



## 6.0 SCREEN 1 – FATAL FLAW ANALYSIS

Using a two-step process, the Rush Line Corridor AA considered a wide range of transit alignment alternatives and employed a systematic and iterative evaluation process to refine the number of alternatives for analysis. This two-step evaluation approach has been defined to comply with the FTA guidelines for New Starts projects and the National Environmental Policy Act (NEPA) regulations. Ultimately, the purpose of this Rush Line Corridor AA is to identify Preferred Alternatives to improve transportation within the corridor through transit investment. The Preferred Alternatives may then take the next step in attempting to secure federal New Starts funding through initiation of the NEPA process (environmental documentation) and entry into Preliminary Engineering.

As shown in the Chapters that follow, the Rush Line Corridor AA project used a two-tiered screening process. Screen 1 entailed a fatal flaw analysis. Evaluating eleven potential alignments for rapid transit, the Screen 1 evaluation resulted in the selection of eight of the original eleven rapid transit corridors and three transit modes (BRT, commuter rail and LRT) for further consideration. Screen 2 entailed a more detailed evaluation of potential alignments within the Rush Line corridors. (Chapter 12 contains the Screen 2 detailed evaluation and findings.) The purpose of Screen 2 was to further define the alignments and transit modes that would meet the goals and objectives of the project. It entailed a detailed definition and technical assessment of the alternatives recommended in Screen 1. Detailed technical assessment included development of conceptual design (e.g. alignment, location of transit stations), transit operating plan, 2030-forecasted ridership using the Metropolitan Council's travel demand model and Longitudinal Housing-Employment Dynamics (LEHD) Data, and order-of-magnitude capital and operating and maintenance (O&M) costs.

This section presents the alternatives evaluated in the Screen 1 Fatal Flaw Analysis along with the results.

### 6.1 Alternatives Evaluated

Based on the recommended alignments and transit technologies, the following alternatives were evaluated during Screen 1. **Figures 5-1** through **5-3** in Chapter 5 show maps of these alternatives.

- BRT
  - Alternative 1: via I-35E/I-35 from downtown Saint Paul to Hinckley.

- Alternative 2A: via the Ramsey County Region Railroad Authority (RCRRA) right-of-way (ROW) and U.S. Highway 61 (TH 61) from downtown Saint Paul to White Bear Lake.
- Alternative 2B: via the RCRRA ROW and I-35E/I-35 from downtown Saint Paul to Forest Lake.
- Commuter rail
  - Alternative 1: via the Canadian Pacific (CP) Railway, Washington County Regional Railroad Authority (WCRRA) ROW, Chisago County Regional Railroad Authority (CCRRA) ROW, and St. Croix Valley Railroad from downtown Saint Paul to Hinckley.
  - Alternative 2A: via the Union Pacific Railroad, RCRRA ROW, Minnesota Commercial Railroad, WCRRA ROW, CCRRA ROW, and St. Croix Valley Railroad from downtown Saint Paul to Hinckley.
  - Alternative 2B: via the RCRRA ROW, Minnesota Commercial Railroad, WCRRA ROW, CCRRA ROW, and St. Croix Valley Railroad from downtown Saint Paul to Hinckley.
  - Alternative 3: via the CP Railway, Minnesota Commercial Railroad, WCRRA ROW, CCRRA ROW, and St. Croix Valley Railroad from downtown Saint Paul to Hinckley.
  - Alternative 4: via I-35E/I-35 from downtown Saint Paul to Hinckley.
- Light Rail Transit Alignments
  - Alternative 1A: via the RCRRA ROW from downtown Saint Paul to Maplewood.
  - Alternative 1B: via the RCRRA ROW and Minnesota Commercial Railroad from downtown Saint Paul to White Bear Lake.
  - Alternative 1C: via the LRT on RCRRA ROW and Minnesota Commercial Railroad from downtown Saint Paul to Forest Lake.
  - Alternative 2: via I-35E from downtown St. Paul to Highway 96 (CSAH 96) in White Bear Lake.

## 6.2 Screen 1 Evaluation Criteria

Screen 1 evaluation used the following criteria to assess each transit alternative:

- ***Socioeconomic Factors:*** Under this category, the analysis estimated the number and density of persons living and employed within the travel shed of each alternative for the current Census year (2000) and horizon year (2030). This was performed using a 2.5-mile buffer around each alternative. The purpose of this analysis is to determine the size of the potential transit market associated with each alternative.
- ***Social Equity Factors:*** Similar to the socioeconomic factor analysis, a 2.5-mile buffer was formed around each alternative to estimate the population typically associated with transit-dependence using 2000 Census data. This population included persons younger than 16 years; persons over 65 years old; persons living at or below poverty level; and zero-car households.
- ***Community Goals and Objectives:*** This category assessed each alternative's consistency with various plans for both the Rush Line Corridor and communities, counties and the region served by the Corridor.

- **Conceptual Engineering:** This category assessed each alternative’s potential impacts relative to major transportation elements that may be impacted, order-of-magnitude capital cost, and right-of-way requirements.
- **Transportation Impact:** This qualitative criterion evaluates the potential impact of each alternative on adjacent transportation facilities that encompass roadways, freight railroads pedestrian and bicycle trails, and existing transit infrastructure. It also assessed existing transit services and facilities proximate to an alternative to determine its “transit readiness.”

A detailed description of the methodology and results of the Screen 1 Fatal Flaw analysis is contained in the Detailed Definition of Alternatives technical memorandum included in this report as **Appendix G**.

## 6.3 Screen 1 Criteria Evaluation Results

### 6.3.1 Socioeconomic Analysis

**Table 6-1** presents the criteria and ranking associated with this socioeconomic analysis, while **Table 6-2** shows 2000<sup>1</sup> and 2030 population and employment figures associated with each alternative. The results show that lengthening an alignment to the north would not yield a direct or comparable increase in population and employment—i.e. the potential transit travel shed of an alignment decreases significantly as it is lengthened. Therefore, longer alternatives would appear to perform poorly under the socioeconomic indicators in comparison to their shorter counterparts. Segment 1 is generally defined by downtown St. Paul and I-694. The analysis indicates that the existing population density for the section of the alignments between downtown St. Paul and I-694 for all of the alternatives ranges from 3,900 to 4,500 persons per square mile. These values decreased by at least a factor of ten as one proceeds northwards towards Hinckley. Employment density for each alternative followed a similar trend.

**Table 6-1: Screen 1 Evaluation: Socioeconomic Analysis**

Criterion: Population Density (Current Year and 2030)		
Value (Persons per Square Mile)	Rating	Description
Greater than 5,000	●	Very Good – Alternative meets criterion very well
3,500 – 5,000	◐	Good – Alternative meets criterion well
1,500 – 3,499	◑	Fair – Alternative meets criterion sufficiently
500 – 1,499	◒	Poor – Alternative does not meet criterion
Less than 500	○	Very Poor – Alternative significantly does not meet criterion
Criterion: Employment Density (Current Year and 2030)		
Value (Persons per Square Mile)	Rating	Description
Greater than 4,000	●	Very Good – Alternative meets criterion very well
2,500 – 4,000	◐	Good – Alternative meets criterion well
1,500 – 2,499	◑	Fair – Alternative meets criterion sufficiently
500 – 1,499	◒	Poor – Alternative does not meet criterion
Less than 500	○	Very Poor – Alternative significantly does not meet criterion

<sup>1</sup> Because of inconsistencies in data availability, the baseline for Chisago County is 2005 instead of 2000.

**Table 6-2: Screen 1 Evaluation – Results of Socioeconomic Analysis**

	Population		Population Density		Rating	Employees		Employment Density		Rating	Area (Square Miles)
	2030	2000	2030	2000 <sup>2</sup>		2030	2000	2030	2000		
<b>BRT Alternatives</b>											
BRT 1	164,760	112,020	1,060	720	⊖	121,770	92,130	780	590	⊖	156
BRT 2A	133,780	104,870	2,540	1,990	⊙	105,820	79,150	2,010	1,500	⊙	53
BRT 2B	190,040	121,440	1,210	770	⊖	121,040	86,560	770	550	⊖	157
<b>Commuter Rail Alternatives</b>											
Commuter Rail 1	191,610	125,310	1,210	790	⊖	123,130	90,680	780	570	⊖	159
Commuter Rail 2A	191,610	127,720	1,240	820	⊖	130,180	92,540	840	600	⊖	155
Commuter Rail 2B	187,270	124,060	1,220	810	⊖	125,090	88,480	810	570	⊖	154
Commuter Rail 3	189,250	122,850	1,200	780	⊖	118,810	92,140	760	590	⊖	157
Commuter Rail 4	167,830	115,010	1,080	740	⊖	118,420	88,050	760	570	⊖	155
<b>LRT Alternatives</b>											
LRT 1A	93,320	77,400	5,300	4,390	●	85,800	64,380	4,870	3,650	●	18
LRT 1B	107,550	89,710	4,480	3,740	●	95,760	71,600	3,990	2,980	●	24
LRT1C	157,410	108,620	2,760	1,910	●	106,910	77,340	1,880	1,360	●	57
LRT 2	101,940	81,370	4,220	3,255	●	93,920	76,720	3,757	3,069	●	24

Data sources: U.S. Census Bureau, Metropolitan Council, Chisago County, and Minnesota State Demographer

### 6.3.2 Social Equity Analysis

Table 6-3 presents the criteria and ranking used for the social equity analysis. Table 6-4 shows the results of the social equity analysis for each alternative. Generally, the alternatives using the Regional Railroad Authority and BNSF Railroad rights-of-way scored higher than those which followed I-35E/I-35. This is a reflection of past development being oriented towards the railroad.

**Table 6-3: Social Equity Criteria and Rating Scheme**

Population under 16	Population over 65	Population Living at or Below Poverty Level	Zero-Car Households	Rating
Greater than 21,000	Greater than 8,000	Greater than 14,500	Greater than 6,000	●
15,000 - 21,000	6000 - 8,000	7,000 - 14,500	3,000 - 6,000	⊙
10,000 - 14,999	2,500 - 5,999	2,500 - 6,999	2,000 - 5,999	⊖
3,000 - 9,999	1,000 - 2,499	1,000 - 2,500	1,000 - 1,999	⊖
Less than 3,000	Less than 1,000	Less than 1,000	Less than 1,000	○

<sup>2</sup> Chisago County data is based on 2005.

**Table 6-4: Social Equity Rankings by Alignments**

Alternative	Population under 16		Population over 65		Population Living at or Below Poverty Level		Zero-Car Households		Study Area (square miles)
	Value	Rating	Value	Rating	Value	Rating	Value	Rating	
BRT 1	29,410	☉	10,690	☉	16,530	☉	6,290	☉	156
BRT 2A	29,880	●	11,460	●	15,390	●	6,950	☉	53
BRT 2B	33,080	☉	12,040	☉	16,190	☉	7,000	☉	157
CR 1	32,220	☉	12,820	☉	16,260	☉	6,560	☉	159
CR 2A	35,070	☉	13,610	☉	17,400	☉	7,540	☉	155
CR 2B	34,080	☉	13,310	☉	16,570	☉	7,310	☉	154
CR 3	31,780	☉	13,190	☉	16,510	☉	6,670	☉	157
CR 4	29,810	☉	11,750	☉	16,150	☉	6,320	☉	155
LRT 1A	22,680	●	8,100	●	14,290	●	6,310	●	18
LRT 1B	25,700	●	10,060	●	14,700	●	6,610	☉	24
LRT 1C	30,870	●	11,370	●	15,260	☉	6,910	●	57
LRT 2	21,990	☉	8,180	●	15,120	●	5,780	☉	24

### 6.3.3 Community Goals and Objectives Review

Table 6-5 shows the rating for each of the alignments relative to their consistency with local and regional plans. Relative to the other alternatives, the LRT alignments received the lowest ratings because they did not fulfill the goals established in the documents identified earlier in this section. Specifically, the three LRT alternatives identified shorter transit alignments (potentially a smaller service area) than those included in the aforementioned plans. This could be interpreted as not addressing the need for increased capacity and safety improvements in the Corridor between the northern border of Ramsey County and North Branch.

On the other hand, the alternatives that terminated in Forest Lake were rated the highest because several of the regional and corridor plans identified Forest Lake as the terminus of the corridor. Similarly, commuter rail alternatives received a higher rating than BRT alternatives because the former was mentioned in more of the aforementioned plans than the latter.

**Table 6-5: Community Goals and Objectives – Results**

Alternative	Consistency with Corridor Plans	Consistency with Regional, County, and Local Plans
BRT Alternative 1	●	⊙
BRT Alternative 2A	●	●
BRT Alternative 2B	●	⊙
CR Alternative 1	●	●
CR Alternative 2A	●	●
CR Alternative 2B	●	●
CR Alternative 3	●	●
CR Alternative 4	●	●
LRT Alternative 1A*	○	○
LRT Alternative 1B*	○	○
LRT Alternative 1C	○	○
LRT Alternative 2*	○	○

\* At the time this analysis was conducted LRT was not considered and possible mode by Metropolitan Council for the Rush Line Corridor. The Metropolitan Council’s updated 2030 Transportation Plan has identified LRT as a possible mode in this corridor this would elevate the rankings of the LRT alternatives to Fair – Alternative meets criterion sufficiently.

**6.3.4 Conceptual Engineering Assessment**

Table 6-6 presents a summary of the conceptual engineering assessment.

**Table 6-6: Conceptual Engineering Assessment – Screen 1 Results**

Evaluation Criteria	BRT 1 Downtown St. Paul – Hinckley via I-35E and I-35	BRT 2A Downtown St. Paul – White Bear Lake via RCRRRA ROW and Hwy 61	BRT 2B Downtown St. Paul – Forest Lake via RCRRRA ROW and I-35E/I-35
Potential major capital cost elements	Interchange reconstruction at stations. Right-of-way acquisition for segment south of I-694. Structures at I-694. ⊙	Right-of-way acquisition on some segments of Hwy 61 (WBL). ●	Interchange reconstruction at stations. Right-of-way acquisition for segment south of I-694. Structures at I-694. ●
Potential right-of-way availability <sup>4</sup>	Limited within I-35E south of I-694. ⊙	Some limitations along Hwy 61, especially near White Bear Lake. ●	Limited in the vicinity of I-694. ●
Range of order-of-magnitude capital cost <sup>5</sup>	\$770 million to \$3.1 billion + Interchange reconstruction, structural modifications at I-694, and right-of-way acquisition south of I-694. ○	\$250 million - \$1.0 billion + Right-of-way acquisition along Hwy 61. ●	\$270 million - \$1.1 billion + Interchange reconstruction, structural modifications and right-of-way acquisition south of I-694. ●

  

Evaluation Criteria	Commuter Rail 1 Downtown St. Paul – Hinckley via CP, RRA and SCV ROWs	Commuter Rail 2A Downtown St. Paul – Hinckley via UP, RRA and SCV ROWs	Commuter Rail 2B Downtown St. Paul – Hinckley via RRA and SCV ROWs
Potential major capital cost elements	Switching at existing wye northeast of the Union Depot could increase capital cost. Proximity to lakes and wetlands could increase construction cost. New grade separation at I-35E. ●	Switching at existing wye northeast of the Union Depot could increase capital cost. New railroad bridge over I-694. Switching operations at wye with CP near White Bear Lake. Proximity to lakes and wetlands could increase construction cost. ●	Required infrastructure to connect Union Depot and RCRRRA right-of-way. Switching at existing wye northeast of the Union Depot could increase capital cost. New railroad bridge over I-694. Switching operations at wye with CP near White Bear Lake. Proximity to lakes and wetlands could increase construction cost. ●
Potential right-of-way availability <sup>4</sup>	Entire route is on existing railroad corridor. Additional right-of-way needs are anticipated to be minimal. ●	Some limitations along Hwy 61, e.g. in White Bear Lake. ●	Limited along Phalen Blvd in downtown St. Paul, White Bear Lake and station areas. ●
Range of order-of-magnitude capital cost <sup>5</sup>	\$390 million - \$1.6 billion + New grade-separation at I-35E, environmental mitigation and special track modifications at wye ●	\$380 million - \$1.5 billion+ New trackage, structures, environmental mitigation and right-of-way acquisition along Hwy 61 ●	\$380 million - \$1.5 billion + New structures, special trackage, environmental mitigation, right-of-way acquisition ●

Evaluation Criteria	Commuter Rail 3 Downtown St. Paul – Hinckley via CP, MNRR, RRA and SCV ROWs		Commuter Rail 4 Downtown St. Paul – Hinckley via I-35E and I-35	
	Potential major capital cost elements	New wye at junction of Northeast diagonal and CP. Proximity to lakes and wetlands could increase construction cost.	⊙	Reconstruction of I-35E and I-35 south of I-694 (limited right-of-way). Structures at I-694 and I-35 split. Connection to Union Depot.
Potential right-of-way availability <sup>4</sup>	Limited in White Bear Lake. May need additional ROW at stations. Need additional ROW at potential new wye at junction with Northeast diagonal?	⊙	Extremely limited south of I-694.	○
Range of order-of-magnitude capital cost <sup>5</sup>	<b>\$400 million - \$1.6 billion +</b> New wye and right-of-way acquisition	⊙	<b>\$390 million - \$1.5 billion +</b> Right-of-way acquisition south of I-694 and reconstruction of I-35E south of I-694 and I-35 split	○

Evaluation Criteria	LRT 1A Downtown St. Paul – Maplewood via RCCRA	LRT 1B Downtown St. Paul – White Bear Lake via RCCRA	LRT 1C Downtown St. Paul – Forest Lake via RCCRA	LRT 2 Downtown St. Paul – TH 96 via RCCRA	
	Potential major capital cost elements	New vehicle storage and maintenance facility? Trail reconstruction/relocation Connection to Maplewood Transit Center	⊙	⊙	⊙
Potential right-of-way availability <sup>4</sup>	Limited between Union Depot in downtown St. Paul and beginning of RCRA ROW	⊙	⊙	⊙	
Range of order-of-magnitude capital cost <sup>5</sup>	<b>\$300 million – \$740 million</b>	⊙	<b>\$430 million – \$1.1 billion</b>	⊙	
			<b>\$850 million - \$2.1 billion</b>	○	
				<b>\$440 million - \$1.1 billion</b>	⊙

### 6.3.5 Transportation Impact Analysis

Alternatives were evaluated to assess their level of impact on the Corridor’s transportation system. This analysis used two performance indicators:

- Potential impacts to adjacent transportation facilities
- Existing transit routes and facilities within the Corridor.

#### Potential Impacts to Adjacent Transportation Facilities

Following is a list of major transportation elements in the Corridor. Any potential impacts to these facilities may result in a higher capital cost and additional right-of-way requirements associated with a particular alternative:

- Railroad wyes adjacent to the Union Depot and near the I-35E/I-694 common segment
- I-35 and I-694, including their common segment (I-35E and I-694)

- I-35E and I-35W split
- Canadian Pacific Railway to Minnesota Commercial Railway
- County Railroad Authority rights-of-way – Currently used as recreational trails
- BNSF right-of-way (currently used by Minnesota Commercial Railway)

Each of the transit alternatives would entail a major capital investment and modifications to the transportation network. BRT alternatives would require building a dedicated lane or right-of-way for buses. Commuter rail alternatives would require upgrade or construction of new tracks to accommodate commuter rail operations. LRT alternatives would require construction of new tracks, separate from existing freight operations as mandated by the Federal Railroad Administration (FRA). This evaluation assessed each alternative's potential impact on the elements identified in the preceding list and an aggregate score was then developed for each alternative. **Figure 6-1** shows the major transportation elements in the Corridor that may result in even higher capital cost, additional right-of-way requirements as all of the alternatives approach downtown St. Paul due to the close proximity and density of major transportation facilities.

#### Existing Transit Routes and Facilities within the Corridor

This assessment identified bus routes and park-and-ride lots within the Corridor or adjacent to an alternative. The major source of this information is Metro Transit.



Figure 6-1  
**Potential Impacted  
 Transportation Facilities**

**Table 6-7** presents the results of the transportation impact analysis for each alternative. Following is a summary of this qualitative assessment:

#### Potential Impacts to Adjacent Transportation Facilities

- ***Railroad Wyes:*** The alternatives that would use the County RRA rights-of-way would all have an impact on the railroad wyes adjacent to Union Depot, as they approach downtown St. Paul from the east. Freight traffic through these two wyes is high (40 to 70 trains per day) and any disruption to these operations was deemed in this analysis as unfavorable. Commuter rail alternatives that would utilize these existing wyes (Alternatives 1, 2A, 3 and 4) fared relatively well against this performance indicator as they would not entail major new construction within or around these facilities. On the other hand, BRT and LRT alternatives approaching downtown St. Paul from the east side either through Highway 61 or the County RRA rights-of-way fared poorly against this criterion because they would require major infrastructure improvements through this area and create potentially significant disruptions. On the other hand, Commuter Rail Alternatives 3 and 4 would entail a new track switch to connect the existing CP Railway to the Minnesota Commercial line. Consequently, these two options fared poorly against this criterion.
- ***Freeways (I-35 and I-694):*** All rail alternatives that entail use of existing freeways fared poorly against this criterion because of potential major disruptions to these roadways during and after construction; right-of-way requirements; and ability to facilitate connections between rail transit and other modes of travel (i.e. pedestrian and bicycle) in a freeway environment.
- ***Connection between RCRRRA right-of-way and Highway 61:*** BRT and LRT alternatives that would use the County RRA rights-of-way would require a new bridge across I-694 and co-location with the existing BNSF track being used by Minnesota Commercial. These alternatives would also require a new connection to Highway 61. Right-of-way is also limited in this area, and construction in this vicinity would likely result in significant traffic disruptions on Highway 61.
- ***County RRA Rights-of-Way:*** Alternatives that would use these rights-of-way would entail reconstruction of the existing paved path to accommodate the transit facility.

#### Existing Transit Routes and Facilities within the Corridor

**Table 6-8** presents the major transit facilities associated with each alternative. The combination of more bus routes and park-and-ride lots and transit centers resulted in a high ranking.

**Table 6-7: Screen 1 – Potential Impact on Adjacent Transportation Facilities**

Alternative	Potential Impact on Adjacent Transportation Facilities						Aggregate Rating
	Railroad Wye	I-35E and I-694	CP – MNRR Switch	I-35 Split	RCRRA Connection to I-694 and Highway 61	Bike Trail (County RRA Rights-of-Way)	
BRT 1	⊙	○		⊙			⊙
BRT 2A	○				○	○	⊙
BRT 2B	○	⊙		⊙	⊙	○	○
CR 1	●					⊙	●
CR 2A	●					○	●
CR 2B	○					○	⊙
CR 3	●		○			⊙	⊙
CR 4	●		○	⊙			⊙
LRT 1A	○					○	●
LRT 1B	○					○	●
LRT 1C	○					○	●
LRT 2	⊙	○					⊙

Rating	Definition
●	Very Good – Corridor meets criterion very well
⊙	Good – Corridor meets criterion well
⊙	Fair – Corridor meets criterion sufficiently
⊙	Poor – Corridor does not meet criterion
○	Very Poor – Corridor significantly does not meet criterion
Blank	No Impact – Alignment does not impact this area

**Table 6-8: Screen 1 – Existing Transit Routes and Facilities**

BRT 1 Downtown St. Paul – Hinckley via I-35E and I-35		BRT 2A Downtown St. Paul – White Bear Lake via RCRRA ROW and Hwy 61		BRT 2B Downtown St. Paul – Forest Lake via RCRRA ROW and I-35E/I-35	
Park-and-ride at Cub at White Bear Township, White Bear Township Theatre, Wyoming, I-35/CR 23 (Metro Transit 275 and 288)	⊙	Park-and-ride at White Bear Lake Shopping Center (Metro Transit 265)	⊙	Park-and-ride at Forest Lake Transit Center, I-35/County Road 23, White Bear Township Theatre, and Cub White Bear Township (Routes 275 and 288)	●

Commuter Rail 1 Downtown St. Paul – Hinckley via CP, RRA and SCV ROWs		Commuter Rail 2A Downtown St. Paul – Hinckley via UP, RRA and SCV ROWs		Commuter Rail 2B Downtown St. Paul – Hinckley via RRA and SCV ROWs		Commuter Rail 3 Downtown St. Paul – Hinckley via CP, MNRR, RRA and SCV ROWs		Commuter Rail 4 Downtown St. Paul – Hinckley via I-35E and I-35	
Park-and-ride at Cub White Bear Township and Forest Lake Transit Center (two bus routes)	⊙	Park-and-ride at White Bear Shopping Center and Forest Lake Transit Center (two bus routes)	⊙	Park-and-ride at White Bear Shopping Center and Forest Lake Transit Center (two bus routes)	⊙	Park-and-ride at White Bear Shopping Center and Forest Lake Transit Center (two bus routes)	⊙	Park-and-ride at Forest Lake Transit Center, I-35/County Road 23, White Bear Township Theatre, and Cub White Bear Township (Routes 275 and 288)	⊙

LRT 1A Downtown St. Paul – Maplewood via RCRRA ROW		LRT 1B Downtown St. Paul – White Bear Lake via RCRRA ROW and MNRR		LRT 1C Downtown St. Paul – Forest Lake via RCRRA ROW and MNRR		LRT 2 Downtown St. Paul – TH 96 via I-35E	
Indirect connection to Maplewood Transit Center (seven bus routes)	⊙	White Bear Lake Shopping Center (Route 265)	⊙	Park-and-ride at: Cub White Bear Township Forest Lake TC (two bus routes) Indirect connection to Maplewood Transit Center (seven bus routes)	⊙	Indirect connection to Little Canada Transit Center Little Canada City Hall park-and-ride (two routes)	⊙

## 6.4 Summary of Screen 1 Evaluation

The tables on the following pages present the results of the evaluation for each alternative. They also indicate whether an alternative should move progress to Screen 2 evaluation for detailed analysis and the rationale for the recommendation, which combines the technical assessment with feedback from the Study Team, Task Force and the public (through the October 2008 Public Open Houses).

- BRT
  - Alternative 1, via I-35E/I-35 from downtown Saint Paul to Hinckley
    - Plus a sub-option that terminates in Forest Lake/Columbus
  - Alternative 2A, via the Ramsey County Region Railroad Authority (RCRRA) right-of-way (ROW) and U.S. Highway 61 (TH 61) from downtown Saint Paul to White Bear Lake
    - Plus a sub-option terminates in Forest Lake/Columbus.
- Commuter Rail
  - Alternative 1, via the Canadian Pacific (CP) Railway, Washington County Regional Railroad Authority (WCRRA) ROW, Chisago County Regional Railroad Authority (CCRRA) ROW, and St. Croix Valley Railroad from downtown Saint Paul to Hinckley
  - Alternative 2A, via the Union Pacific Railroad, RCRRA ROW, Minnesota Commercial Railroad, WCRRA ROW, CCRRA ROW, and St. Croix Valley Railroad from downtown Saint Paul to Hinckley.
- Light Rail Transit Alignments
  - Alternative 1A, via the RCRRA ROW from downtown Saint Paul to Maplewood
  - Alternative 1B, via the RCRRA ROW and Minnesota Commercial Railroad from downtown Saint Paul to White Bear Lake.

Table 6-9: Summary of Screen 1 Evaluation – BRT Alternatives

Evaluation Criteria	BRT 1 Downtown St. Paul – Hinckley via I-35E and I-35		BRT 2A Downtown St. Paul – White Bear Lake via RCRRA ROW and Hwy 61		BRT 2B Downtown St. Paul – Forest Lake via RCRRA ROW and I-35E/I-35	
	Value	Rating	Value	Rating	Value	Rating
<b>Socio-Economic</b>						
2000 Population within one mile <sup>1</sup>	112,020	●	104,870	●	114,760	●
2000 Population Density within one mile <sup>1</sup>	718	○	1,986	●	2,087	●
2000 Employment within one mile <sup>1</sup>	92,130	●	79,150	◎	78,290	◎
2000 Employment Density within one mile <sup>1</sup>	587	○	1,522	◎	1,435	◎
2030 Population within one mile <sup>2</sup>	164,760	●	133,780	◎	159,620	●
2030 Population Density within one mile <sup>2</sup>	1,049	◎	2,524	●	2,902	●
2030 Employment within one mile <sup>2</sup>	121,770	●	105,820	◎	109,550	◎
2030 Employment Density within one mile <sup>2</sup>	776	○	2,035	●	1,992	●
<b>Social Equity<sup>3</sup></b>						
Zero-car households	6,280	◎	6,950	◎	6,690	◎
Population below poverty level	16,530	◎	15,390	◎	15,250	◎
Population over 65	10,690	◎	11,460	◎	10,500	◎
Population under 16 years old	29,410	●	29,880	●	28,980	●
<b>Community Goals and Objectives</b>						
Consistency with corridor plans	Service area consistent with plans. However, plans predominately identified corridor for commuter rail.	●	Service area consistent with plans. However, plans predominately identified corridor for commuter rail. (Higher rating due to use of RRA ROW.)	●	Service area consistent with plans. However, plans predominately identified corridor for commuter rail.	●
Consistency with regional, county and local plans		◎		●		◎
<b>Conceptual Engineering</b>						
Potential major capital cost elements	Interchange reconstruction at stations. Right-of-way acquisition for segment south of I-694. Structures at I-694.	◎	Right-of-way acquisition on some segments of Hwy 61 (WBL).	◎	Interchange reconstruction at stations. Right-of-way acquisition for segment south of I-694. Structures at I-694.	◎
Potential right-of-way availability <sup>4</sup>	Limited within I-35E south of I-694.	◎	Some limitations along Hwy 61, especially near White Bear Lake.	◎	Limited in the vicinity of I-694.	◎
Range of order-of-magnitude capital cost <sup>5</sup>	<b>\$770 million to \$3.1 billion +</b> Interchange reconstruction, structural modifications at I-694, and ROW acquisition south of I-694.	○	<b>\$250 million - \$1.0 billion +</b> ROW acquisition along Hwy 61.	◎	<b>\$270 million - \$1.1 billion +</b> Interchange reconstruction, structural modifications and ROW acquisition south of I-694.	◎
<b>Transportation</b>						
Potential impacts to adjacent transportation facilities	I-35E and I-694; I-35 split.	◎	Existing trail on RCRRA right-of-way; I-694; and Hwy 61.	○	I-35E and I-694; I-35 split; and existing trail on RCRRA ROW.	◎
Existing transit routes and facilities within the corridor	Park-and-ride at: Cub at WB Twp; WB Twp Theatre; Wyoming; I-35/CR 23. Routes 275 and 288.	◎	Park-and-ride at White Bear Lake Shopping Center. Route 265.	◎	Park-and-ride at Forest Lake Transit Center; I-35/CR 23; White Bear Twp Theatre; and Cub White Bear Twp. Routes 275 and 288.	●
<b>Draft Recommended Action</b>	<b>Carry forward the route alternative up to I-35E split or to North Branch.</b>		<b>Carry forward.</b>		<b>Eliminate.</b>	

1 Source: 2000 U.S. Census. Chisago County data are year 2005 estimates.

2 Source: Metropolitan Council and Collar County travel demand models.

3 Source: 2000 U.S. Census.

4 Assumes exclusive BRT lanes along entire route, and no general purpose lanes will be converted to bus lanes.

5 Source: URS Corporation. Year 2008 dollars. Based on unit cost of \$10 million to \$40 million per mile.

Rating Definition	
●	Corridor meets criterion very well
●	Corridor meets criterion well
◎	Corridor meets criterion sufficiently
○	Corridor does not meet criterion
○	Corridor significantly does not meet criterion

**Table 6-10: Summary of Screen 1 Evaluation – Commuter Rail Alternatives**

Evaluation Criteria	Commuter Rail 1 Downtown St. Paul – Hinckley via CP, RRA and SCV ROWs		Commuter Rail 2A Downtown St. Paul – Hinckley via UP, RRA and SCV ROWs		Commuter Rail 2B Downtown St. Paul – Hinckley via RRA and SCV ROWs		Commuter Rail 3 Downtown St. Paul – Hinckley via CP, MNRR, RRA and SCV ROWs		Commuter Rail 4 Downtown St. Paul – Hinckley via I-35E and I-35	
	Value	Rating	Value	Rating	Value	Rating	Value	Rating	Value	Rating
<b>Socio-Economic</b>										
2000 Population within one mile <sup>1</sup>	125,310	●	127,720	●	124,060	●	122,850	●	112,020	●
2000 Population Density within one mile <sup>1</sup>	790	⊙	820	⊙	810	⊙	790	⊙	710	⊙
2000 Employment within one mile <sup>1</sup>	90,680	⊙	92,540	⊙	88,480	⊙	92,140	⊙	92,130	⊙
2000 Employment Density within one mile <sup>1</sup>	570	○	580	○	570	○	590	○	590	○
2030 Population within one mile	192,320	●	191,610	●	187,270	●	189,250	●	164,760	●
2030 Population Density within one mile	1,210	⊙	1,210	⊙	1,220	⊙	1,220	⊙	1,050	⊙
2030 Employment within one mile	123,130	●	130,180	●	125,090	●	123,410	●	121,770	●
2030 Employment Density within one mile	770	○	820	○	810	○	800	○	780	○
<b>Social Equity</b>										
Zero-car households	6,560	⊙	7,540	●	7,310	●	6,670	⊙	6,320	⊙
Population below poverty level	16,250	⊙	17,390	⊙	16,560	⊙	16,500	⊙	16,740	⊙
Population over 65	12,810	⊙	13,600	⊙	13,300	⊙	13,190	⊙	10,800	⊙
Population under 16 years old	32,230	⊙	35,080	●	34,090	●	31,780	●	29,670	⊙
<b>Community Goals and Objectives</b>										
Consistency with corridor plans		●		●		●		●		○
Consistency with regional, county and local plans	Commuter rail consistent with existing plans.	●	Commuter rail consistent with existing plans. Proposed alignment most consistent with plans.	●	Commuter rail consistent with existing plans.	●	Commuter rail consistent with existing plans.	●	Commuter rail consistent with existing plans but alignment on I-35E/I-35 is not.	○
<b>Conceptual Engineering</b>										
Potential major capital cost elements	Switching at existing wye northeast of the Union Depot could increase capital cost. Proximity to lakes and wetlands could increase construction cost. New grade separation at I-35E.	⊙	Switching at existing wye northeast of the Union Depot could increase capital cost. New railroad bridge over I-694. Switching operations at wye with CP near White Bear Lake. Proximity to lakes and wetlands could increase construction cost.	⊙	Required infrastructure to connect Union Depot and RCRRRA ROW. Switching at existing wye northeast of the Union Depot could increase capital cost. New railroad bridge over I-694. Switching operations at wye with CP near White Bear Lake. Proximity to lakes and wetlands could increase construction cost.	⊙	New wye at junction of Northeast diagonal and CP. Proximity to lakes and wetlands could increase construction cost.	⊙	Reconstruction of I-35E and I-35 south of I-694 (limited ROW). Structures at I-694 and I-35 split. Connection to Union Depot.	○
Potential right-of-way availability	Entire route is on existing railroad corridor. Additional ROW needs are anticipated to be minimal.	●	Some limitations along Hwy 61, e.g. in White Bear Lake.	⊙	Limited along Phalen Blvd in downtown St. Paul, White Bear Lake and station areas.	⊙	Limited in White Bear Lake. May need additional ROW at stations. Need additional ROW at potential new wye at junction with Northeast diagonal?	⊙	Extremely limited south of I-694.	○
Range of order-of-magnitude capital cost	<b>\$390 M - \$1.6 B</b>	⊙	<b>\$380 M - \$1.5 B</b>	⊙	<b>\$380 M - \$1.5 B</b>	⊙	<b>\$400 M - \$1.6 B</b>	⊙	<b>\$390 M - \$1.5 B</b>	○
<b>Transportation</b>										
Potential impacts to adjacent transportation facilities	Relocation of trail on RRA ROW. Reconstruction of existing freight tracks for upgrade.	⊙	Relocation of trail on RRA ROW. Reconstruction of existing freight tracks for upgrade.	⊙	Relocation of trail on RRA ROW. Reconstruction of existing freight tracks for upgrade of complex switching operations at wye near Union Depot could affect freight movement at this location.	⊙	Construction of new wye at northeast diagonal could have severe operational impact on freight movements in this area. Trail reconstruction on RRA ROW. Reconstruction of existing freight track for double tracking/track upgrades.	○	Construction impacts on I-35E, I-35E/I-35W split, I-35 and I-694 commons.	○
Existing transit routes and facilities within the corridor	Park-and-ride at Cub White Bear Twp and Forest Lake TC (two bus routes)	⊙	Park-and-ride at White Bear Shopping Center and Forest Lake TC (two bus routes)	⊙	Park-and-ride at White Bear Shopping Center and Forest Lake TC (two bus routes)	⊙	Park-and-ride at White Bear Shopping Center and Forest Lake TC (two bus routes)	⊙	Park-and-ride at Forest Lake Transit Center; I-35/CR 23; White Bear Twp Theatre; and Cub White Bear Twp. Routes 275 and 288.	●
<b>Draft Recommended Action</b>	<b>Carry forward connection to downtown St. Paul as a sub-option to Alt. 2A.</b> Will further define northern terminus during Screen 2.		<b>Carry forward.</b> Alignment is most consistent with past studies (relative to Alts. 1 and 2B).		<b>Eliminate.</b> Complex switching operations near the Union Depot.		<b>Eliminate.</b> Cost of new wye at Northeast diagonal could have major freight and cost impacts.		<b>Eliminate.</b> Cost and impacts of I-35E reconstruction especially south of I-694 and I-35 split would be extremely great.	

<sup>1</sup> Sources: 2000 U.S. Census, Metropolitan Council

Table 6-11: Summary of Screen 1 Evaluation – LRT Alternatives

Evaluation Criteria	LRT 1A		LRT 1B		LRT 1C		LRT 2	
	Downtown St. Paul – Maplewood via RCRRRA		Downtown St. Paul – White Bear Lake via		Downtown St. Paul – Forest Lake via RCRRRA		Downtown St. Paul – TH 96 via I-35E	
	Value	Rating	Value	Rating	Value	Rating	Description	Rating
<b>Socio-Economic</b>								
2000 Population within one mile <sup>1</sup>	77,400	⊙	89,710	⊙	108,620	⊙	81,370	⊙
2000 Population Density within one mile <sup>1</sup>	4,390	●	3,740	●	1,910	●	3,255	●
2000 Employment Density within one mile <sup>1</sup>	3,650	●	2,980	●	1,360	●	3,069	●
2030 Population within one mile <sup>2</sup>	93,320	⊙	107,550	●	157,410	●	101,940	●
2030 Population Density within one mile <sup>2</sup>	5,300	●	4,480	●	2,760	●	4,078	●
2030 Employment within one mile <sup>2</sup>	85,800	⊙	95,760	●	106,910	●	93,920	●
2030 Employment Density within one mile <sup>2</sup>	4,870	●	3,990	●	1,880	●	3,757	●
<b>Social Equity<sup>3</sup></b>								
Zero-car households	6,310	●	6,610	●	6,910	●	5,780	⊙
Population below poverty level	14,290	⊙	14,700	⊙	15,260	⊙	15,120	⊙
Population over 65	8,100	⊙	10,060	●	11,370	●	8,180	⊙
Population under 16 years old	22,680	⊙	25,700	●	30,870	●	21,990	⊙
<b>Community Goals and Objectives</b>								
Consistency with corridor plans	Alternative is shorter than transit enhancements discussed in plans.	○	Alternative is shorter than transit enhancements discussed in plans.	○	Alternative is shorter than transit enhancements discussed in plans.	○	Alternative is shorter than transit enhancements discussed in plans.	○
Consistency with regional, county and local plans	Alternative does not improve capacity and safety between northern Ramsey County and North Branch.	○	Alternative does not improve capacity and safety between northern Ramsey County and North Branch.	○	Alternative does not improve capacity and safety between northern Ramsey County and North Branch.	○	Alternative does not improve capacity and safety between northern Ramsey County and North Branch.	○
<b>Conceptual Engineering</b>								
Potential major capital cost elements	New vehicle storage and maintenance facility? Trail reconstruction/relocation Connection to Maplewood Transit Center	⊙	New bridge at I-694 Relocation of MNRR tracks New vehicle storage and maintenance facility? Trail reconstruction/relocation ROW Connection to Maplewood Transit Center	⊙	Interline with Central Corridor Connection to downtown St. Paul New bridge at I-694 New vehicle storage and maintenance facility? Trail reconstruction/relocation Connection to Maplewood Transit Center	⊙	Potential complete reconstruction of I-35E. Interchange reconstruction at stations. ROW acquisition for segment south of I-694. Structures at I-94/I-35E common segment. Connection to downtown St. Paul. New vehicle storage and maintenance facility?	○
Potential right-of-way availability	Limited between Union Depot in downtown St. Paul and beginning of RCRRRA ROW. Limited at stations.	⊙	Limitations at stations, especially in White Bear Lake	⊙	Limited between Union Depot in downtown St. Paul and beginning of RCRRRA ROW. Limited at stations.	⊙	Severely limited south of I-694.	⊙
Range of order-of-magnitude capital cost <sup>4</sup>	<b>\$300 M - \$740 M</b>	●	<b>\$430 M - \$1.1 B</b>	⊙	<b>\$850 M - \$2.1 B</b>	○	<b>\$440 M - \$1.1 B</b>	⊙
<b>Transportation</b>								
Potential impacts to adjacent transportation facilities	Existing trail on RCRRRA ROW Connection to Union Depot. Freight railway wye, I-94.	⊙	I-694 bridge. Existing trail on RCRRRA ROW Connection to Union Depot Freight railroad relocation Hwy 61 traffic. Freight railway wye, I-94.	⊙	I-694 bridge. Existing trail on RCRRRA ROW Connection to Union Depot. Freight railway wye, I-94.	⊙	I-35E traffic I-35E/I-694 traffic Connection to Union Depot Interline with Central Corridor.	⊙
Existing transit routes and facilities within the corridor	Indirect connection to Maplewood Transit Center (seven bus routes)	⊙	White Bear Lake Shopping Center (Route 265)	⊙	Park-and-ride at Cub White Bear Twp and Forest Lake TC (two bus routes) Indirect connection to Maplewood Transit Center (seven bus routes)	⊙	Indirect connection to Little Canada Transit Center Little Canada City Hall park-and-ride (two routes)	⊙
<b>Draft Recommended Action</b>	<b>See LRT 1B.</b>		<b>Carry forward.</b> Retain LRT 1A as a sub-option.		<b>Eliminate.</b> Population and employment decrease significantly north of I-694, and alternative is cost prohibitive.		<b>Eliminate.</b> ROW requirements could be cost-prohibitive.	
Sources: 2000 U.S. Census, Metropolitan Council								

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