to the Universe of Alternatives. The Initial Screening evaluated each alignment and mode that advanced from the Universe of Alternatives. The Initial Screening relied on readily available information and focused on a high-level, qualitative, and quick assessment of a relatively high number transit modes and alignments. An overall assessment of "does not support purpose and need" meant that the mode or alignment did not meet the stated Purpose and Need for the Riverview Corridor and was not carried forward.

The following exhibits present the alternatives carried forward as a result of the Initial Screening. At this juncture, the evaluation of modes and alignments remained separate.

**Exhibit 16: Modes Carried Forward from Initial Screening**[1]

| Local Bus | Bus Rapid Transit | Modern Streetcar |
|---|---|---|
|  |  |  |
| **Light Rail Transit** | **Diesel Multiple Unit** | **Commuter Rail** |
|  |  |  |

[1] Red 'x' = Alternative dismissed.

**Exhibit 17: Trunk Alignments Carried Forward from Initial Screening**

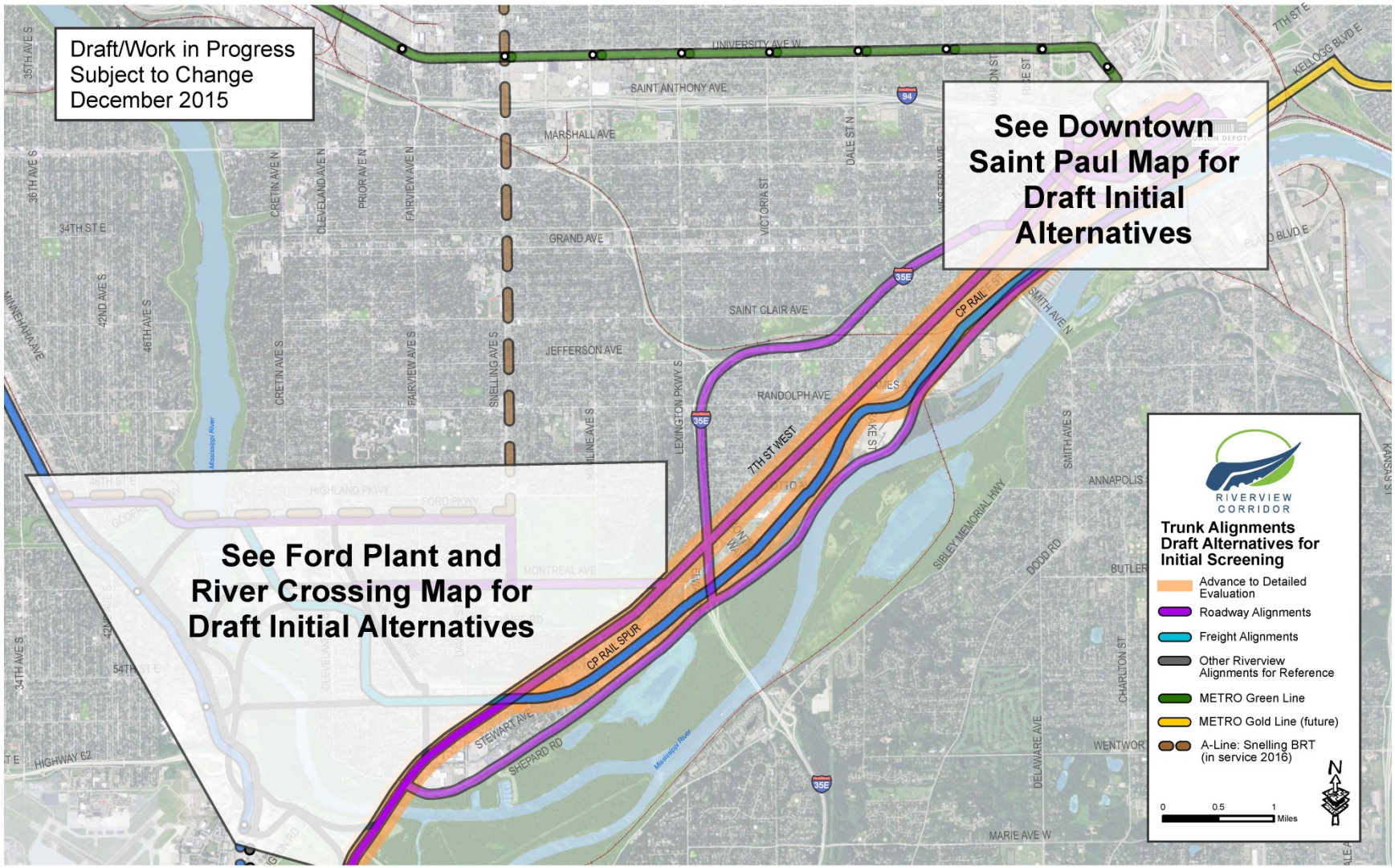


**Exhibit 18: Downtown Saint Paul Alignments Carried Forward from Initial Screening**

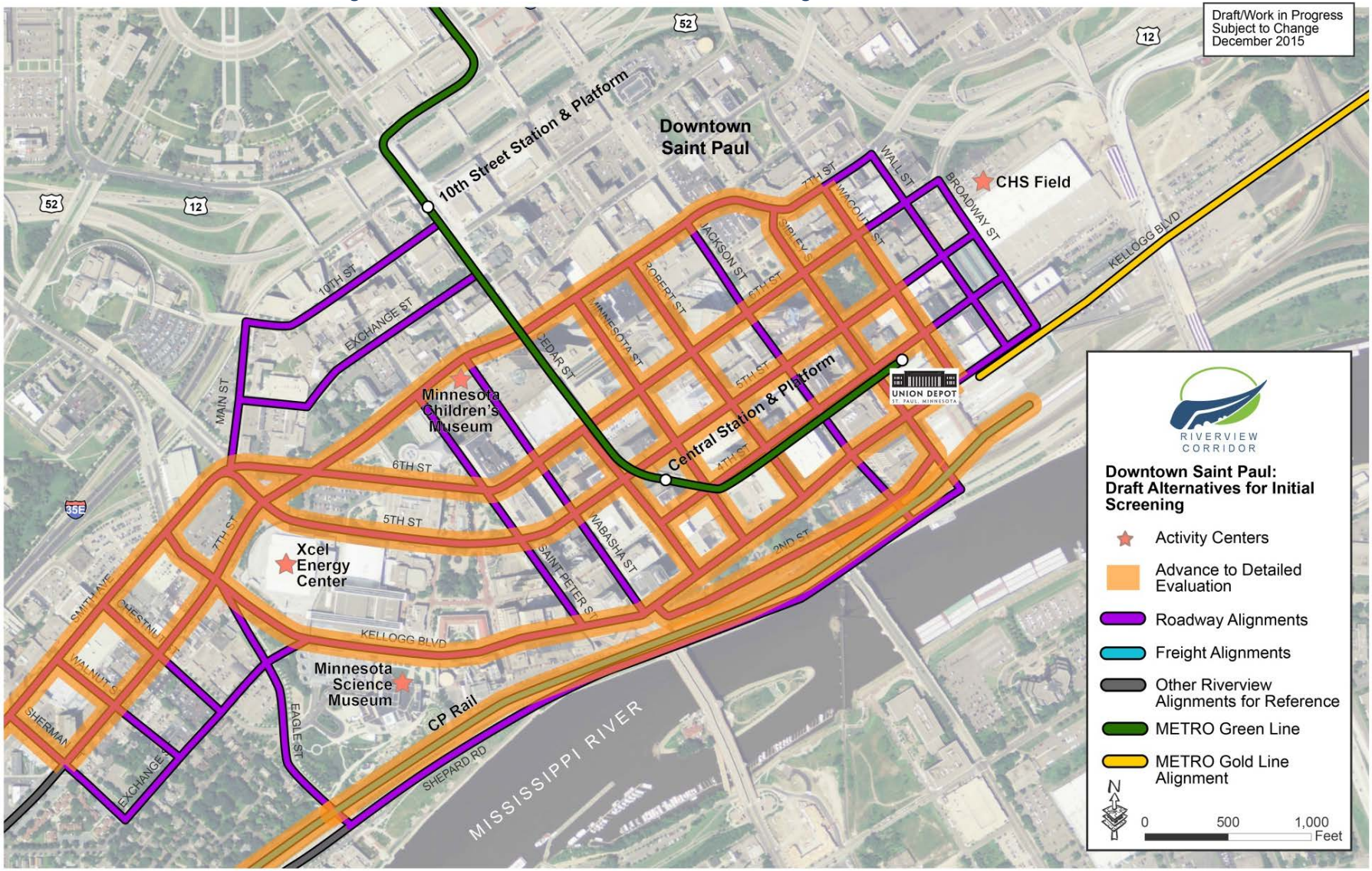


**Exhibit 19: Ford Site Alignments Carried Forward from Initial Screening**

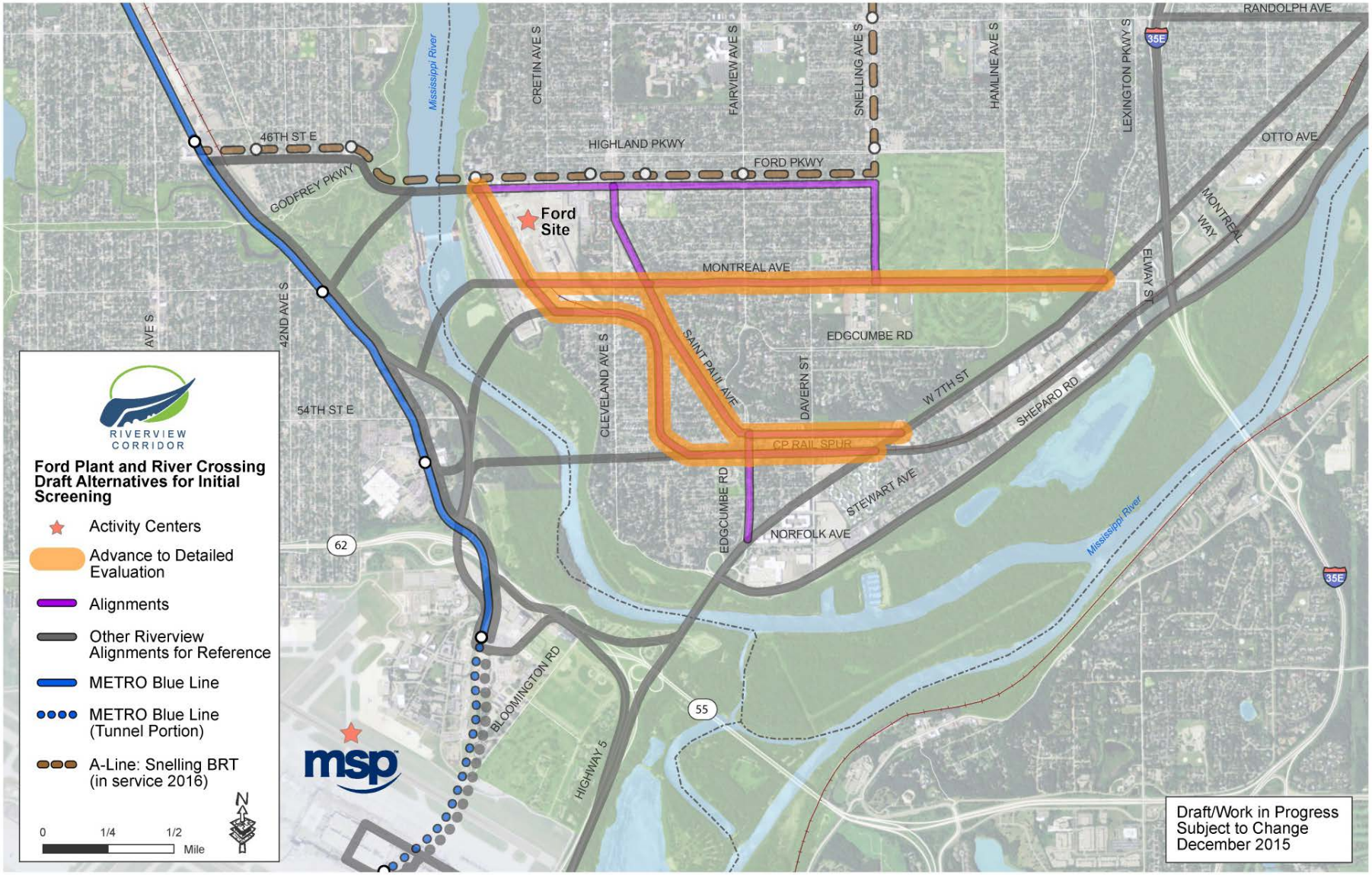
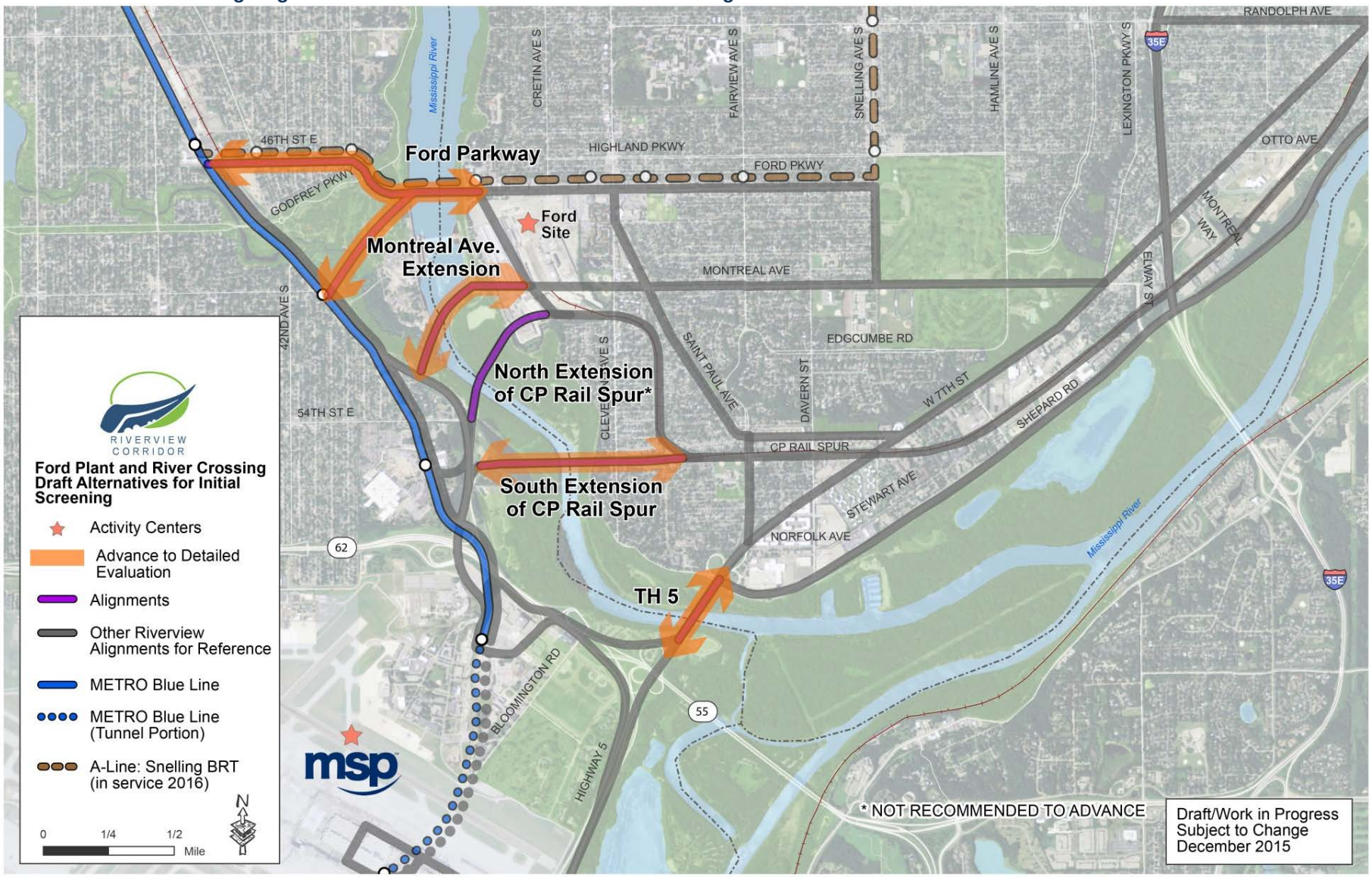


**Exhibit 20: River Crossing Alignments Carried Forward from Initial Screening**



## 4.0 TECHNICAL SCREENING: RESULTS

Following Initial Screening, a Technical Screening process was implemented to further screen transit modes and routes to carry forward into the full Detailed Evaluation where 27 criteria would be applied (*Memorandum: Technical Screening, May 4, 2017)*. The Technical Screening stage applied a set of six technical criteria to determine how well a transit mode or alignment could meet each criterion, as listed below:

1. Ability to leverage existing infrastructure
   - Extent an alternative would use existing transportation infrastructure.
   - Anticipated level of reconstruction required by an alternative.

2. Estimated travel time
   - Relative travel time based on:
     - Fastest = Elevated/tunnel
     - Faster = Dedicated lanes
     - Fast = Shared-use lanes

3. Regulatory requirements and guidelines
   - Consider substantive requirements for resources such as water, parkland, historic and cultural.

4. High-level construction effects
   - Consider reasonableness of potential impacts from underground or elevated alternatives.

5. Pedestrian/bicycle access
   - Notable challenges (e.g., terrain, roadway connections).

6. Ability to leverage federal funding

### 4.1 Modes Carried Forward

The modes carried forward following the Technical Screening stage of the Alternatives Analysis are shown in Exhibit 21.

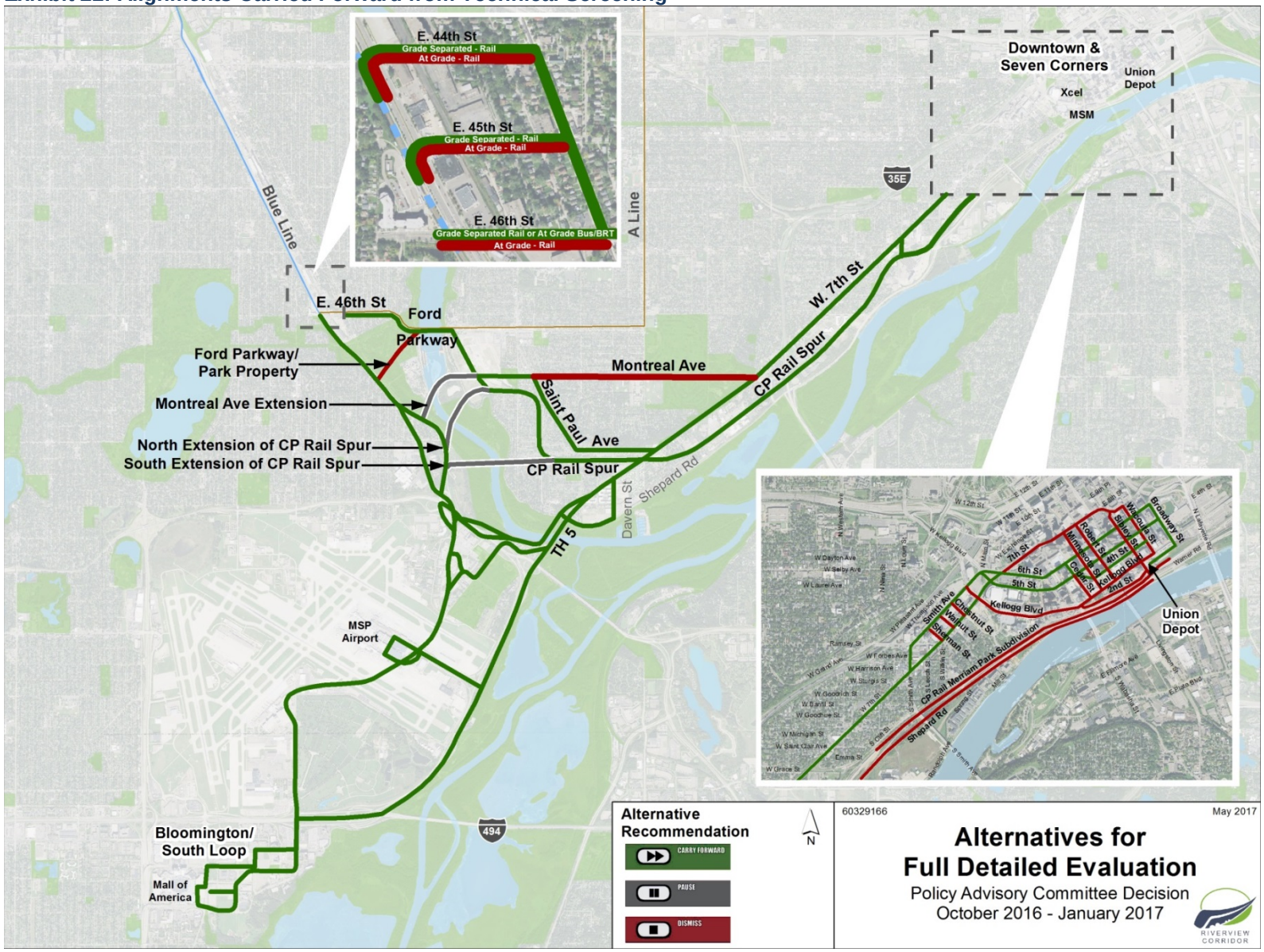
**Exhibit 21: Modes Carried Forward from Technical Screening**

| Transit Mode | PAC Decision |
|---|---|
| • Bus/Bus Rapid Transit |   |
| • Rail: Light Rail Transit or Modern Streetcar |   |
| • Diesel Multiple Unit |   |

## 4.2 Alignments Carried Forward

The alignments carried forward following the Technical Screening stage of the Alternatives Analysis are shown in Exhibit 22.

**Exhibit 22: Alignments Carried Forward from Technical Screening**



## 5.0 DETAILED DEFINITION OF ALTERNATIVES

The Detailed Definition of Alternatives describes the 10 Most Promising Alternatives (MPAs) that advanced through the Initial Screening and Technical Screening process, to be assessed in the Detailed Evaluation of Alternatives.[2] The alternatives defined at this juncture paired mode and alignment.

The alignment alternatives of the 10 MPAs all run between downtown Saint Paul and the Mall of America. An area of distinction between the alternatives is the Mississippi River crossing. Alternatives cross the Mississippi River at Ford Parkway or Hwy 5. For details, see Memorandum: Focused Evaluation of Rail Alternatives by River Crossing, under separate cover. Additionally, following is a summary of the pairing of rail modes to river crossing:

- Rail (modern streetcar) on Ford Parkway Bridge: Based on an initial assessment of existing traffic operations on the Ford Parkway Bridge (volumes, speed), the Study presumed that the bridge can be retroffited to accommodate modern streetcar infrastructure in shared use operations.

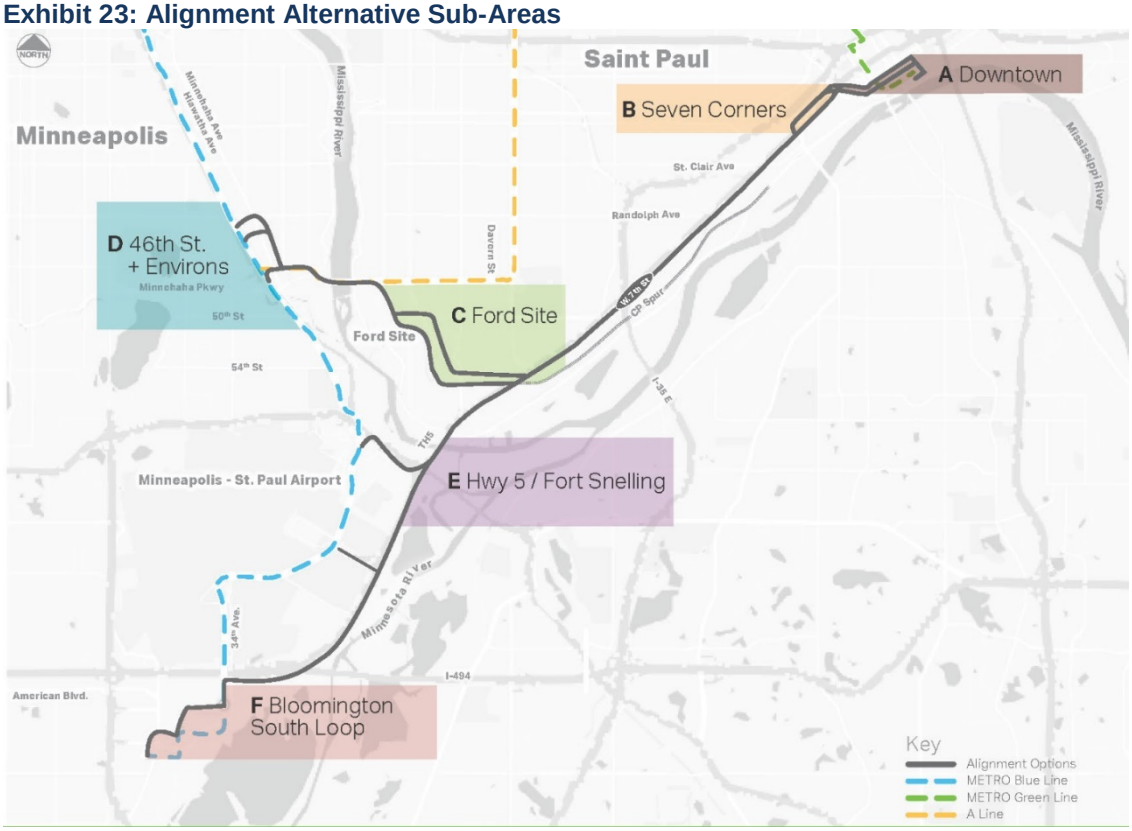
- Rail (modern streetcar or LRT) on Hwy 5 Bridge: Due to high traffic volumes and speeds on the existing bridge, the Study presumed dedicated lanes for rail transit, pedestrians, and bicyclists. As such, preliminary concepts include retrofit of the existing structure (i.e. widen bridge deck); build a new structure in place of the existing bridge; build a new structure adjacent to the existing Hwy 5 Bridge for rail transit, pedestrians, and bicyclists.

If the selected Riverview LPA is a rail alternative, then future environmental review and engineering phases of the project will evaluate river crossing options.

Further, depending on the transit mode, each sub-area (see Exhibit 23) can include multiple alignment options. The Detailed Definition of Alternatives is further described in Report #7: Detailed Definition of Alternatives, under separate cover.

[2] The 10 MPAs are illustrated in the MPA Booklet: http://riverviewcorridor.com/wp-content/uploads/2017/01/Riverview-Most-Promising-Alternatives-Booklet-Jan.-2017.pdf

**Exhibit 23: Alignment Alternative Sub-Areas**




The 10 MPAs approved by the PAC in January 2017 are described as follows:

- **Alternative 1 – No Build**

  This alternative has the same alignment as existing Route 54.

- **Alternative 2 - Arterial BRT**

  This arterial BRT alternative would have a similar alignment to BRT: W. 7th – Hwy 5/Fort Snelling, and would operate in shared use lanes with general traffic.

- **Alternative 3 - BRT: W. 7th – Hwy 5/Fort Snelling**

  This dedicated BRT alternative would originate at Union Depot, travel through downtown Saint Paul along 5th and 6th Streets, turn to the southwest generally along W. 7th Street, cross the Mississippi River via Hwy 5, connect to MSP, and terminate at the Mall of America.

- **Alternative 4 - Rail: W. 7th – Hwy 5/Fort Snelling**

  This rail (modern streetcar or LRT) alternative would originate at Union Depot, travel through downtown Saint Paul along the METRO Green Line and 5th and 6th Streets, turn to the southwest generally along W. 7th Street, cross the Mississippi River adjacent to Hwy 5, interline with the existing METRO Blue Line at Fort Snelling station, connect to MSP and terminate at the Mall of America.

- **Alternative 5 - BRT: W. 7th – Ford Site**

  This dedicated BRT alternative would originate at Union Depot, travel through downtown Saint Paul along 5th and 6th streets, turn to the southwest generally along W. 7th Street, and proceed northwest along the Canadian Pacific (CP) Spur or St. Paul Avenue to Ford Parkway where it would cross the Mississippi River. The route would then utilize Hwy 55 after connecting to the METRO Blue Line's 46th Street station. After intersecting with Hwy 5, it would proceed to MSP and the Mall of America.

- **Alternative 6 - Rail: W. 7th – Ford Site**

  This rail (modern streetcar) alternative would originate at Union Depot, travel through downtown Saint Paul along the METRO Green Line and 5th and 6th Streets, and turn to the southwest generally along W. 7th Street. The route would proceed northwest along the CP Spur or St. Paul Avenue to Ford Parkway where it would cross the Mississippi River. The route would then interline with the METRO Blue Line at 46th Street station, connect to MSP and terminate at the Mall of America.

- **Alternative 7 - BRT: W. 7th – CP Spur – Ford Site**

  This dedicated BRT alternative would originate at Union Depot, travel through downtown Saint Paul along 5th and 6th streets, turn to the southwest generally along W. 7th Street, turn south near Toronto Street, and then turn west to run along the CP Spur. The route would proceed northwest along the CP Spur or St. Paul Avenue to Ford Parkway, where it would cross the Mississippi River. The route would then utilize Hwy 55 after connecting to the METRO Blue Line's 46th Street station. After intersecting with Hwy 5, it would proceed to MSP and the Mall of America.

- **Alternative 8 - Rail: W. 7th – CP Spur – Ford Site**

  This rail (modern streetcar) alternative would originate at Union Depot, travel through downtown Saint Paul along the METRO Green Line and 5th and 6th Streets, turn to the southwest generally along W. 7th Street, turn south near Toronto Street, and then turn west to run along the CP Spur. The route would proceed northwest along the CP Spur or St. Paul Avenue to Ford Parkway where it would cross the Mississippi River. The route would then interline with the METRO Blue Line at 46th Street station, connect to MSP and terminate at the Mall of America.

- **Alternative 9 - BRT: W. 7th – CP Spur – Hwy 5/Fort Snelling**

  This dedicated BRT alternative would originate at Union Depot, travel through downtown Saint Paul along 5th and 6th streets, turn to the southwest generally along W. 7th Street, turn south near Toronto Street, and then turn west to run along the CP Spur. The route would cross the Mississippi River via Hwy 5, connect to MSP, and terminate at the Mall of America.

- **Alternative 10 - Rail: W. 7th – CP Spur – Hwy 5/Fort Snelling**

  This rail (modern streetcar or LRT) alternative would originate at Union Depot, travel through downtown Saint Paul along the METRO Green Line and 5th and 6th Streets, turn to the southwest generally along W. 7th Street, turn south near Toronto Street, and then turn west to run along the CP Spur. The route would cross the Mississippi River adjacent to Hwy 5 to,

interline with the METRO Blue Line at Fort Snelling station, connect to MSP and terminate at the Mall of America.

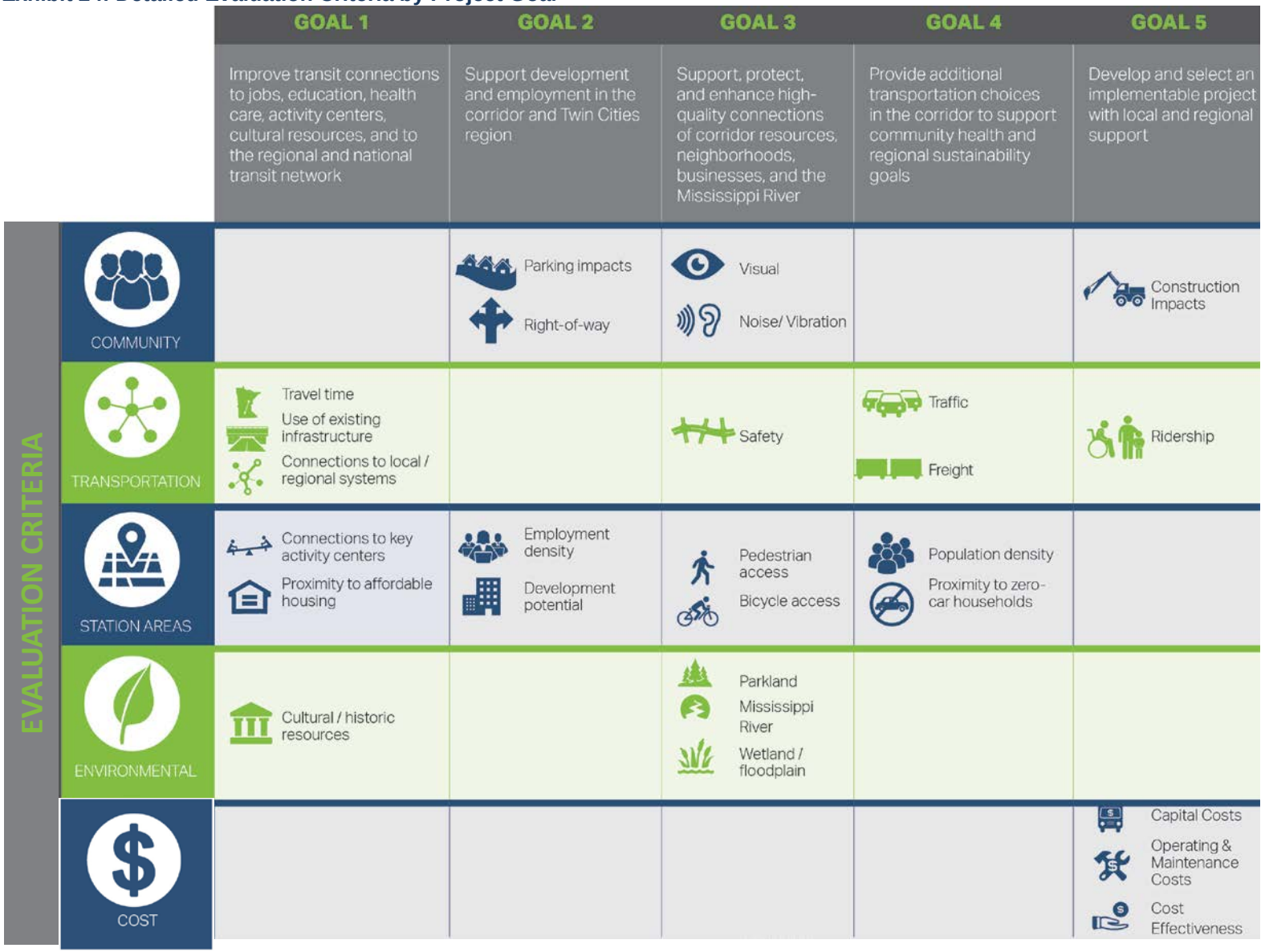
# 6.0 DETAILED EVALUATION OF ALTERNATIVES

The Detailed Evaluation assessed the mode and route options, called the Most Promising Alternatives, carried forward as a result of the Initial Screening and Technical Screening analysis. The Detailed Evaluation phase applied more and relatively finer criteria to arrive at a LPA. The evaluation considered both the project Purpose and Need and Federal Transit Administration Capital Investment Grant program Project Justification criteria.

## 6.1 Criteria

The detailed evaluation used 27 criteria to assess the 10 MPAs, which were grouped into five categories, transportation, community, station areas, cost, and environmental. Exhibit 24 presents their connection to the project goals and objectives.

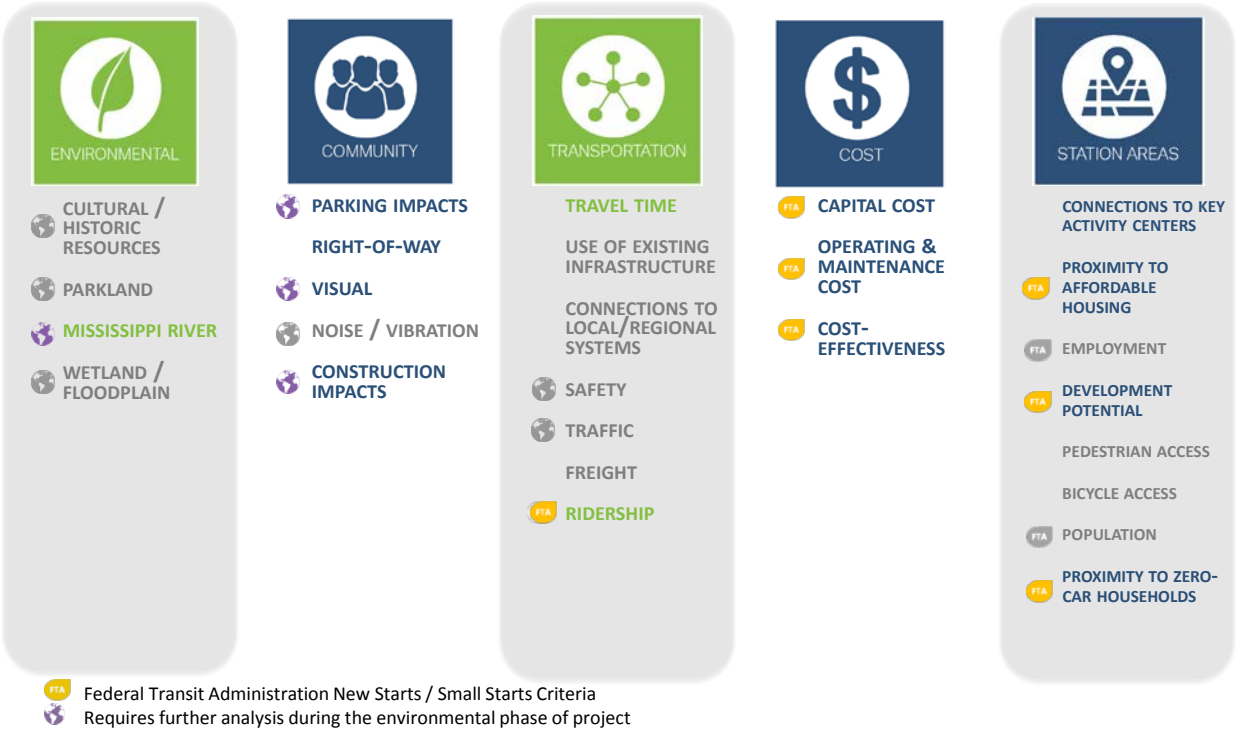
**Exhibit 24: Detailed Evaluation Criteria by Project Goal**



The methodology and detailed results of each criterion can be found in the memoranda listed in Section 9. Since the review is a high-level and preliminary assessment of potential impacts, many of the criteria require further analysis during future environmental review and engineering phases of the selected Riverview LPA.

The results of each category were presented to the TAC and PAC to weigh the opportunities and challenges of each alternative. The Detailed Evaluation primarily differentiated alternatives by mode and alignment, and some criteria differentiated alternatives by operating environment. Exhibit 25 presents the differentiating criteria in either blue or green font.

**Exhibit 25: Differentiating Criteria for Most Promising Alternatives**




In February 2017, the PAC requested analysis of six additional BRT alternatives. The purpose of these additional alternatives was to provide a one-to-one correspondence between BRT and rail options by defining and analyzing the same number and location of stations. The detailed evaluation of the six additional BRT alternatives can be found in Memorandum: Six Additional BRT Alternatives, available under separate cover.

## 6.2 Decisions: What Modes?

The Detailed Evaluation results informed the first significant PAC decision of the Detailed Evaluation phase of the Alternatives Analysis: what modes should be dismissed or carried forward? The PAC first considered BRT (Arterial or Dedicated) and then rail alternatives (modern streetcar or LRT). As

is typical for pre-project development studies, the No Build alternative will be carried forward into future project phases as a basis for comparison.

The results of the differentiating criteria for the BRT comparison are shown in Exhibit 26. For reference, green, bold text denotes the mode showing an advantage with a particular criterion. Costs shown are in year 2016 dollars.

**Exhibit 26: Differentiating Criteria: BRT**

| Criterion | Arterial BRT | Dedicated BRT |
|---|---|---|
| 2040 ridership | 10,000-11,000/day | **11,000-14,000/day** |
| Capital Cost (2015$) | **$75M** | $450-650M |
| O&M Cost (2015$) | **$10M** | $11M-$14M |
| Cost per Rider | **$4-$6** | $6-$10 |
| Traffic | **Shared use operation would lessen traffic impacts** | |
| Parking | **Would have fewer parking impacts on W. 7th Street** | |
| Development Potential | | **More permanent infrastructure has been associated with higher development potential** |
| **Finding** | **Carry forward** | **Dismiss** |

Exhibit 27 presents the results of the differentiating criteria for the rail comparison.

**Exhibit 27: Differentiating Criteria: Rail**

| Criterion | Modern Streetcar | Light Rail |
|---|---|---|
| Traffic | **Potential for lessening traffic impact using shared use lanes**<br><br>**Shared use lanes could also narrow lane widths** | |
| Parking Impacts | **Modern Streetcar could decrease parking impact using shared use lanes** | |
| Construction | **Modern Streetcar could decrease parking impact using shared use lanes** | |
| Right-of-Way | **Modern Streetcar could require less right-of-way to accommodate various users** | |
| **Finding** | **Carry forward** | **Dismiss** |

## 6.3 Decisions: What Alignments?

The next significant PAC decision of the Detailed Evaluation phase was to decide what alignments would be dismissed or carried forward. The PAC first considered using existing streets or the CP Spur (W. 7th Street or CP Spur, and St. Paul Avenue or CP Spur), and then the River Crossing (Hwy 5 or Ford Parkway). As is typical for pre-project development studies, the No Build alternative will be carried forward into future project phases as a basis for comparison.

### Street vs. CP Spur

The results of the differentiating criteria for the street or CP Spur comparisons are shown in Exhibit 28 and Exhibit 29. For reference, green, bold text denotes the alignment showing an advantage with a particular criterion. However, in evaluating alignments using streets vs. the CP Spur, the decision was to carry forward both options for future environmental review and engineering phases of the selected Riverview LPA.

**Exhibit 28: Differentiating Criteria: W. 7th Street vs. CP Spur**

| Criterion | W. 7th Street | CP Spur |
|---|---|---|
| Capital Cost (2015$) | **W. 7th Street is ~40M (Bus/BRT) to $80M (Rail) less expensive** | |
| Right-of-Way | **W. 7th Street does not require ~$40M CP Spur property acquisition (excludes CP Yard)** | |
| Parking | | **CP Spur would not remove parking** |
| Construction | W. 7th Street will have road and sidewalk construction regardless of Riverview project | **CP Spur has fewer construction impacts** |
| **Finding** | **Carry forward for environmental review** | **Carry forward for environmental review** |

**Exhibit 29: Differentiating Criteria: St. Paul Avenue vs. CP Spur**

| Criterion | St. Paul Avenue | CP Spur |
|---|---|---|
| Capital Cost (2015$) | **Staying within roadway right-of-way to the Ford Site is cheaper (W. 7th Street + St. Paul Avenue)** | |
| Right-of-Way | **St. Paul Avenue does not require ~$40M CP Spur property acquisition (excludes CP Yard)** | |
| **Finding** | **Carry forward for environmental review** | **Carry forward for environmental review** |

### Hwy 5 vs. Ford Pkwy

The results of the differentiating criteria for the river crossing comparison are shown in Exhibit 30.

**Exhibit 30: Differentiating Criteria: River Crossing**

| Criterion | Hwy 5 | Ford Parkway |
|---|---|---|
| Ridership | **Total: 19,000-20,000<br>New: 1,500-2,500** | Total: 18,000-19,000<br>New: 1,000-2,000 |
| Travel Time | **44 minutes** | 55 minutes |
| Capital Cost (2015$) | $1.0B-$1.4B | $1.2B-$1.5B |
| Operating and Maintenance Cost (2015$) | **$24M per year** | $28M per year |
| Cost per Rider | **$10-$12** | $12-$14 |
| Mississippi River | | **Presumes use of existing bridge** |
| Population and Employment | | **Near more people, households, jobs** |
| Development Potential | | **Directly serves Ford Site, single largest redevelopment site** |
| Affordable Housing | | **Directly connects existing affordable housing at VA** |
| Activity Centers | | **Routes have 5 more activity centers** |
| **Finding** | **Conduct focused evaluation for further differentiation** | **Conduct focused evaluation for further differentiation** |

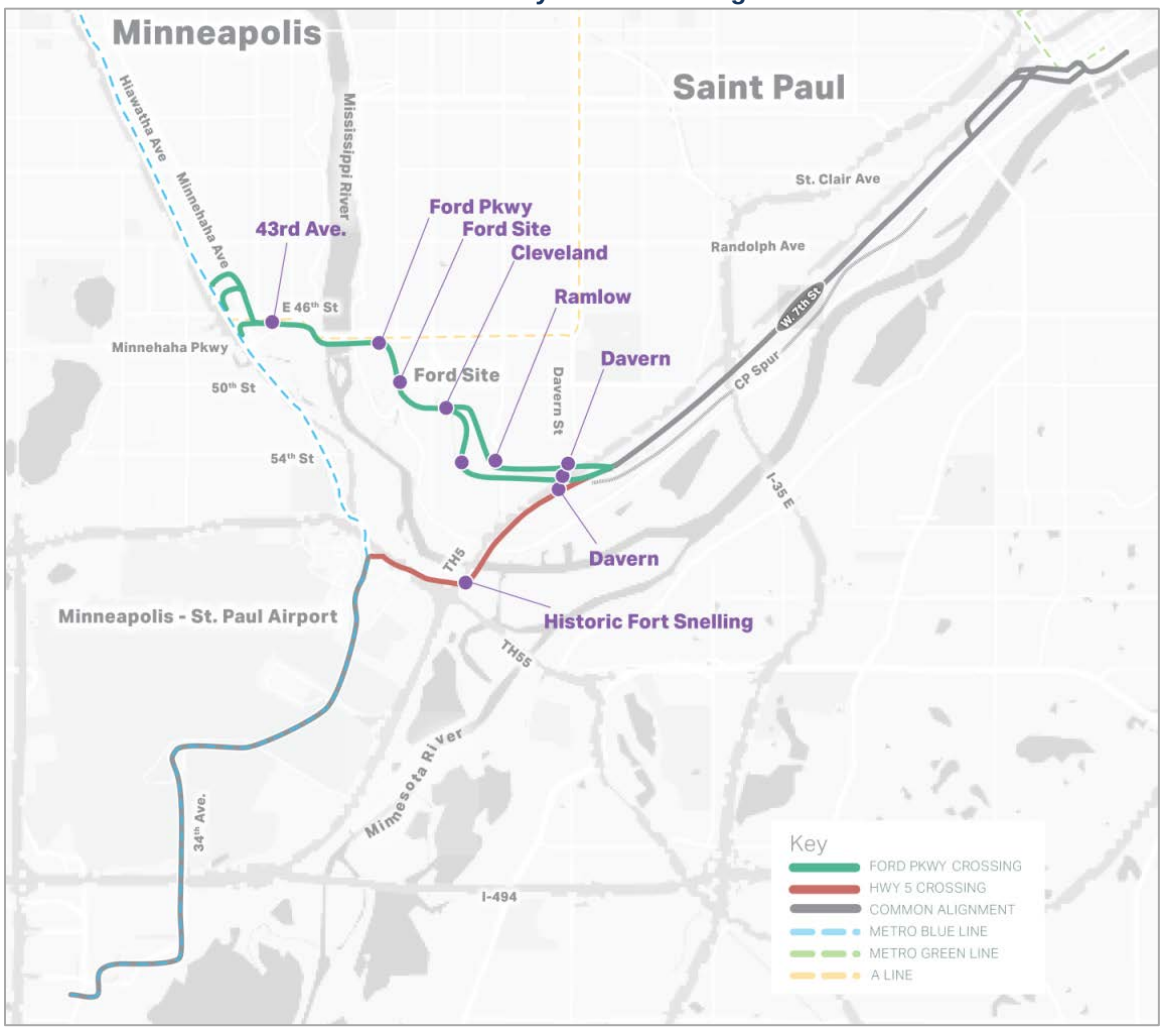
## 6.4 Focused Evaluation of Rail Alternatives by River Crossing

Exhibit 31 illustrates the two existing river crossings – at Hwy 5 and Ford Parkway. This focused analysis arose from discussions between the TAC, PAC, and public. Specifically, the results of the detailed evaluation seemed to suggest little or no differentiation by river crossing, as shown in Exhibit 30. This focused analysis, therefore, drilled down on the information previously developed for the detailed definition and evaluation of alternatives to answer the following key questions:

1. Travel market: How do Ford Site trips differ from W. 7th Street trips?
2. Ridership: How do ridership forecasts for Ford Parkway alternatives differ from Hwy 5 alternatives?
3. Cost: How does cost for Ford Parkway alternatives differ from Hwy 5 alternatives?

The methodology and detailed results of this focused evaluation can be found in Memorandum: Focused Evaluation of Rail Alternatives by River Crossing, available under separate cover.

**Exhibit 31: Generalized Rail Alternatives by River Crossing**




## Findings

1. Travel market: How do Ford Site trips differ from W. 7th Street trips?
   The Ford Parkway crossing/Ford Site is a distinct travel market from Hwy 5 crossing/W. 7th Street. The key differences lie in the proportion of trips to/from Minneapolis, downtown Saint Paul, and the rest of the Riverview Corridor. For example, nearly one-third of trips crossing at Ford Parkway travel to/from Minneapolis compared to only nine percent of trips crossing at Hwy 5. Only two percent of trips crossing at Ford Parkway travel to/from downtown Saint Paul compared to 10 percent of trips crossing at Hwy 5.

2. Ridership: How do ridership forecasts for Ford Parkway alternatives differ from Hwy 5 alternatives?
   Year 2040 forecasts indicate that crossing at Ford Parkway would:

   - Add approximately 3,300 boardings between Davern Street and the Fort Snelling park-and-ride station

- Decrease the number of boardings along the rest of the alignment, most notably by 1,600 in Bloomington South Loop, and by 2,700 along W. 7th Street and downtown Saint Paul, resulting in a net decrease of 4,700.[3]
- Require continued operation of Route 54 service between downtown Saint Paul and the Mall of America. The 2040 average weekday boardings for Route 54 under this scenario is 5,300.
- Decrease ridership on a few key bus routes in the corridor.

3. Cost: How does cost for Ford Parkway alternatives differ from Hwy 5 alternatives?
   Overall, a rail alternative crossing at Ford Parkway would cost slightly more than one at Hwy 5. Some key factors to account for are:

   - Nature of route – Crossing at Ford Parkway entails the cost of a longer route, more stations, site preparation (CP Yard), and more rail vehicles
   - River crossing – Retrofitting the existing Ford Parkway Bridge would cost significantly less than constructing a new structure at or near Hwy 5
   - Blue Line tie-in – However, connecting to the existing Blue Line appears complex and costly, regardless of whether a Riverview rail line crosses at Ford Parkway or Hwy 5
   - Estimated O&M cost – Crossing at Ford Parkway is $28 million, vs. $24 million crossing at Hwy 5.[4]

## 6.5 Summary of Findings

Exhibit 32 presents the overall findings with respect to the 10 Most Promising Alternatives:

- Dismissed Dedicated BRT and LRT alternatives
- Carry forward for future environmental review/engineering phases– Alignment options using streets and CP Spur
- Ford Parkway vs. Hwy 5 river crossing – Each serves a distinct travel market. Connecting a Riverview modern streetcar line to the existing Blue Line appears to be a challenge with both alternatives.

[3] Includes 400 along Airport segment
[4] In year 2015 dollars.

**Exhibit 32: Summary of Findings: Mode**

**No-Build Alternative (Route 54)** (Alternative 1) — CARRY FORWARD

- Basis of comparison for other alternatives
- Has the least cost of all alternatives
- Would not change existing traffic, transit, pedestrian and parking uses or patterns in the corridor
- Unlikely to change existing land use and development patterns

**Arterial BRT** (Alternative 2) — CARRY FORWARD

- Would improve service and infrastructure relative to the No-Build alternative at a relatively low cost
- Could result in increased ridership relative to the No-Build
- May change existing land use and development patterns

**Modern Streetcar** (Alternatives 4b, 6, 8, and 10b) — CARRY FORWARD

- Would provide highest level of improvement to transit service and infrastructure relative to the No-Build
- Would double transit ridership along the corridor relative to the No-Build
- Would have the highest capital and operating and maintenance costs
- Most likely to change existing land use and development patterns

**Dedicated BRT Alternatives** (Alternatives 3, 5, 7, 9) — DISMISS

- Higher capital and operating and maintenance costs than Arterial BRT are not commensurate with incremental benefits such as ridership
- Cost per rider is $3 to $6 more than Arterial BRT
- Development potential is greater than Arterial BRT, but substantial differences are limited due to ~50% of the corridor not being dedicated

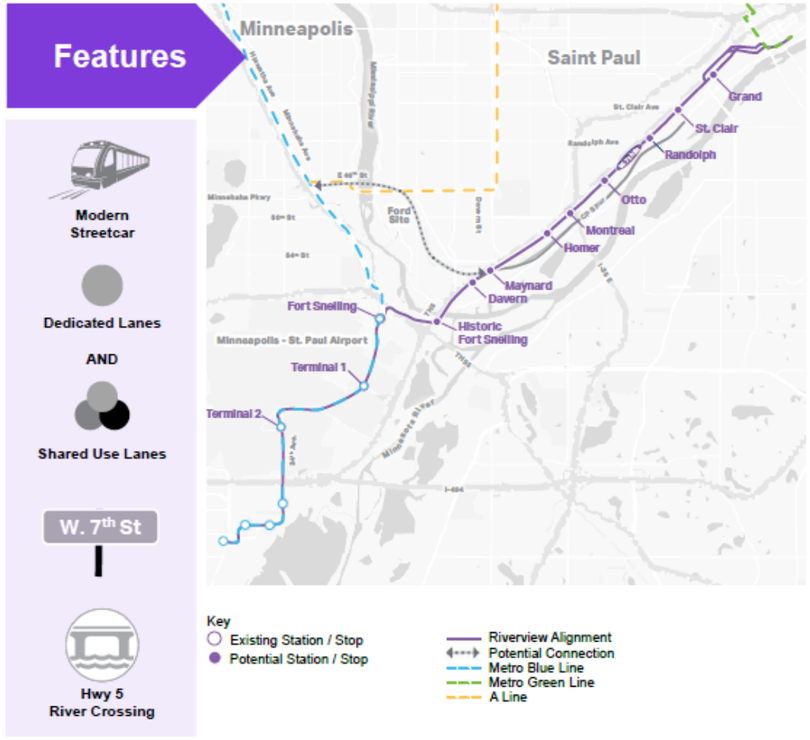
**LRT Alternatives** (Alternatives 4a and 10a) — DISMISS

- Greater traffic impact due to dedicated lanes
- Greater parking and/or sidewalk impacts due to dedicated lanes
- Greater construction impacts due to dedicated lanes

**Exhibit 33: Overall Findings for Hwy 5 Modern Streetcar Alternatives**

## Alternative 4b Modern Streetcar: W. 7th - Hwy 5 / Fort Snelling

### Features



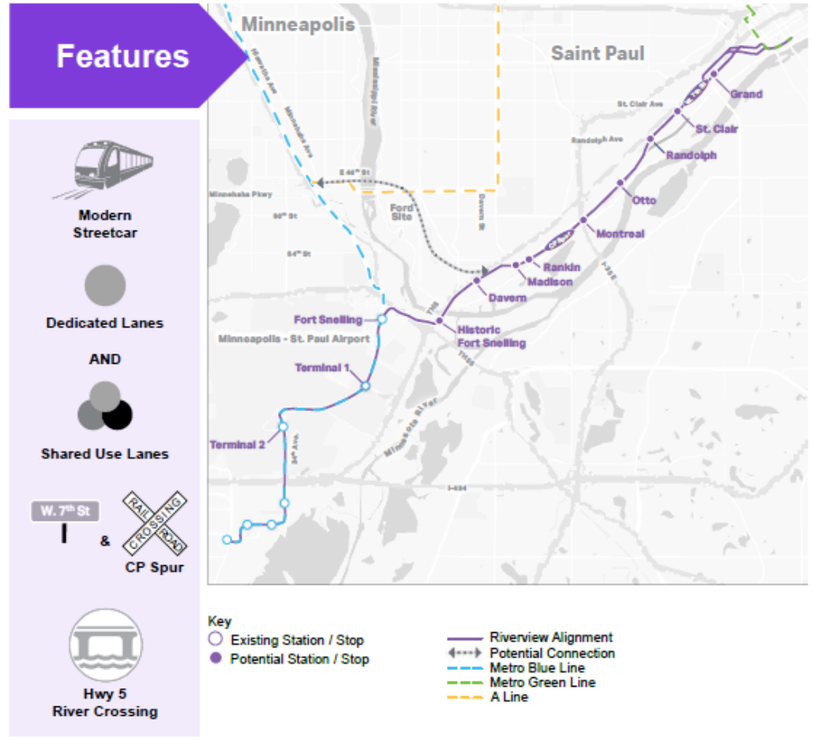

### Key Characteristics

| Route Length | Total # Stations | Travel Time | 2040 Daily Ridership Forecast | Capital Cost | O&M Cost | Cost Per Rider |
|---|---|---|---|---|---|---|
| 11.7 miles | 20 | 44 min. | Total: 20,400<br>Transit-Dependent: 4,600<br>New Riders: 2,700 | $1.0B - $1.3B | $24M | $10 - $11 |

Alternative 4b is a Modern Streetcar alternative between downtown Saint Paul and Mall of America using W. 7th St and Hwy 5. This alternative would tie-in to the Green Line in downtown Saint Paul at Cedar St and 5th/6th St, and the Blue Line at Fort Snelling. This alternative would necessitate a new bridge adjacent to or replacing the existing Hwy 5 bridge and could include a tunnel under Historic Fort Snelling.

## Alternative 10b Modern Streetcar: W. 7th - CP Spur - Hwy 5 / Fort Snelling

### Features




### Key Characteristics

| Route Length | Total # Stations | Travel Time | 2040 Daily Ridership Forecast | Capital Cost | O&M Cost | Cost Per Rider |
|---|---|---|---|---|---|---|
| 11.9 miles | 20 | 43 min. | Total: 19,600<br>Transit-Dependent: 4,500<br>New Riders: 2,200 | $1.1B - $1.4B | $24M | $10 - $12 |

Alternative 10b is a Modern Streetcar alternative between downtown Saint Paul and Mall of America using W. 7th St, the CP Spur, and Hwy 5. This alternative would tie-in to the Green Line in downtown Saint Paul at Cedar St and 5th/6th St, and the Blue Line at Fort Snelling. This alternative would necessitate a new bridge adjacent to or replacing the existing Hwy 5 bridge, and could include a tunnel under Historic Fort Snelling and land bridge between the CP Spur and Montreal Ave over I-35E.

**Exhibit 34: Overall Findings for Ford Parkway Modern Streetcar Alternatives**

## Alternative 6 Modern Streetcar: W. 7th - Ford Site

### Features

Modern Streetcar

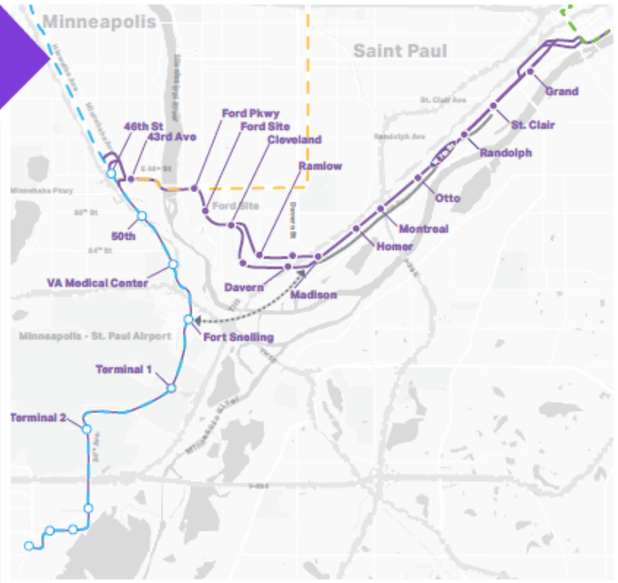
Dedicated Lanes

AND

Shared Use Lanes

W. 7th St & St. Paul Ave — CP Spur

Ford Pkwy River Crossing




Key
- Existing Station / Stop
- Potential Station / Stop
- Riverview Alignment
- Potential Connection
- Metro Blue Line
- Metro Green Line
- A Line

### Key Characteristics

| Route Length | Total # Stations | Travel Time | 2040 Daily Ridership Forecast | Capital Cost | O&M Cost | Cost Per Rider |
|---|---|---|---|---|---|---|
| 15.7 miles | 27 | 56 min. | Total: 19,000<br>Transit-Dependent: 4,400<br>New Riders: 1,800 | $1.2B - $1.4B | $28M | $12 - $14 |

Alternative 6 is a modern streetcar alternative between downtown Saint Paul and Mall of America using W. 7th St, St. Paul Ave or the CP Spur, Ford Pkwy, 46th St, Minnehaha Ave, and 43rd St. This alternative would tie-in to the Green Line in downtown Saint Paul at Cedar St and 5th/6th St, and the Blue Line at 46th St. This alternative would necessitate retrofitting the Ford Pkwy bridge and a bridge or tunnel under Hwy 55 to cross the SOO Line tracks at 43rd St.

## Alternative 8 Modern Streetcar: W. 7th - CP Spur - Ford Site

### Features

Modern Streetcar

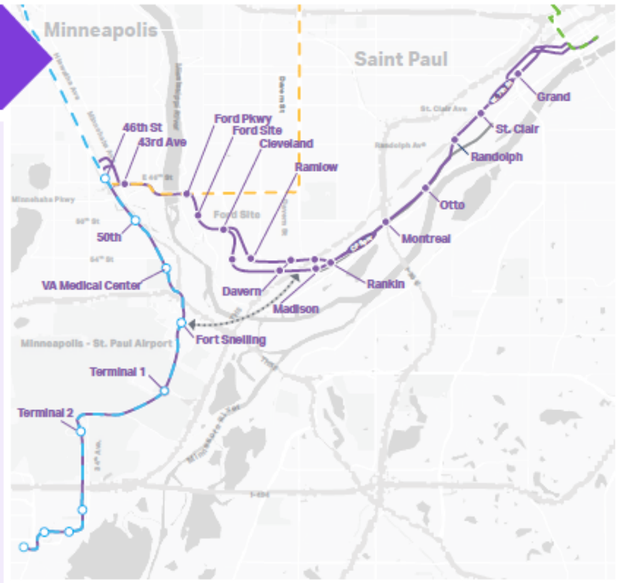
Dedicated Lanes

AND

Shared Use Lanes

W. 7th St & St. Paul Ave — CP Spur

Ford Pkwy River Crossing




Key
- Existing Station / Stop
- Potential Station / Stop
- Riverview Alignment
- Potential Connection
- Metro Blue Line
- Metro Green Line
- A Line

### Key Characteristics

| Route Length | Total # Stations | Travel Time | 2040 Daily Ridership Forecast | Capital Cost | O&M Cost | Cost Per Rider |
|---|---|---|---|---|---|---|
| 15.8 miles | 27 | 54 min. | Total: 18,400<br>Transit-Dependent: 4,200<br>New Riders: 1,500 | $1.2B - $1.5B | $28M | $12 - $14 |

Alternative 8 is a modern streetcar alternative between downtown Saint Paul and Mall of America using W. 7th St, St. Paul Ave or the CP Spur, Ford Pkwy, 46th St, Minnehaha Ave, and 43rd St. This alternative would tie-in to the Green Line in downtown Saint Paul at Cedar St and 5th/6th St, and the Blue Line at 46th St. This alternative would necessitate retrofitting the Ford Pkwy bridge and a bridge or tunnel under Hwy 55 to cross the SOO Line tracks at 43rd St, and could include a land bridge between the CP Spur and Montreal Ave over I-35E.

# 7.0 RIVERVIEW LPA AND FORD CORRIDOR


## 7.1 Riverview LPA

In December 2017, the PAC approved the Riverview LPA: modern streetcar from Union Depot in downtown Saint Paul to Minneapolis/St. Paul Airport and the Mall of America along W. 7th Street and crossing the Mississippi River near the Hwy 5 Bridge. The PAC considered community input on the draft LPA at the November 2017 public hearing before ultimately approving it in December 2017. Community input received on the draft LPA at the public hearing included both comments supportive and not supportive of the LPA:

**Supportive of LPA**

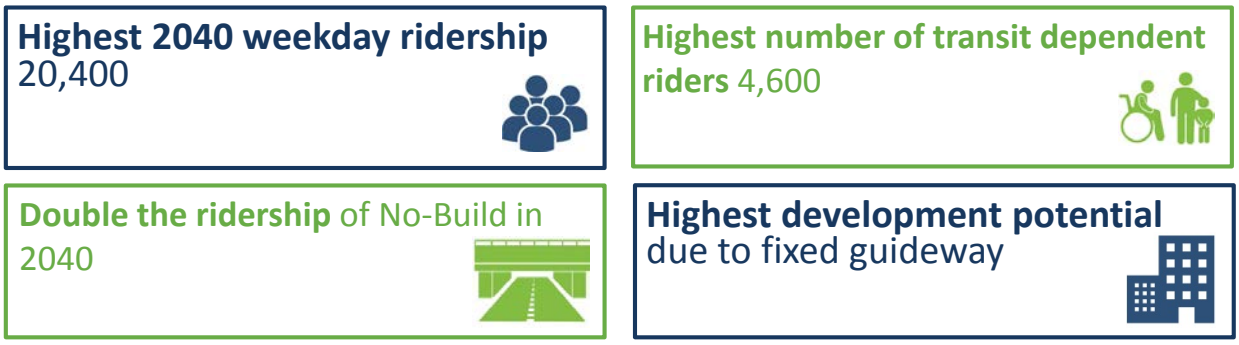
- Support for improved transit on W. 7th Street regardless of mode
- Improve pedestrian and bicyclist amenities as part of construction
- Direct access to businesses and residents on W. 7th Street
- More direct service between downtown Saint Paul and MSP Airport
- Modern streetcar attracts new riders and meets the transportation needs of a growing population
- Modern streetcar more accessible for people with disabilities
- Modern streetcar improves region's "competitiveness" for new companies and employees

**Not supportive of LPA**

- Potential for tax increases to support transit investment
- Loss of historic small businesses and homes
- Gentrification
- Personal security on transit
- Fare evasion
- Pedestrian and bicyclist safety concerns

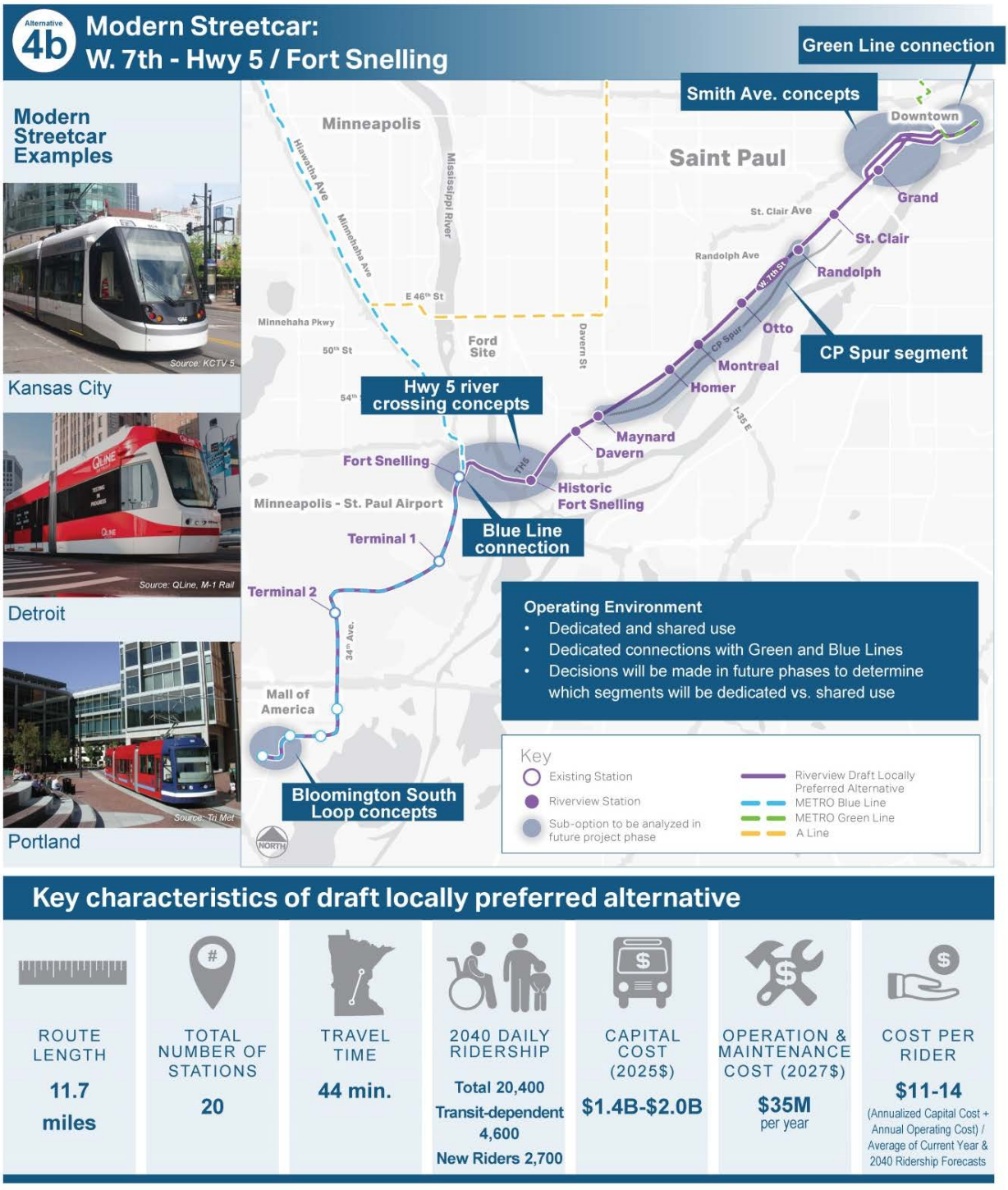
In addition to the public input, the PAC considered that the LPA was found to best meet the Purpose and Need (Exhibit 35).

**Exhibit 35: Purpose and Need and the LPA**




Additionally, the Detailed Evaluation results for the LPA indicate that it would be the strongest corridor alternative for the Federal Transportation Administration's Capital Investment Grant funding. The draft Capital Investment Grant program ratings can be found in Memorandum: Preliminary FTA Project Justification Rating, available under separate cover. The Riverview LPA is summarized in Exhibit 36.

**Exhibit 36: Riverview LPA Summary**



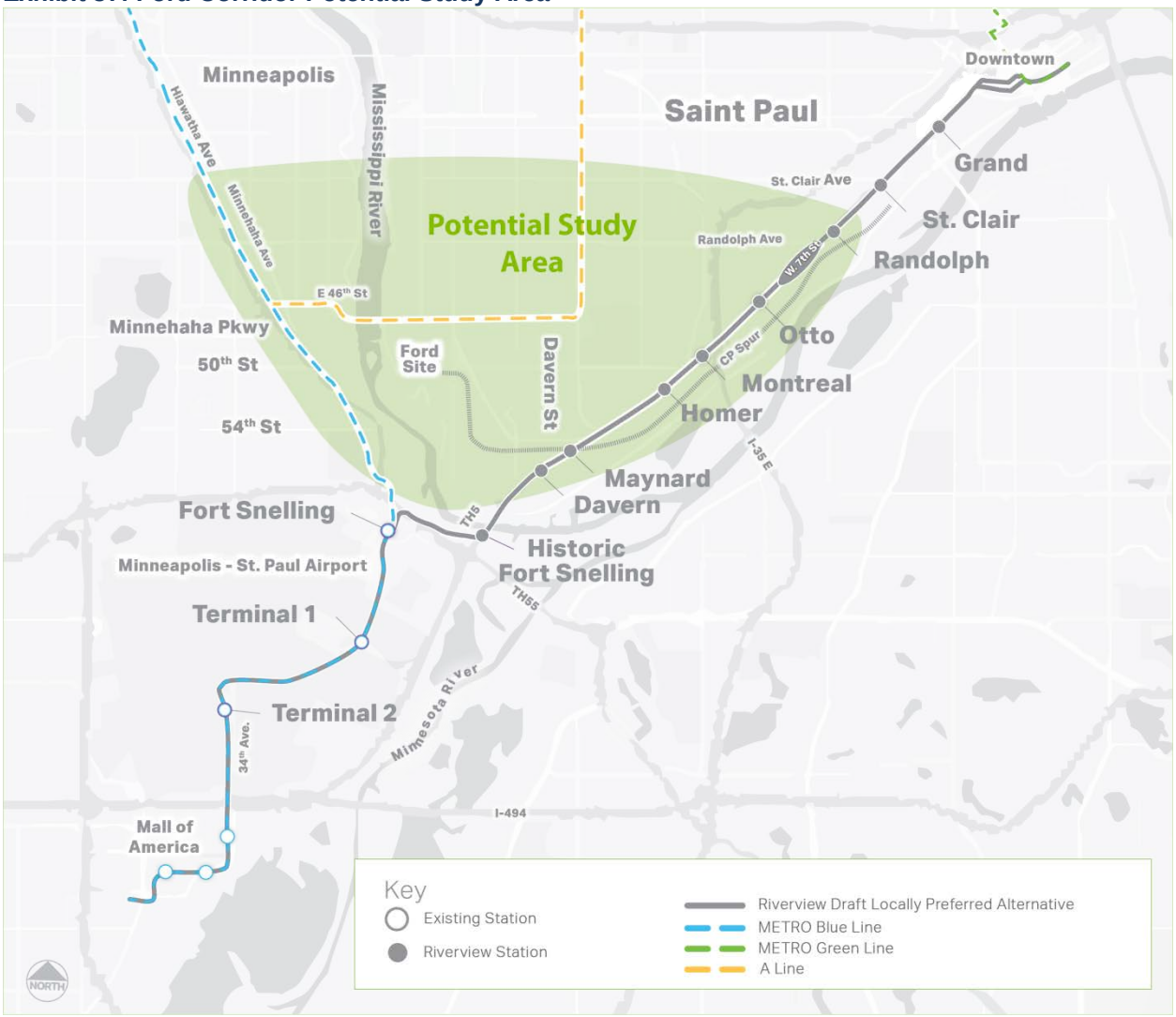

## Key characteristics of draft locally preferred alternative

| ROUTE LENGTH | TOTAL NUMBER OF STATIONS | TRAVEL TIME | 2040 DAILY RIDERSHIP | CAPITAL COST (2025$) | OPERATION & MAINTENANCE COST (2027$) | COST PER RIDER |
|---|---|---|---|---|---|---|
| 11.7 miles | 20 | 44 min. | Total 20,400<br>Transit-dependent 4,600<br>New Riders 2,700 | $1.4B-$2.0B | $35M per year | $11-14 (Annualized Capital Cost + Annual Operating Cost) / Average of Current Year & 2040 Ridership Forecasts |

## 7.2 Ford Corridor

As a part of the decision to approve the Riverview LPA, the PAC endorsed the completion of two separate studies related to the Ford Corridor and Highland Park. The first study will identify and implement feasible, near-term transit improvements to better serve Highland Park. The second study will develop and analyze alternatives to connect the Ford Site to the Riverview Corridor and the Blue Line in Minneapolis. Exhibit 37 depicts the potential study area of the Ford Corridor for the approved transit studies. The premise of this decision is to address the need for a connected transit system between the distinct travel markets associated with the Ford Parkway river crossing and Hwy 5 river crossing.

**Exhibit 37: Ford Corridor Potential Study Area**



# 8.0 IMPLEMENTATION PLAN

## 8.1 Riverview LPA

The Riverview LPA implementation plan entails several steps before initiating FTA coordination and the Project Development phase. The comprehensive implementation plan is detailed in Report 9: Implementation Plan, under separate cover. Specifically, the implementation plan contains a range of implementation methods that could be used, the potential project schedules based on the implementation method, agency roles, anticipated agreements, and adjacent project coordination. It is recommended that the evaluation of the defined implementation methods be completed in the next phase of the project.

The Study has identified several considerations for future environmental review and engineering phases of the selected Riverview LPA. The LPA entails retaining some route and operating environment options for future environmental analysis and engineering, as summarized below:

**Route**

- Downtown Saint Paul: Green Line connection
- Seven Corners: Smith Avenue concepts
- CP Spur segment parallel to W. 7th Street
- Hwy 5 river crsosing concepts
- Bloomington South Loop concepts

**Operating environment**

- Dedicated and shared use
- Center- or side-running

Additionally, several technical issues have been identified to be solved in future environmental review and engineering phases of the selected Riverview LPA (Exhibit 38).

**Exhibit 38: Riverview LPA Technical Issues**

| Location | Issue |
|---|---|
| **Downtown Saint Paul** | • Connection with Green Line and 5th / 6th Streets |
| **Seven Corners** | • Business impacts<br>• Transit operations<br>• Hospital access/operations<br>• Events (Xcel, street festivals, etc.) |
| **Trunk – W. 7th Street** | • On-street parking<br>• Construction impacts<br>• Traffic operations |
| **Trunk – CP Spur** | • Reduces on-street parking impacts<br>• Impacts to adjacent residences<br>• Away from activities on W. 7th Street |
| **Hwy 5 River Crossing** | • Bridge/tunnel is eligible for National Register of Historic Places<br>• Reconstruct Hwy 5 bridge, build a new bridge, or consider retrofitting existing Hwy 5 bridge<br>• Historic Fort Snelling impacts: Blue Line connection options, access, impacts to parkland and historic resources |

Beyond the technical issues identified by location, there are other more general technical issues to be considered in future environmental review and engineering phases of the selected Riverview LPA, including but not limited to:

- Right-of-way
- Utility relocation/improvements
- Construction impacts
- Pedestrian and bicycle accommodations
- Connection to the Blue Line and Green Line
- Coordination with MSP airport

As the Riverview LPA moves forward into the next project phases, it is likely that more technical, community, and environmental issues will emerge. Ultimately, there is a need for to continue coordination between agencies, and with neighborhoods and businesses to address potential impacts during future environmental review and engineering phases of the selected Riverview LPA.

## 8.2 Ford Corridor

The PAC decision to support the initiation of two separate transit studies to serve the Ford Corridor entails an implementation plan with a broad view of potential transit solutions. The PAC has requested the completion of a study of near-term transit improvements in the Highland Park neighborhood, as well as a study of medium to long-term transit improvements to serve the future Ford Site development. Whereas, by selecting a Hwy 5 alternative as the Riverview LPA, the PAC

has recognized the need for the City of Saint Paul, Metro Transit, and the Ramsey County Regional Railroad Authority to work in consultation with Hennepin County Regional Railroad Authority and the City of Minneapolis to develop and deliver separate transit, livability, and economic development investments to the Ford Corridor as soon as possible.

The next steps for the Ford Corridor studies are summarized as follows:

- Identify funding partners
- Identify study lead/co-leads
- Develop and execute necessary inter-agency agreements
- Develop work plan, schedule, and budget
- Establish distinct advisory committees
- Identify and adopt locally preferred alternative and determine next steps

Although the Ford Corridor will move forward as a separate transit corridor from the Riverview Corridor, both will influence one another in the future phases of each project.

## 9.0 LIST OF STUDY DOCUMENTS UNDER SEPARATE COVER

| Title | Date |
|---|---|
| Report #1: Project Management Plan | December 2014 |
| Report #2: Quality Management Plan | December 2014 |
| Report #3: Public Engagement Plan | March 2015 |
| Report #4: Travel Demand Forecasting Methodology | September 2016 |
| Report #5: Capital Cost Methodology | February 2016 |
| Supplement: Basis of Estimate | February 2018 |
| Report #6: Operations and Maintenance Cost Estimating Methodology | February 2016 |
| Supplement: O&M Cost Estimates | February 2018 |
| Report #7: Detailed Definition of Alternatives | February 2018 |
| Report #9: Implementation Plan | February 2018 |
| Technical Memorandum #1: Previous and Work-In-Progress Transportation Planning | March 2015 |
| Technical Memorandum #2: Transit Travel Demand Market Analysis | August 2015 |
| Technical Memorandum #3: Development Market Analysis | August 2015 |
| Supplement: Update on Strategic Development Areas | January 2017 |
| Technical Memorandum #4: Purpose and Need Statement | August 2015 |
| Technical Memorandum #5: Initial Screening | March 2016 |
| Supplement: Technical Screening | May 2017 |
| Technical Memorandum #6: Year 2040 Service Plans | February 2018 |
| Technical Memorandum #7: Transportation | February 2018 |
| Technical Memorandum #8: Community Issues | February 2018 |
| Technical Memorandum #9A: Environmental Resources | February 2018 |
| Technical Memorandum #9B: Station Areas | February 2018 |
| Memorandum: Six Additional BRT Alternatives | February 2018 |
| Memorandum: Focused Evaluation of Rail Alternatives by River Crossing | February 2018 |
| Memorandum: Preliminary FTA Project Justification Rating | February 2018 |
| Memorandum: Preliminary Draft Concepts of LPA | February 2018 |

# Appendix A: Advisory Committee Memberships

**Policy Advisory Committee**

| Name | Title | Organization |
|---|---|---|
| Kristin Beckmann | Deputy Mayor | City of Saint Paul |
| Tim Busse | Councilmember | City of Bloomington |
| Jon Commers | Councilmember | Metropolitan Council |
| Pat Mancini | Owner, Mancini's Char House | Riverview Corridor Business Representative |
| Scott McBride | Metro District Engineer | Minnesota Department of Transportation |
| Peter McLauglin | Commissioner | Hennepin County Regional Railroad Authority |
| Rebecca Noecker | Councilmember – Ward 2 | City of Saint Paul |
| Rafael Ortega | Commissioner | Ramsey County Regional Railroad Authority |
| John Regal | Board Chair | Saint Paul Area Chamber of Commerce |
| Bridget Rief | Director of Airport Development Department | Metropolitan Airports Commission |
| Laurel Severson | Citizen | Riverview Corridor Citizen Representative |
| Chris Tolbert | Councilmember - Ward 3 | City of Saint Paul |
| Peter Wagenius | Policy Director | City of Minneapolis |

## Technical Advisory Committee

| Name | | Organization/Representing |
|---|---|---|
| Scott | Banaszynski | Allina Health |
| Inyan | Canupa Winyan Walking Elk | American Tribal Representative |
| Carrie | Christensen | Minneapolis Park & Recreation Board |
| Katie | DiSanto | Saint Paul Area Chamber of Commerce |
| Innocent | Eyoh | Minnesota Pollution Control Agency |
| Mark | Finken | Saint Paul Public Works |
| Jon | Fure | CapitolRiver Council |
| Tim | Griffin | Saint Paul Riverfront Corporation |
| Laurie | Hansen | Saint Paul Port Authority |
| Chuck | Hubbard | Canadian Pacific Railway |
| Anton | Jerve | Saint Paul Planning and Economic Development |
| Dan | Kueny | Transit Dependent Community Representative |
| Bill | Lindeke | City of Saint Paul – Ward 2 |
| Joe | Lux | Ramsey County Public Works |
| Lisa | Mandell | U.S. Fish and Wildlife Service |
| Gina | Mitteco | MnDOT Metro District |
| Pat | Mosites | Metropolitan Airports Commission |
| Susan | Overson | National Park Service |
| Larry | Peterson | Minnesota Department of Natural Resources |
| Emma | Pachuta | Transit for Livable Communities/Saint Paul Smart Trips |
| Tom | Pfannenstiel | Minnesota Historical Society |
| Don | Pflaum | City of Minneapolis |
| Neil | Ralston | Metropolitan Airports Commission |
| Alan | Robbins-Fenger | National Park Service |
| Mike | Rogers | Ramsey County Regional Railroad Authority |
| Schane | Rudlang | City of Bloomington |
| Joe | Scala | Hennepin County Regional Railroad Authority |

| Name | | Organization/Representing |
|---|---|---|
| Heidi | Schallberg | Metropolitan Council |
| Gary | Thompson | Highland District Council |
| Scott | Thompson | Metro Transit |
| David | Thune | West 7th Street/Fort Road Federation |
| Justin | Weingartz | Government Services Administration |

**Project Management Team**

| Name | | Organization/Representing |
|---|---|---|
| Joe | Gladke | Hennepin County |
| Anton | Jerve | Saint Paul Planning and Economic Development |
| Craig | Lamothe | Metro Transit |
| Tim | Mayasich | Ramsey County Regional Railroad Authority |
| Gina | Mitteco | MnDOT Metro District |
| Mike | Rogers | Ramsey County Regional Railroad Authority |
| Kevin | Roggenbuck | Ramsey County Regional Railroad Authority |
| Joe | Scala | Hennepin County |
| Heidi | Schallberg | Metropolitan Council |
| Amy | Canfield | AECOM |
| April | Manlapaz | AECOM |
| Joy | Miciano | Zan Associates |
| Gavin | Poindexter | AECOM |
| Nancy | Stavish | AECOM |

# Appendix B: Freight Memorandum

# TECHNICAL MEMORANDUM

From: AECOM Consultant Team, April Manlapaz

To: Mike Rogers, Project Manager RCRRA

Topic: Canadian Pacific Corridor Evaluation

## 1.0 INTRODUCTION

The Riverview Corridor is an approximately 12-mile transportation route that runs from Union Depot in downtown Saint Paul to Minneapolis-Saint Paul International Airport (MSP Airport) and the Mall of America. It connects neighborhoods, historic districts, businesses, thriving commercial districts and downtown Saint Paul to the regional transportation network. The corridor study area includes Saint Paul Lowertown, Downtown Saint Paul, Upper Landing, West 7th Street area, Highland Park (including the Ford redevelopment site), MSP Airport, Bloomington's South Loop and Mall of America.

The alternatives analysis has identified segments of the Canadian Pacific (CP) owned and operated CP Merriam Park Subdivision and CP Ford Line Spur ('CP Spur') as potential transit routes. As an overview, the primary ("trunk") transit routes include the following:

- Dedicated Transit on West 7th Street – The transitway is an exclusive guideway operating in West 7th Street. This does not include the use of any CP rail corridors.
- Hybrid Alternative on West 7th Street and the CP Rail – The transitway is a combination of exclusive guideway on street, shared guideway on street, and exclusive guideway on CP Spur corridor.
- CP's rail corridor for rail transit – The transitway is an exclusive guideway (with potential hybrid suboptions).

This memorandum reviews the operating characteristics and railway site descriptions of the existing CP Merriam Park Subdivision from Mile Post (MP) 410 (vicinity of Saint Paul Union Depot, Saint Paul) to MP 412 and CP Spur, Fordson Junction, MP 0.0 (vicinity of Grace Street and Western Avenue South, Saint Paul) to End of Track at MP 4.2, the former Ford Plant Rail Yard (vicinity of West Hampshire Avenue and Cleveland Avenue South, Saint Paul. This narrative corresponds to **Appendix A** "Union Depot Track Operations," and **Appendix B** "Existing Railroad Conditions". Mileposts and map locations identified are approximate, based on the CP Track Charts and other available information including Google Earth.

This memorandum also reviews the temporal separation and spatial separation considerations of the West 7th Street Hybrid Transit and CP's rail corridor for rail transit options.

## 2.0 CURRENT TRAIN OPERATIONS

Current regular train movements on the Merriam Park Subdivision are 2 daily AMTRAK Passenger Trains (The Empire Builder) and from 2 to 4 Twin Cities and Western Railroad (TC&W) daily freight trains operating under trackage agreements. CP has not regularly operated through freight trains on this subdivision since the early 1990's when the operation of these trains was rerouted to another railway's subdivisions.

CP has not provided service on the Ford Line Spur following the closure of the Ford Plant in December 2011. As of this writing, the three customer sidings noted in **Appendix B** are not receiving rail service at this time. The sidings are likely being held in reserve by the businesses the sidings would serve in case there was a need for rail movements for their goods and services.

The CP Spur parallels, but does not connect with, an existing Union Pacific Railroad (UPRR) Industrial Spur from Fordson Junction for approximately 1500 feet southwest from Grace Street and Western Avenue S. to Palace Avenue and Duke Street, Saint Paul. The UPRR Spur services a grain processing facility and Finished Vehicle Transload Center, both in the vicinity of Randolph Avenue and Erie Streets. The UPRR Spur would be required to be retained if the Ford Line Spur was used for the rail transit and Hybrid Transit Options in this vicinity.

## 3.0 EXISTING GRADE CROSSINGS

The Merriam Park Subdivision in the study area includes two fully-protected grade crossings west of Saint Paul Union Depot, used by CP and other railways' train movements including AMTRAK, TC&W and UPRR. The CP Spur includes a number of grade crossings where warning devices are in service and maintained under the current status of the Spur. The crossings have active or passive warning devices that are maintained in working order as the rail line is technically considered to be active. The number and proximity of crossings would need further evaluation to determine the impacts to the neighborhoods in terms of safety, noise/vibration, and overall neighborhood impacts. **Appendix C** "Existing Railroad Conditions Right-of-Way Widths" includes maps of the grade crossing locations and a list of public roadway crossings and warning devices currently in place.

Both the Merriam Park Subdivision's and CP Spur's grade crossings are currently part of a Continuous Quiet Zone (C.Q.Z.) from Merriam Park MP 410.96 and the entire CP Spur.

When a C.Q.Z. is not in effect, Federal regulation requires that locomotive horns begin sounding 15–20 seconds before entering public highway-rail grade crossings, no more than one-quarter mile in advance. Only a public authority, the governmental entity responsible for traffic control or law enforcement at the crossings, is permitted to create Quiet Zones.

The Federal Railroad Administration (FRA) defines a Quiet Zone as a section of a rail line at least one-half mile in length that contains one or more consecutive public highway-rail grade crossings at which locomotive horns are not routinely sounded when trains are approaching the crossings. The prohibited use of train horns at Quiet Zones only applies to trains when approaching and entering crossings and does not include train horn use within passenger stations or rail yards. Train horns may be sounded in emergency situations or to comply with other railroad or FRA rules even within a Quiet Zone. Quiet Zone regulations also do not eliminate the use of locomotive bells at crossings.

Therefore, a more appropriate description of a designated Quiet Zone would be a “reduced train horn area.”

Communities wishing to establish Quiet Zones must work through the appropriate public authority that is responsible for traffic control or law enforcement at the crossings.

The establishment of a Quiet Zone for a Diesel Multiple Unit (DMU)-type operation on FRA-regulated railroad infrastructure or Light Rail Transit (LRT) operation adjacent to existing FRA-regulated railroad infrastructure would need to be evaluated, negotiated, engineered and approved to ensure compliance with the current FRA conditions and regulations governing the creation of a new Quiet Zone, regardless of the present C.Q.Z. designations of the CP Merriam Park Subdivision and the CP Spur.

The official regulations governing the use of locomotive horns at public highway-rail grade crossings and the establishment of Quiet Zones are contained in 49 CFR Part 222 and a copy of the rule can be downloaded or printed at: http://www.fra.dot.gov/eLib/Details/L02809.

Quiet Zones under FRA regulations do not exist for FTA-regulated transit properties. The selection of the LRT or DMU options to operate exclusively on the former CP Spur would permit the creation of “quiet zones” to mitigate noise and vibration of these types of operations. FTA’s guidance for noise analysis, safety infrastructure rules, and safety requirements must be followed with respect to the establishment of Quiet Zones. Mitigation for noise and vibration could follow the principal tenets of the FRA Quiet Zone regulations and these may be included for Quiet Zones for FTA-regulated transit properties.

## 4.0 EXISTING FREIGHT TRACKAGE EVALUATION

The Merriam Park Subdivision from MP 411.2 to MP 412 is a former double track right of way that was single-tracked by CP. Track centers were approximately 15 feet, following the standard Milwaukee Road design of the era when the double tracking occurred. Fifteen-foot track centers are no longer considered standard track center distances by freight railroads for adjacent tracks under current rail design standards. “Adjacent tracks” are defined as two or more tracks with track centers spaced less than 25 feet apart.

Current rail design standards generally require a minimum of 20-foot track centers for adjacent tracks. Several railroads have recently extended their lateral (spatial) track spacing to 25 feet. Tracks spaced at that distance may not cause a hazard to employees in one track from trains and equipment moving on the other track. This spacing concurs with the FRA’s requirements with respect to the spacing of tracks. Therefore, tracks spaced at 25 feet are not defined as adjacent tracks, but tracks spaced at a lesser distance will be so defined. Tracks that converge or cross will be considered as adjacent tracks in the zone through which their centers are less than 25 feet apart.

For FRA-regulated transit options such as an FRA-compliant DMU rail vehicle, a minimum of 20-foot track centers would have to be designed for adjacent tracks, with a strong probability that the owner railroads (CP and UPRR) would require 25-foot track centers so that the tracks that FRA-compliant DMU operates on would not be considered adjacent tracks under the FRA Railway Workplace Safety Rule. The selected DMU would have to be FRA-compliant for crash worthiness standards

and agreements reached with the railways' owners (CP and UPRR) to operate this equipment on their trackage or any new trackage required to operate this type of service.

For non-FRA-compliant DMU rail vehicle or LRT rail vehicle options the owner railroads (CP and UPRR) would likely require a minimum of 25 feet to 50 feet of spatial separation between their railroads' trackage to the non-FRA compliant DMU or LRT transit lines' trackage. Agreements would have to be negotiated with the railways' owners (CP and UPRR) to operate this equipment and service on all adjacent trackage constructed to operate this type of service.

Depending on the selected transitway guideways, the addition of a new second and probable third track from MP 411.2 to MP 412 with or without adjacency separation would be a costly option from a design, engineering, construction and operational perspective for this portion of the transit corridor. Additionally, the existing freight and passenger rail infrastructure in this area is physically constrained and limited due to the width of the existing railroads' rights of way and lack of available land on which a dedicated transitway guideway and freight and passenger corridor could be collocated and maintained.

The following represents details on existing freight track ownership, operations, and physical features. These are considerations in developing the alternative concepts for the Riverview Corridor.

1. MILEPOSTS: MP 410 to MP 412 (Fordson Jct.) Merriam Park Subdivision.
   MP 0.0 Fordson Jct. to end of track MP 4.2 (Cleveland Avenue) Ford Line Spur.
2. MAXIMUM RAIL GRADE MERRIAM PARK SUB: 1.25% Westward Ascending MP 411 to 412. 1.25% Eastward Descending MP 412 to 411.
3. TRACK OWNERSHIP:
   a. Union Depot Railroad (RCRRA): Saint Paul Union Depot Trackage.
   b. Joint CP/Union Pacific: MP 410.4 to MP 411.2 Merriam Park and additional lead trackage to UPRR Robert Street lift span.
   c. CP: MP 411.2 to MP 412 Merriam Park.
   d. CP: MP 0.0 to MP 4.2 Ford Line Spur.
4. TRACKAGE CONFIGURATION:

**Appendix C** "Existing Railroad Conditions Right-of-Way Widths" provides this data based on the information available from the Ramsey County Assessors GIS database.

- MP 410.4 to MP 411.2 Merriam Park: Double Track CP/UPRR excluding additional trackage to UPRR Robert Street lift span.
- MP 411.2 to MP 412 Merriam Park: Single Track CP (former Double Track right of way).
- MP 0.0 to MP 4.2 Ford Line Spur: Single Track CP.
- Customer Siding: W. James Ave/Duke Street, Approx. MP 0.5.
- Passing Siding: Otto Avenue/Victoria Way West, Approx. MP 1.4 to MP 1.8.

- Customer Siding: Glen Terrace/S. Homer Street Approx. MP 2.5 to MP 2.8.
- Customer Siding: S. Homer Street/Rankin Street Approx. MP 2.8 to MP 2.9.
- 4 Track Yard: S. Davern St/S. Prior Avenue Approx. MP 3.7 to MP 4.1.
- Customer Siding/Team Track: Prior Avenue/Cleveland Ave S. Approx. MP 4.1.
- 2 Track Yard Lead: Ramlo Place to Cleveland Avenue S. Bridge Approx. MP 4.15 to MP 4.3.
- Ford Plant Yard: West of Cleveland Avenue S. Bridge.

**5.** TRAIN CONTROL (TRACK SIGNALIZATION):

a. Centralized Train Control (CTC) between Saint Paul Yard and Merriam Park, controlled by CP Minnesota Train Dispatcher and Burlington Northern Sante Fe (BNSF) East Hump Train Dispatcher. This includes movements to/from Saint Paul Union Depot.

b. Ford Line Spur: Unsignaled, maximum 10 MPH operating speed.

# 5.0 TEMPORAL SEPARATIONS AND SPATIAL SEPARATION CONSIDERATIONS

## 5.1 Overview

- Transit could operate safely within a freight railroad corridor using spatial or temporal separation.
- Spatial separation = Transit tracks are within a freight railroad corridor, usually with a minimum distance of separation between the freight railroad corridor and the rail transit corridor with railroad-approved engineering solutions where minimum required separation distances cannot be maintained and when other transit/freight rail conflict engineering solutions such as intrusion detection, transit/railway signalization, combined railroad/rail transit grade crossing protection, including FRA-regulated Quiet Zones, are required.
- Temporal separation = Transit would operate using the same tracks as freight, in assigned blocks of time (time of day, day of week).
  - Transit service that is typically associated with temporal separation: Commuter rail, some light rail (peak period, peak direction).
  - Freight rail service that is typically associated with temporal separation: Freight rail service that can be operated when transit service is not required/provided during specific date and time period(s).
  - Temporal separation is not a practical option where frequency and number of freight trains using the freight rail trackage is high and cannot be scheduled for periods when transit rail service is not operated.

- Agreement(s) with the freight railroad owner(s) are required for all transit (LRT, DMU, Commuter Rail) options to operate within freight railroad right-of-way, regardless of the type of separation to be used.
- Agreement(s) with freight railroad owner(s) for use of railroads' property for stations, parking areas, and related transit infrastructure are required if property cannot be acquired by transit agency.

## 5.2 Some Details on Temporal and Spatial Separation

- Factors
  - Type(s) of transit vehicle.
  - Amount of rail traffic – Transit service and freight rail service.
  - Energy source for transit vehicle(s), i.e., electric or diesel traction (impacts of overhead electrification).
  - Transit rail station platform design to accommodate Americans with Disabilities Act (ADA) requirements and freight rail carrier American Railway Engineering and Maintenance-of-Way Association (AREMA) and Clearance standards.
  - Railroad track design to accommodate both transit and freight railroad's operations including maximum operating speeds on curved trackage.
- Types of Transit Vehicle – FRA-Compliant vs. Non-Compliant
  - Compliant example – Northstar Commuter Rail, specific DMUs
    - Would use freight tracks
  - Non-compliant examples – LRT, modern streetcar, DMU in Texas (Denton County has FRA waiver)
    - Require spatial separation from the freight railroad's trackage within the freight ROW, i.e. separate tracks, specific minimum distance(s) between freight railroad and rail transit operations and protective installations such as intrusion detection, etc.
- Amount of traffic
  - Transit service with relatively low ridership/low service requirements could integrate well with temporal separation that only grants limited morning and evening peak service.
  - Freight railroad with minimal traffic.
    - Could limit their freight operation to overnight service to allow a transit provider to operate, for example, from 5 AM to 11 PM.
    - Examples: Austin Metro LRT, NJ Transit's River Line.
    - Requires negotiated agreement and generally subject to change by freight railroad operator/owner.
  - Freight railroad with more traffic

    - Different negotiated arrangement that could permit transit operations in the peak morning and peak evening periods using assigned slots or windows for transit operations.

- Who decides?
    - Freight railroad determines assigned time blocks for transit service and freight service based on their customers' needs.
    - Track and signals inspection and minor maintenance would take place overnight between cessation of transit service and pullout for the next day's service, in accordance with the owner railroad's and Federal Track Safety Standards Inspections.
    - Track and transit rail infrastructure maintenance could occur when transit service would be minimal (e.g. on weekends).

### 5.2.1 Potential Applicability of Temporal Separation to the Riverview Corridor

- Based on Purpose and Need, the Corridor would require 24-hour transit service.
- Route 54 serves the Corridor through West 7th Street and operates
    - Every 12 to 15 minutes in the peak period
    - Approximately between 3 AM and 1 AM
    - Seven days a week
- CP's Merriam Park Subdivision main track approximately between Randolph and downtown Saint Paul is an active freight corridor with 6 to 8 trains per day, including 2 Amtrak trains. As such, temporal separation temporal separation would not accommodate transit needs in this scenario.

### 5.2.2 Potential Applicability of Spatial Separation to the Riverview Corridor

To accommodate the required two-way transit operations, the existing minimum right of way width must be approximately 28 feet between stations and approximately 50 feet at stations. Additionally, the required physical separation between transit service and freight service must be maintained to maintain spatial separation between these two modes.

The Merriam Park Subdivision between Saint Paul Union Depot (MP 410.4) and Fordson Junction (MP 412.0) does not have sufficient width to spatially accommodate the existing CP and UPRR freight rail lines, two adjacent light rail tracks, and to maintain the required physical separation between freight and transit rail service options. Therefore this option is not feasible for the proposed types of transit rail service.

- The CP Spur does not have sufficient width, except in a few areas (primarily former yard trackage), to spatially accommodate the existing freight rail line and two adjacent light rail

tracks and transit stations for most of the Spur's length, and to maintain the required physical separation between freight and transit rail service options. Additionally, there is insufficient separation between the CP Spur and the UPRR Industrial Spur that runs parallel but vertically below the CP Spur between MP 0.2 and MP 0.5 to accommodate the existing CP Spur and two adjacent light rail tracks. Therefore this option is not feasible for the proposed types of transit rail service.

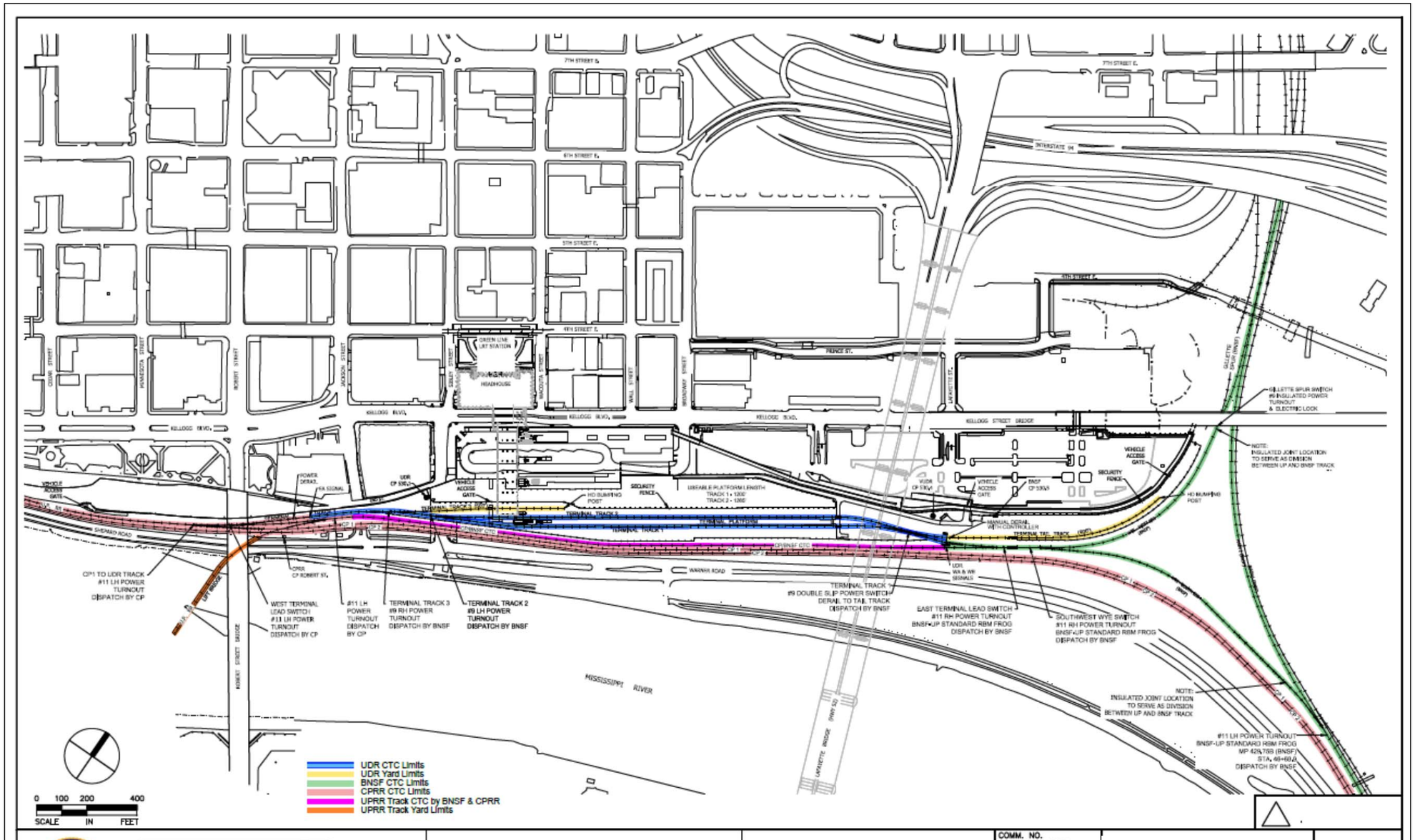
- The co-location of CP's Merriam Park Subdivision and CP Spur with all options of rail transit services will require significant private land acquisitions of commercial, industrial and residential properties along the proposed joint right of way due to the requirements for rail transit's adjaceny separation from the freight railroad and proposed transit rail stations. There is a need to balance the potential benefits of this option versus the costs of the displacement and relocation of businesses and residences in this area.
- Depending on the selected transitway guideways, the addition of a new second and probable third track from MP 411.2 to MP 412 with or without adjacency separation would be a costly option from a design, engineering, construction and operational perspective for this portion of the transit corridor. The design, engineering and construction challenges in this area are due to the narrow existing right of way, the existing railroad's route upgrade on the slope of a valley from the Mississippi River and the lack of horizontal plane to situate the required new track construction for each of the rail transit options.
    - The CP Spur with existing railway tracks removed is a viable rail transit option for the following reasons:
    - The corridor can be dedicated exclusively to rail transit without interfacing with existing rail freight and passenger operations and infrastructure.
    - The right of way width is sufficient to accommodate 2 rail tracks for light rail or similar transit vehicle options.
    - The right of way passes through areas of potential ridership for the transit service to be provided. This includes serving residential, commercial and industrial customers.
    - Fewer land acquisitions are required to accommodate the proposed transit rail services.
    - Noise and vibration along the route can be controlled through the establishment of Quiet Zones in compliance with FTA guidance.

# APPENDICES

## Appendix A: Union Depot Track Operations

## Appendix B: Existing Railroad Conditions

## Appendix C: Existing Railroad Conditions Right-of-Way Widths




Ramsey County Regional Railroad Authority

# UNION DEPOT
ST. PAUL, MINNESOTA

AECOM
800 LA SALLE AVENUE, SUITE 500
MINNEAPOLIS, MINNESOTA 55402
612.376.2000 TEL
612.376.2275 FAX
WWW.AECOM.COM

| | |
|---|---|
| COMM. NO. | 31811621 |
| SCALE | 1"=175' FS |
| DATE | MAY 12, 2015 |
| DRAWN | IBURRELL |

## APPENDIX A
TRACK OPERATIONS

TO-1

SAINT PAUL UNION DEPOT

MP 410.5
ROBERT ST JCT

MP 411.2
CHESTNUT ST JCT

MP 412.0 / MP 0.0
FORDSON JCT

CUSTOMER SIDING #1

UP INDUSTRIAL SPUR

MP 1.0

PASSING SIDING

MP 2.0

FORD PLANT YARD

MP 4.0

CUSTOMER SIDING #2

CUSTOMER SIDING #3

MP 3.0

DAVERN ST YARD

SWITCHING TRACK

DRAFT-WORK IN PROCESS

LEGEND:

- CANADIAN PACIFIC
- UNION PACIFIC
- BNSF

NORTH

0 500 1000 2000

**APPENDIX B**
EXISTING
RAILROAD CONDITIONS

RIVERVIEW CORRIDOR

SHEET 1 | 08/02/2016

AECOM

Aug. 02 2016 02:58 pm P:\BP\60329166\900_Work\910_CAD\CIVIL\EXHIBITS\EXHB-TRK-EX.dwg By: maurisakb

CP MERRIAM PARK SUB
WESTERN AVE S
WEST 6TH ST
ST PETER ST
CEDAR ST
ROBERT ST
N. SMITH AVE
W 7TH ST
W. KELLOGG BLVD
GRAND AVE
FORBES AVE
CP MERRIAM PARK SUB
UP MANKATO SUB
SHEPARD RD
W JEFFERSON AVE
ONEIDA ST
RANDOLPH AVE
ARMSTRONG AVE W
BAY ST
W 7TH ST
WEST 7TH ST.
MONTREAL WAY
ADRIAN ST
MISSISSIPPI RIVER
FORD PKWY
FORD PLANT SITE
SAINT PAUL AVE
SNELLING AVE
MONTREAL AVE
HAMLINE AVE S
CP SPUR
I-35 E
UP MANKATO SUB
CLEVELAND AVE
EDGCUMBE RD
S DAVERN ST
WEST 7TH ST.
SHEPARD RD
SAINT PAUL AVE
E MAYNARD DR
ALTON ST
HWY 5

DRAFT-WORK IN PROCESS

LEGEND:
- LESS THAN 50' ROW WIDTH
- 50' TO 100' ROW WIDTH
- GREATER THAN 100' ROW WIDTH

DISCLAIMER:

RIGHT-OF- WAY WIDTHS DERIVED FROM PUBLISHED DATA FROM THE MINNESOTA GEOSPATIAL COMMONS. PRIOR TO ENGINEERING RIGHT-OF-WAY WIDTHS SHOULD BE INDEPENDENTLY VERIFIED BY A LICENSED SURVEYOR.

NORTH

0 500 1000 2000

**APPENDIX C**
EXISTING RAILROAD CONDITIONS
RIGHT-OF-WAY WIDTHS

SHEET 1 | 08/30/2016

RIVERVIEW CORRIDOR

AECOM

Aug, 30 2016 07:03 am P:\BP\60329166\900_Work\910_CAD\CIVIL\EXHIBITS\EXHIB-TRK-ROW.dwg By: maurisakb