

5. EVALUATION

Introduction

This chapter presents an overview of the evaluation methodology developed for the Southwest Rail Transit Study. The methodology and results are described in more detail in the *Technical Memorandum 4.0 Evaluation*.

Methodology

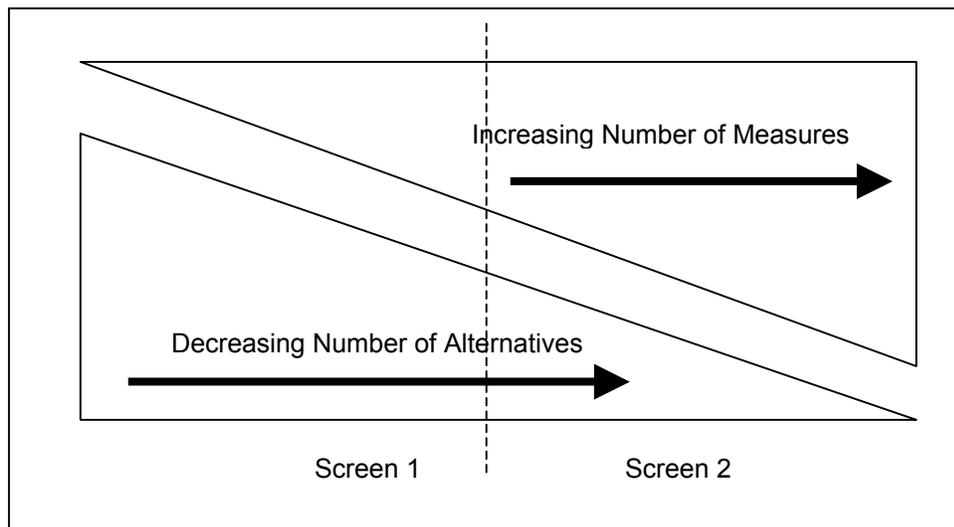
The evaluation process for the Southwest Corridor Rail Study was conducted in two phases, which applied increasingly detailed and comprehensive evaluation measures to a decreasing number of alternatives. The alternatives advanced or carried forward for further evaluation at the end of each phase are those that best meet the Southwest Rail Transitway goals documented in *Chapter 2. Purpose and Need*.

During the initial evaluation phase, Screen 1, several alignment segments were evaluated based on broadly defined, qualitative measures of the potential transportation, economic, and environmental impacts of rail transit. As a result of this analysis, the Southwest Technical Advisory Committee (TAC) recommended a number of alignment segments be evaluated in more detail during the next evaluation phase, Screen 2.

During Screen 2 the remaining alignment segments were combined into alignment options, which were then evaluated based upon more detailed quantitative measures of the potential transportation, economic, environmental and social impacts of rail transit.

The evaluation measures were based on various sources, including those used by the Federal Transit Administration for their New Starts rail transit program and those used in the Twin Cities for the Cedar Avenue Transitway and Red Rock Commuter Rail Feasibility Studies.

Figure 5.1 Evaluation Process



Initial Alignment Segments

The initial set of alignment segments were developed through discussions with local elected officials, the Southwest Technical Advisory Committee (TAC), and suggestions from the general public. The first phase, Screen 1, evaluated all segments on a relatively broad, qualitative level to determine which were the most promising. The segments considered most promising were then compiled into alignment alternatives for evaluation during Screen 2.

For the Screen 1 evaluation, the alignments were segmented into those west of Highway 169, between Highway 169 and Highway 100, and east of Highway 100.

Alignment Segments West of Highway 169

Segment W1 is defined as light rail transit between Highway 312/5 and Highway 169 via the HCRRA property.

Segment W2 is defined as light rail transit between Highway 62 and Highway 169 via the HCRRA property.

Segment W3 is defined as light rail transit from the Southwest Metro Transit Station to Highway 169 via Highway 212 (east side), Shady Oak Road (center) and the HCRRA property.

Segment W4 is defined as light rail transit extending from the Southwest Metro Transit Station to Highway 169 via I-494 and the HCRRA property.

Segment W5 is defined as light rail transit extending from the Southwest Metro Transit Station to Highway 169 via Baker Road and the HCRRA property.

Segment W6 is defined as diesel multiple unit extending from Highway 62 to Highway 169 via the Canadian Pacific Railroad property.

Segment W7 is defined as diesel multiple unit extending from Dell Road to Highway 169 via the Canadian Pacific Railroad property.

Segment W8 is defined as light rail transit from the Southwest Metro Station to Highway 169 via Highway 212 and Highway 169 (west side).

Alignment Segments Between Highway 169 and Highway 100

Segment C1 is defined as light rail transit from Highway 169 to Highway 100 via the HCRRA property.

Segment C2 is defined as diesel multiple unit from Highway 169 to Highway 100 via the Canadian Pacific Railroad property.

Alignment Segments East of Highway 100

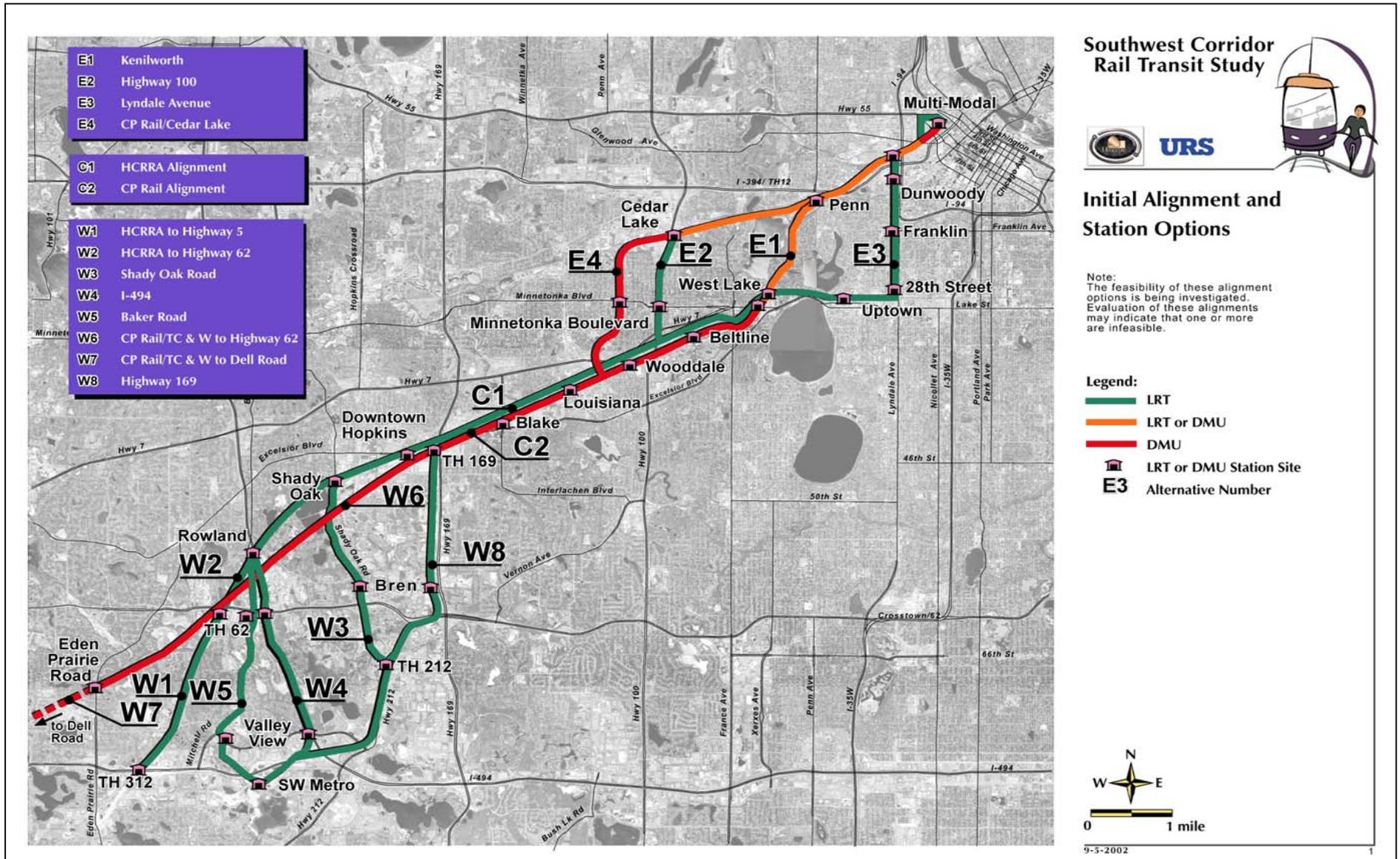
Segment E1 is defined as light rail transit or diesel multiple unit from Highway 100 to downtown Minneapolis via the HCRRA property in St. Louis Park and the Kenilworth Corridor in Minneapolis.

Segment E2 is defined as light rail transit from Highway 100 to downtown Minneapolis via Highway 100 (center) and the Cedar Lake Corridor.

Segment E3 is defined as light rail transit from Highway 100 to downtown Minneapolis via the HCRRA property in St. Louis Park, the Midtown Corridor in Minneapolis and Lyndale Avenue.

Segment E4 is defined as diesel multiple unit from Highway 100 to downtown Minneapolis via the Canadian Pacific Railroad property through St. Louis Park. This option would require the construction of the northern interconnect in St. Louis Park.

Figure 5.2 Initial Alignment Segments



Screen 1 Evaluation

The intent of the Screen 1 evaluation was to analyze a large number of alternatives using relatively broad qualitative measures to indicate which alternatives are likely to be most effective in meeting the Southwest Transitway goals. Those that were considered most effective were retained for further analysis during the Screen 2 evaluation. The detailed results of the Screen 1 evaluation are contained in *Technical Memorandum 4.0: Evaluation*.

Screen 1 Evaluation Measures

Transportation

The transportation evaluation measures are intended to gauge how well an alternative improves transit ridership, provides a competitive travel time, serves population and employment concentrations, connects to other rail transit lines, and impacts traffic.

- **Potential Ridership** defined as the expected transit ridership impact of the new rail transit service.
- **Travel Time** defined as the estimated rail transit travel time.
- **Service Area** defined as service to concentrations of population and employment centers according to the 2000 U.S. Census.
- **Transit Connectivity** defined as the potential to connect to other rail transit lines (applies to all segments except the central segments, C1 and C2).
- **Traffic Impacts** defined as potential impact to traffic patterns and parking.

Economic

The economic evaluation measures are intended to estimate the relative costs and right-of-way availability for each segment.

- **Relative Capital Cost (estimated)** defined as the relative cost (per mile) of building the system.
- **Relative Operating and Maintenance Cost (estimated)** defined as the relative annual cost (per hour) to operate and maintain the system.
- **Right-of-Way** defined as the anticipated cost and difficulty in acquiring and/or leasing right-of-way required to construct and operate the system.

Environmental

The environmental evaluation measures are intended to identify areas where there may be environmental impacts caused by rail transit.

- **Potentially Impacted Natural Environment** defined as wetlands, water bodies, floodplains, and parks located within 50 feet either side of the alignment segment.
- **Potentially Impacted Dwelling Units** defined as dwelling units (single and multi-family) located within 50 feet either side of the alignment segment.

Table 5.1 Screen 1 Evaluation Results

Eastern Segments (E1, E2, E3, and E4)

	E1 - HCRRA (LRT)	E1 - HCRRA (DMU)	E2 - TH 100 (LRT)	E3 - Lyndale (LRT)	E4 - CP Rail (DMU)
Southwest TAC Recommendation	Retain	Retain	Not Retain	Retain	Not Retain

Transportation

	E1 - HCRRA (LRT)	E1 - HCRRA (DMU)	E2 - TH 100 (LRT)	E3 - Lyndale (LRT)	E4 - CP Rail (DMU)
Potential Ridership	Improved transit service should increase ridership.	Required transfer for downtown core & slower travel time than LRT should result in smaller ridership increase compared to LRT.	Improved transit service should increase ridership.	Improved transit service and direct access to Uptown should increase ridership.	Required transfer for downtown core & slower travel time than LRT should result in smaller ridership increase compared to LRT.
Travel Time¹	15.5 minutes	20.5 minutes	14.5 minutes	18.0 minutes	22.5 minutes
Service Area	<p>Direct service to downtown core.</p> <p>Good service to population & employment concentrations in St. Louis Park (Wooddale & Beltline).</p> <p>No direct service to Uptown/South Minneapolis.</p>	<p>Indirect (transfer required) service to downtown core.</p> <p>Good service to population & employment concentrations in St. Louis Park (Wooddale & Beltline).</p> <p>No direct service to Uptown/South Minneapolis.</p>	<p>Direct service to downtown core.</p> <p>Does not serve population & employment concentrations in St. Louis Park (Wooddale & Beltline).</p> <p>No direct service to Uptown/South Minneapolis.</p>	<p>Direct service to downtown core.</p> <p>Good service to population & employment concentrations in St. Louis Park (Wooddale & Beltline).</p> <p>Direct service to Uptown/South Minneapolis.</p>	<p>Indirect (transfer required) service to downtown core.</p> <p>Does not serve population & employment concentrations in St. Louis Park (Wooddale & Beltline).</p> <p>No direct service to Uptown/South Minneapolis.</p>
Transit Connectivity	<p>Direct connection to Hiawatha/Central LRT lines.</p> <p>Transfer required for Uptown/South Minneapolis service.</p>	<p>Transfer required at multi-modal station to connect with Hiawatha/Central LRT lines.</p> <p>Transfer required for Uptown/South Minneapolis service.</p>	<p>Direct connection to Hiawatha/Central LRT lines.</p> <p>Transfer required for Uptown/South Minneapolis service.</p>	<p>Direct connection to Hiawatha/Central LRT lines.</p> <p>Direct service to Uptown/South Minneapolis.</p>	<p>Transfer required at multi-modal station to connect with Hiawatha/Central LRT lines.</p> <p>Transfer required for Uptown/South Minneapolis service.</p>
Traffic & Parking Impacts	No significant impacts.	No significant impacts.	Traffic impacts TH 100 west frontage road.	Eliminates two traffic lanes & some access (right in/right out) limitations on Lyndale Avenue. Loss of 250 to 350 on-street Lyndale Ave. parking spaces.	No significant impacts.

¹ Travel time between TH 100 and Nicollet Mall Station in downtown Minneapolis.

Economic

	E1 - HCRRRA (LRT)	E1 - HCRRRA (DMU)	E2 - TH 100 (LRT)	E3 - Lyndale (LRT)	E4 - CP Rail (DMU)
Relative Capital Cost (per unit)	Least expensive of LRT options. More expensive than DMU options.	Least expensive DMU options. Less expensive than LRT options.	Most expensive LRT option due to structures and right-of-way required. More expensive than DMU options.	More expensive than E1 (LRT) due to structures (Loring Park & Midtown Greenway) & embedded track (Lyndale) More expensive than DMU options.	More expensive than E1 (DMU) due to required northern & southern interconnects. Less expensive than LRT options.
Relative Operating & Maintenance Cost (per unit)	Average for LRT options. Less than DMU options.	More than LRT options due to annual lease payments to private rail companies. Slightly lower than E4 DMU option.	Average for LRT options. Less than DMU options.	Average for LRT options. Less than DMU options.	More than LRT options due to annual lease payments to private rail companies. Slightly higher than E1 DMU option.
Right-of-Way	Majority of right-of-way in public ownership (HCRRRA).	Agreement to use railroad right-of-way needs to be negotiated.	No right-of-way available in the TH 100 Corridor. Acquisition would have significant impacts for St. Louis Park. Requires additional right-of-way at stations.	Majority of right-of-way in public ownership (HCRRRA & Minneapolis) Requires additional right-of-way at stations.	Agreement to use railroad right-of-way needs to be negotiated. Requires additional right-of-way at stations.

Environmental

	E1 - HCRRRA (LRT)	E1 - HCRRRA (DMU)	E2 - TH 100 (LRT)	E3 - Lyndale (LRT)	E4 - CP Rail (DMU)
Potentially Impacted Natural Environment					
Wetlands	No significant impacts.	No significant impacts.	No significant impacts.	No significant impacts.	East of Dakota Park in St. Louis Park.
Water Bodies	Cedar Lake Lagoon (between Cedar Lake and Lake of the Isles).	Cedar Lake Lagoon (between Cedar Lake and Lake of the Isles).	No significant impacts.	Lake of the Isles Lagoon (between Lake Calhoun and Lake of the Isles).	No significant impacts.
Floodplains	No significant impacts.	No significant impacts.	No significant impacts.	No significant impacts.	No significant impacts.
Parks	No significant impacts.	No significant impacts.	No significant impacts.	Loring Park.	No significant impacts.
Potentially Impacted Dwelling Units (w/in 50 feet)	near Lake Street in Minneapolis.	near Lake Street in Minneapolis.	Between 28 th Street and Wooddale Avenue.	Lyndale Avenue and 29 th Street Greenway near Lake Street.	28 th Street and Wooddale Avenue.

Central Segments (C1 and C2)

	C1 - HCRRA (LRT)	C2 - CP Rail (DMU)
Southwest TAC Recommendation	Retain	Retain

Transportation

	C1 - HCRRA (LRT)	C2 - CP Rail (DMU)
Potential Ridership	Improved transit service should increase ridership.	Improved transit service should increase ridership.
Travel Time²	7.0 minutes	8.5 minutes
Service Area	Good service to population & employment concentrations in Hopkins & St. Louis Park.	Good service to population & employment concentrations in Hopkins & St. Louis Park.
Transit Connectivity	N/A	N/A
Traffic & Parking Impacts	No significant impacts.	No significant impacts.

Economic

	C1 - HCRRA (LRT)	C2 - CP Rail (DMU)
Relative Capital Cost (per unit)	Slightly higher than DMU option.	Slightly lower than LRT option.
Relative Operating & Maintenance Cost (per unit)	Slightly lower than DMU option.	More than LRT option due to annual lease payments to private rail companies.
Right-of-Way	Majority of right-of-way in public ownership (HCRRA).	Agreement to use railroad right-of-way needs to be negotiated. Requires additional right-of-way for stations.

Environmental

	C1 - HCRRA (LRT)	C2 - CP Rail (DMU)
Potentially Impacted Natural Environment		
Wetlands	No significant impacts.	No significant impacts.
Water Bodies	Minnehaha Creek.	Minnehaha Creek.
Floodplains	Minnehaha Creek.	Minnehaha Creek.
Parks	No significant impacts.	No significant impacts.
Potentially Impacted Dwelling Units (w/in 50 feet)	West of TH 100.	West of TH 100.

² Travel time between TH 100 and TH 169.

WESTERN SEGMENTS (W1- W8)

	W1- HCRRRA/TH312 (LRT)	W2-HCRRRA/TH62 (LRT)	W3-Shady Oak (LRT)	W4-I-494 (LRT)	W5- Baker Rd. (LRT)	W6- TH 62 (DMU)	W7- Dell Rd. (DMU)	W8 - TH169 (LRT)
Southwest TAC Recommendation	Retain	Combine with W1	Not Retain	Retain	Not retain	Combine with W7	Retain	Retain

Transportation

	W1- HCRRRA/TH312 (LRT)	W2-HCRRRA/TH62 (LRT)	W3-Shady Oak (LRT)	W4-I-494 (LRT)	W5- Baker Rd. (LRT)	W6- TH 62 (DMU)	W7- Dell Rd. (DMU)	W8 - TH169 (LRT)
Potential Ridership	Improved transit service should increase ridership.	Improved transit service should increase ridership	Improved transit service should increase ridership.	Improved transit service should increase ridership.	Improved transit service should increase ridership.	Improved transit service should increase ridership.	Improved transit service should increase ridership.	Improved transit service should increase ridership .
Travel Time³	14.0 minutes	10.5 minutes	14.5 minutes	15.0 minutes	15.0 minutes	8.5 minutes	13.0 minutes	12.5 minutes
Service Area	Serves employment concentrations in Hopkins & Minnetonka (SuperValu, Minnetonka Business Park)	Serves employment concentrations in Hopkins & Minnetonka (SuperValu, Minnetonka Business Park)	Serves employment & population concentrations in Hopkins, Minnetonka and Eden Prairie (Opus Business Park, Golden Triangle).	Due to freeway right-of-way location provides indirect service to population and employment concentrations in Minnetonka & Eden Prairie.	Serves employment & population concentrations in Hopkins, Minnetonka and Eden Prairie (e.g. Minnetonka Business Park).	Serves employment & population concentrations in Hopkins, Minnetonka and part of Eden Prairie.	Serves employment & population concentrations in Hopkins, Minnetonka, Eden Prairie and potentially Chanhassen.	Serves employment concentration, particularly the Minnetonka Corporate Center on Bren Road.
Transit Connectivity	Requires new transit station at TH 312. Able to extend to Southwest via the HCRRRA property.	Requires new transit station at TH 62. Able to extend to Southwest via the HCRRRA property.	Connects to SW Metro Station. Unknown extension beyond SW Metro Station.	Connects to SW Metro Station. Unknown extension beyond SW Metro Station.	Connects to SW Metro Station. Unknown extension beyond SW Metro Station.	Requires new transit station at TH 62. Able to extend to Southwest via the CP rail line.	Requires new transit station at Dell Road. Able to extend to Southwest via the CP rail line.	Connects to SW Metro Station. Unknown extension beyond SW Metro Station.
Traffic & Parking Impacts	No significant impacts.	No significant impacts.	Driveway and minor cross-streets on Shady Oak Road would be limited to right-in/right-out access.	No significant impacts.	Driveway and minor cross-streets on Baker Road could be limited to right-in/right-out access.	No significant impacts.	No significant impacts.	No significant impacts.

³ Travel time between TH 100 and TH 169.

Economic

	W1- HCRRA/TH312 (LRT)	W2-HCRRA/TH62 (LRT)	W3-Shady Oak (LRT)	W4-I-494 (LRT)	W5- Baker Rd. (LRT)	W6- TH 62 (DMU)	W7- Dell Rd. (DMU)	W8 - TH169 (LRT)
Relative Capital Cost (per unit)	Average for LRT options. More expensive than DMU options.	Average for LRT options. More expensive than DMU options.	More expensive than other LRT options due to Shady Oak Rd. reconstruction, embedded tracks & structures. More expensive than DMU options.	Average for LRT options. More expensive than DMU options.	More expensive than other LRT options due to Baker Rd. reconstruction, embedded tracks & structures. More expensive than DMU options.	Less expensive than LRT options. Average for DMU options.	Less expensive than LRT options. Average for DMU options.	More expensive than other LRT options due to structures required. More expensive than the DMU options.
Relative Operating & Maintenance Cost (per unit)	Average for LRT options. Less than DMU options.	Average for LRT options. Less than DMU options.	Average for LRT options. Less than DMU options.	Average for LRT options. Less than DMU options.	Average for LRT options. Less than DMU options.	More than LRT options due to annual lease payments. Slightly higher than E1 DMU option.	More than LRT options due to annual lease payments. Slightly higher than E1 DMU option.	Average for LRT options. Less than DMU options.
Right-of-Way	Majority of right-of-way in public ownership (HCRRA).	Majority of right-of-way in public ownership (HCRRA).	Requires additional right-of-way along Shady Oak Road. Requires right-of-way at stations.	Assumes use of Mn/DOT right-of-way along I-494. Requires right-of-way at stations.	Requires additional right-of-way along Baker Road. Requires right-of-way at stations.	Agreement to use railroad right-of-way needs to be negotiated. Requires right-of-way at stations.	Agreement to use railroad right-of-way needs to be negotiated. Requires right-of-way at stations.	Requires additional right-of-way required along TH 169. Requires right-of-way at stations.

Environmental

	W1- HCRRA/TH312 (LRT)	W2-HCRRA/TH62 (LRT)	W3-Shady Oak (LRT)	W4-I-494 (LRT)	W5- Baker Rd. (LRT)	W6- TH 62 (DMU)	W7- Dell Rd. (DMU)	W8 - TH169 (LRT)
Potentially Impacted Natural Environment								
Wetlands	Shady Oak Lake and east of Glen lake.	Shady Oak Lake and east of Glen lake.	south of TH 62.	Shady Oak Lake	Shady Oak Lake, Forest Hills School Park and along Bent Creek.	No significant impacts.	No significant impacts.	Valley park.
Other Water Bodies	Shady Oak Lake & three small creeks.	Shady Oak Lake & two small creeks.	Shady Oak Lake & two small creeks.	Shady Oak Lake & three small creeks.	Shady Oak Lake & Bent Creek.	Shady Oak Lake, Birch Island Lake & Purgatory Creek	Shady Oak Lake, Birch Island Lake, Duck Lake & Purgatory Creek	Valley Park.
Floodplains	No significant impacts.	No significant impacts.	No significant impacts.	No significant impacts.	No significant impacts.	No significant impacts.	No significant impacts.	Valley Park.
Parks	No significant impacts.	No significant impacts.	Shady Oak Beach Park.	No significant impacts.	Forest Hills School Park.	Birch Island Lake Park.	Birch Island Lake Park.	Valley Park.
Potentially Impacted Dwelling Units (w/in 50 feet)	Edenvale Boulevard and Valley View Road.	Northwest of Shady Oak Lake.	East side of Shady Oak Road between Bren Road and TCWRR R/W.	HCRRA right-of-way.	Baker Road between CSAH 62 and Valley View Road.	Railroad right-of-way south of Birch Island Lake Park.	between Duck Lake & Dell Road Along R/W south of Valley View Road.	East of Highway 169 between Highway 62 and Valley View Road.

Screen 1 Recommendations

The Southwest Technical Advisory Committee (TAC) reviewed the Screen 1 evaluation and recommended that the most promising segments be considered for further study.

Segments Recommended for Continued Study

Segment W1: LRT from Highway 312/5 to Highway 169 via the HCRRA property

Segment W4: LRT from the Southwest Metro Station to Highway 169 via I-494 & the HCRRA property

Segment W7: DMU from Dell Road to Highway 169 via the CP rail line

Segment W8: LRT from the Southwest Metro Station to Highway 169 via Highways 212 and 169

Segment C1: LRT from Highway 169 to Highway 100 via the HCRRA property

Segment C2: DMU from Highway 169 to Highway 100 via the CP rail line

Segment E1: LRT or DMU from Highway 100 to downtown Minneapolis via the Kenilworth Corridor

Segment E3: LRT from Highway 100 to downtown Minneapolis via the Midtown Greenway and Lyndale Avenue

Segments NOT Recommended for Continued Study

Segment W3: LRT between the Southwest Metro Station and Highway 169 via Shady Oak Road
This segment was not recommended for further study due to relatively high capital and right-of-way costs; additional right-of-way requirements along Shady Oak Road; and, significant traffic impacts on Shady Oak Road due to lane use for LRT and access modifications (right in/right out).

Segment W5: LRT between the Southwest Metro Station and Highway 169 via Baker Road
This segment was not recommended for further study due to relatively high capital and right-of-way costs; additional right-of-way requirements along Baker Road; and, significant traffic impacts on Baker Road due to lane use for LRT and access modifications (right in/right out).

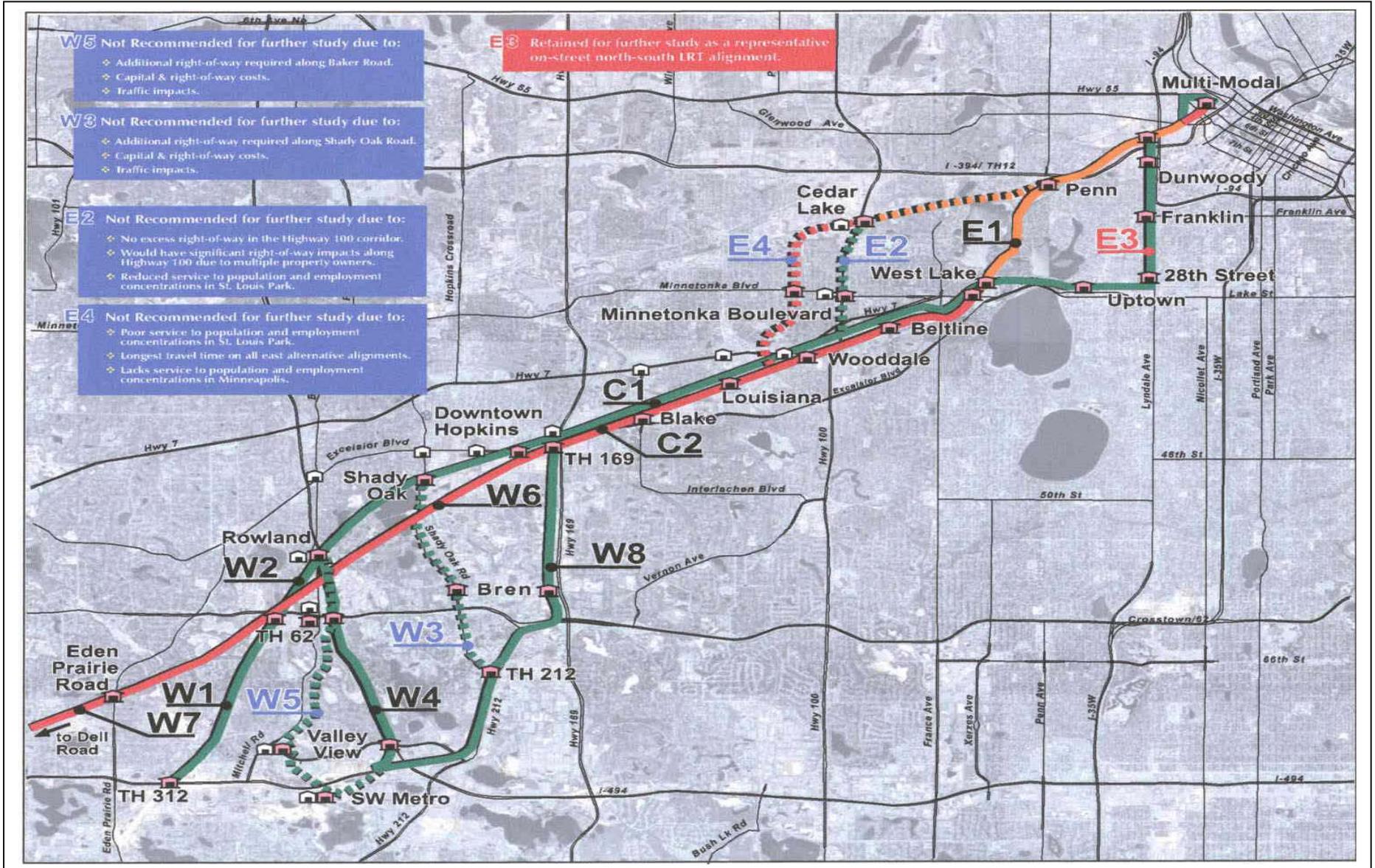
Segment W2: LRT from Highway 62 to Highway 169 via the HCRRA property
This segment was recommended to be combined with segment W1, which terminates at Highway 312/5.

Segment W6: DMU from Highway 62 to Highway 169 via the CP rail line
This segment was recommended to be combined with segment W7, which terminates at Dell Road.

Segment E2: LRT from Highway 100 to downtown Minneapolis via Highway 100
This segment was not recommended for further study due to the lack of available right-of way within the Highway 100 Corridor; the potential difficulty and negative community impacts of acquiring the necessary right-of-way on the west side of Highway 100; and, the lack of rail transit service to population and employment concentrations in St. Louis Park, especially around Wooddale Avenue and Beltline Boulevard.

Segment E4: DMU from Highway 100 to downtown Minneapolis via the CP & BNSF Rail lines
This segment was not recommended for further study due to the lack of service to population and employment concentrations in St. Louis Park, significantly longer travel time, and less potential to improve ridership.

Figure 5.3 Screen 1 Recommendation



Screen 2 Evaluation

For the Screen 2 evaluation, the segment options from the Screen 1 evaluation were compiled into routing alignments. In addition, an Express Bus Baseline alternative (Route 650) was defined in order to compare the rail options to a bus option.

Screen 2 Alignment Alternatives

Express Bus Baseline Alternative (Route 650)

The Route 650 Express Bus Baseline Alternative was defined as a limited-stop bus route mimicking the rail transit options. The Route 650 alternative extends from the Southwest Metro Transit Station in Eden Prairie to downtown Minneapolis via Highway 5, Mitchell Road, Baker Road, Excelsior Boulevard, Highway 169, Highway 7, Highway 25 to Beltline Boulevard (to access a park-and-ride lot), to Highway 100 (shoulders) and I-394 High Occupancy Vehicle (HOV) lane. The purpose of the Route 650 is to compare the results of a bus only system with that of a bus-rail system.

LRT 1A (combines segments W1 + C1 + E1)

This alternative is defined as light rail transit from Highway 312/5 to downtown Minneapolis via the HCRRA property and the Kenilworth Corridor.

LRT 1B (combines segments W1 + C1 + E3)

This alternative is defined as light rail transit from Highway 312/5 to downtown Minneapolis via the HCRRA property, the Midtown Greenway Corridor, and Lyndale Avenue.

LRT 2A (combines segments W4 + C1 + E1)

This alternative is defined as light rail transit from the Southwest Metro Transit Station to downtown Minneapolis via the I-494 Corridor, the HCRRA property, and the Kenilworth Corridor.

LRT 2B (combines segments W4 + C1 + E3)

This alternative is defined as light rail transit from the Southwest Metro Transit Station to downtown Minneapolis via the I-494 Corridor, the HCRRA property, the Midtown Greenway Corridor, and Lyndale Avenue.

LRT 3A (combines segments W8 + C1 + E1)

This alternative is defined as light rail transit from the Southwest Metro Transit Station to downtown Minneapolis via Highways 212 and 169, the HCRRA property, and the Kenilworth Corridor.

LRT 3B (combines segments W8 + C1 + E3)

This alternative is defined as light rail transit from the Southwest Metro Transit Station to downtown Minneapolis via Highways 212 and 169, the HCRRA property, the Midtown Greenway Corridor, and Lyndale Avenue.

LRT 4A (combines segments C1 + E1)

This alternative is defined as light rail transit from downtown Hopkins to downtown Minneapolis via the HCRRA property and the Kenilworth Corridor.

LRT 4B (combines segments C1 + E3)

This alternative is defined as light rail transit from downtown Hopkins to downtown Minneapolis via the HCRRA property, the Midtown Greenway Corridor, and Lyndale Avenue.

DMU 5 (combines segments W7 + C2 + E1)

This alternative is defined as diesel multiple unit from Dell Road to downtown Minneapolis via the Canadian Pacific, Kenilworth, and Burlington Northern Santa Fe freight rail lines. This alternative assumes that both freight rail and DMU operate in the Kenilworth Corridor.

Screen 2 Evaluation Measures

The Screen 2 Evaluation applied more quantitative measure to determine how well the alternatives address the Southwest Rail Transitway goals. *Technical Memorandum 4.0 Evaluation* contains a detailed description of the Screen 2 evaluation.

For purposes of the Screen 2 Evaluation, the measures were grouped into four categories: transportation, economic, environmental, and social.

Screen 2 Evaluation Measures

Transportation

These evaluation measures are intended to gauge how well each alternative attract riders, improves mobility through reducing travel time and attracting riders, serve population and employment concentrations, and provide travel choices.

- **Forecasted Ridership** defined as the estimated 2020 weekday transit ridership using the Metropolitan Council's travel demand model.
- **Travel Time Savings** defined as the year 2020 change in annual vehicle hours traveled (VHT) relative to the Route 650 Express Bus Baseline Alternative using the Metropolitan Council's regional model. This applies to automobile trips only.
- **Transit Connectivity** defined as a qualitative assessment of an alternative's ability to connect to the Hiawatha and proposed Central light rail transit lines.
- **Travel Time Reliability** defined as a qualitative assessment of an alternative's susceptibility to fluctuations in travel time due to traffic congestion, roadway accidents and inclement weather.
- **Travel Time Comparison** (Rail Transit vs. Single Occupant Vehicles): defined as the estimated afternoon rush hour travel time via rail transit versus single occupant vehicles for a number of origin/destination pairs.
- **Service Area** defined as an estimate of the number of jobs and households within one-half mile of transit stations using 2000 U.S. Census data. The purpose of this measure is to identify concentrations of households and employment along or proximate to an alternative.
- **Traffic & Parking Impacts** defined as where existing traffic lanes would be affected by the construction of an alternative, identifies where at-grade crossings would exist, elimination of parking, park & ride demand, and access/circulation issues at stations.



Economic

These measures are intended to examine the costs and the cost-effectiveness of each alternative.

- **Estimated Capital Cost** defined as the one-time costs to construct a rail system, namely the guideway, stations, structures, right-of-way, cost of engineering (design), administration and contingencies.
- **Estimated Operating and Maintenance (O&M) Cost** defined as the on-going annual costs to operate and maintain the rail system.

Environmental

These measures are intended to indicate the potential environmental impacts and benefits of each alternative.

- **Impact to Air Quality** defined as an estimate of the annual reduction of carbon dioxide (CO₂) emissions in metric tons relative to the Route 650 Express Bus Baseline Alternative in year 2020.
- **Potentially Impacted Natural Environment** defined as an inventory of all wetlands, water bodies, floodplains, and parklands located within 50 feet either side of each proposed alignment option.
- **Potential Proximity Impacts** defined as the estimated sound exposure level, generalized ground surface vibration, and the number of dwelling units within 50 and 100 feet of proposed alignment.

Social

These measures are intended to gauge the potential impacts and /or benefits to the study area and the region of each alternative.

- **Potential for Transit-Oriented Land Use Development** defined as a qualitative assessment of the potential for transit-oriented development at stations, consistency with regional plans, and consistency with local comprehensive plans.
- **Environmental Justice** defined as an estimate of the number of minority and low-income households within one-half mile of stations as a percent of county totals, using 2000 U.S. Census data.
- **Consistency with Federal/Regional Policies (Access to Jobs)** defined as an estimate of the number of low-income households and jobs within one-half mile of stations, using 2000 U.S. Census data and the Metropolitan Council's 2020 forecast. The intent of this measure is to indicate the degree to which an alternative provides access to jobs for low-income persons.
- **Neighborhood/Community Cohesion** defined as a qualitative assessment of an alternative's potential impacts on access to and from neighborhoods or communities. Access is defined to include the transit system or station as a focus of the community.
- **Impact on Property Values** defined as a qualitative assessment of an alternative's potential impact on adjacent residential and commercial properties. This assessment is based on information from other regions across the country with rail transit.

Figure 5.2 Screen 2 Evaluation Results

	Bus Base	1a	1b	2a	2b	3a (modified)	3b	4a	4b	5
SW TAC Recommendation	Retain	Retain	Not Retain	Retain	Not Retain	Retain	Not Retain	Retain	Not Retain	Not Retain

Transportation

	Bus Base	1a	1b	2a	2b	3a (modified)	3b	4a	4b	5
2020 Forecasted Rail Transit Ridership	7,000	17,450	19,925	18,500	20,975	17,800	19,375	16,500 ⁴	18,275	16,975
Travel Time Savings (Vehicle hours of Travel)	N/A	330,000	300,000	330,000	270,000	300,000	285,000	150,000	90,000	240,000
System Connectivity <ul style="list-style-type: none"> • Connections to 2010 transitways • Future extensions 	Indirect On roadways	Direct HCRRA	Direct HCRRA	Direct undetermined	Direct undetermined	Direct undetermined	Direct undetermined	Direct HCRRA	Direct HCRRA	Indirect CP Rail
Travel Time Reliability Travel time fluctuations	Moderately Reliable	Highly Reliable	Highly Reliable	Highly Reliable	Highly Reliable	Highly Reliable	Highly Reliable	Highly Reliable	Highly Reliable	Highly Reliable
Rail Transit versus SOV Travel Time										
Minneapolis CBD to SW Metro Transit Station		NA/NA	NA/NA	31/34	35/34	29/34	33/34	NA/NA	NA/NA	NA/NA
UMN to Southwest Metro Transit Station		NA/NA	NA/NA	40/38	44/38	40/38	44/38	NA/NA	NA/NA	NA/NA
Minneapolis CBD to Hopkins		18/26	22/26	18/26	22/26	18/26	22/26	22/26	22/26	30/26
St. Louis Louis Park to MSP		33/31	37/31	33/31	37/31	33/31	37/31	37/31	37/31	45/31
Hopkins to Uptown (Hennepin & Lake)		NA/NA	12/19	NA/NA	12/19	NA/NA	12/19	12/19	12/19	NA/NA
Service Area (2000 U.S. Census) <ul style="list-style-type: none"> • Employment within 1/2 mile of stations • Households within 1/2 mile of stations 	221, 870 15,614	198,000 16,084	206,069 31,573	195,307 16,213	203,376 31,702	209,267 14,684	217,336 30,174	187,878 13,465	194,177 26,522	195,066 15,349
Traffic/Parking Impacts <ul style="list-style-type: none"> • Disruption/elimination of general traffic lanes • At-grade crossings • Elimination/consolidation of parking • Park & Ride demand • Access/circulation issues at stations 	N/A 0 None 2,500 None	None 28 None 4,560 TH312	Lyndale (2 lanes) 44 Lyndale* 4,110 TH312	None 28 None 4,795 TH62	Lyndale (2 lanes) 37 Lyndale* 4,345 TH62	TH 169 23 None 4,560 TH 212 Shady Oak	Lyndale (2 lanes) 39 Lyndale* 3,905 TH 212 Shady Oak	None 16 None 3,635 None	Lyndale (2 lanes) 28 Lyndale* 3,175 None	None 29 None None

** requires the elimination of 300 on-street parking spaces and their consolidation into structured parking

⁴ Source: 29th Street & Southwest Busway Feasibility Study, Hennepin County, 2000.

	Bus Base	1a	1b	2a	2b	3a (modified)	3b	4a	4b	5
SW TAC Recommendation	Retain	Retain	Not Retain	Retain	Not Retain	Retain	Not Retain	Retain	Not Retain	Not Retain

Economic

	Bus Base	1a	1b	2a	2b	3a	3b	4a	4b	5
Capital Costs In Millions (2003 & 2010)	\$72.2 \$87.3	\$503.0 \$606.1	\$614.8 \$740.9	\$582.0 \$701.4	\$691.4 \$833.1	\$663.4 \$799.4*	\$769.1 \$926.8*	\$358.0 \$431.3	\$468.7 \$564.8	\$425.5 \$512.7
<ul style="list-style-type: none"> • 2003 (current year) • 2010 (anticipated construction year) 										
Operating & Maintenance Costs in Millions (2003)	\$9.9	\$15.7	\$16.8	\$16.0	\$17.1	\$14.9	\$16.2	\$6.4	\$7.8	\$19.2 - 25.7*

* Includes Hopkins Spur at an estimated cost of \$45.2 million (2003) and \$54.5 million (2010)

** Includes the estimated annual lease payment of \$1 to 7.5 million.

Environmental

	Bus Base	1a	1b	2a	2b	3a	3b	4a	4b	5
Air Quality										
• Reduction in HCVOG in metric tons annually	N/A	33.1	31.2	32.8	18.2	22.1	20.2	13.9	13.3	27.0
• Reduction in NOX in metric tons annually	N/A	12.7	11.9	12.6	7.0	8.5	7.7	5.3	5.1	10.4
• Reduction in CO in metric tons annually	N/A	179.7	168.9	178.0	98.5	120.1	109.3	75.3	72.0	146.6
Noise and Vibration										
• Noise (for vehicle)	N/A	82 dBA	82 dBA	82 dBA	82 dBA	82 dBA	82 dBA	82 dBA	82 dBA	90dBA
• Vibration (for vehicle)	N/A	73VdB	73VdB	73VdB	73VdB	73VdB	73VdB	73VdB	73VdB	84VdB
• Potential # of impacted dwelling units (within 100 feet single-family/multi-family) (within 200 feet single-family/multi-family)	N/A	35/155 100/290	65/485 110/555	125/145 40/255	42/475 50/520	7/145 60/255	37/475 70/520	5/145 30/255	35/400 40/250	20/180 130/310
Potentially Affected Natural Environment										
Wetland Impact	N/A	7	7	8	8	9	9	4	0	4
Water Bodies (<i>Lakes, Rivers, Creeks, etc.</i>)	N/A	10	10	9	9	8	8	9	2	9
Parklands	N/A	6	6	5	5	5	5	7	2	7
Floodplains	N/A	2	2	2	2	2	2	2	0	2

	Bus Base	1a	1b	2a	2b	3a (modified)	3b	4a	4b	5
SW TAC Recommendation	Retain	Retain	Not Retain	Retain	Not Retain	Retain	Not Retain	Retain	Not Retain	Not Retain

Social

	Bus Base	1a	1b	2a	2b	3a	3b	4a	4b	5
Potential for TOD at stations										
• TOD potential at station locations	Low	High	Moderate							
• Consistency with regional growth plan (i.e., Blueprint/Transit 2020)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
• Consistency with local comprehensive plans	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Environmental Justice										
• Percentage of minority households within ½ mile of stations (relative to county totals)	13.6%	11.1%	15.1%	11.4%	15.3%	11.9%	15.7%	12.2%	16.6%	11.3%
• Percentage of low income households within ½ mile of stations (relative to county totals)	8.7%	8%	10.3%	8%	10.3%	8.2%	10.5%	8.7%	11.1%	8%
Consistency with Access to Jobs Program										
• Employment within ½ mile of stations	81,870	58,000	66,069	55,307	63,376	69,267	77,336	47,878	54,177	55,066
• Low-income households within 1/2 mile of stations	1,362	1,284	3,232	1,301	3,249	1,203	3,151	1,167	2,941	1,244
Promote Neighborhood/Community Cohesion										
• Barrier for access to/from community	No	No	No	No	No	No	No	No	No	No
Protect Property Values										
• Potential impact to residential/commercial properties within 1/2 mile of stations	None	None or Positive								

Southwest Technical Advisory Committee (TAC) Recommendation

The Southwest Technical Advisory Committee (TAC) developed the following recommendation regarding which rail transit alternatives should be included in future studies.

The Southwest TAC's recommendation was presented to the public at a series of open houses in May 2003 prior to being presented to the Southwest Policy Advisory Committee (PAC) for their consideration.

Southwest Technical Advisory Committee (TAC) Recommendation

Based upon the results of the Screen 2 Evaluation, the Southwest TAC recommended that alternatives LRT 1A, LRT 2A, LRT 4A, and a modified LRT 3A continue to be considered in future studies. The Southwest TAC also recommended that the diesel multiple unit (DMU) technology (DMU 5) and the Lyndale Avenue alternatives (LRT 1B, LRT 2B, LRT 3B, and LRT 4B) no longer be considered in future studies.

Alternatives Recommended for Further Study

LRT 1A: Highway 312/5 to downtown Minneapolis via the HCRRA property & Kenilworth

This alternative is projected to carry 17,450 trips per day, cost \$606 million in year 2010 dollars to construct, cost \$15.7 million in year 2010 dollars annually to operate, serve 16,000 households and 198,000 jobs, and provide a travel time from TH 312/5 to Nicollet Mall Street of 35 minutes.

LRT 2A: SW Metro to downtown Minneapolis via I-494, the HCRRA property, & Kenilworth

This alternative is projected to carry 18,500 trips per day, cost \$701 million in year 2010 dollars to construct, cost \$16 million in year 2010 dollars annually to operate, serve 16,200 households and 195,300 jobs, and provide a travel time from the Southwest Metro Transit Station to Nicollet Mall of 30 minutes.

LRT 4A: downtown Hopkins to downtown Minneapolis via the HCRRA property

This alternative is projected to carry 16,500 trips per day, cost \$431 million in year 2010 dollars to construct, cost \$6.4 million in year 2010 dollars annually to operate, serve 13,500 households and 187,900 jobs, and provide a travel time from downtown Hopkins to Nicollet Mall of 25 minutes.

Modified LRT 3A: SW Metro to downtown Minneapolis via Eden Prairie Center, Golden Triangle, Opus, & Hopkins

Originally, the Southwest TAC decided to recommend that LRT 3A be removed from future consideration due to the high capital costs and relatively low ridership from the stations in Eden Prairie and Minnetonka. The relatively high capital costs resulted from the structures that are required to cross through the wetland adjacent to Highway 169 south of Hopkins and to access the Southwest Metro Transit Station in Eden Prairie. Southwest TAC members theorized that the relatively low ridership from the stations in Eden Prairie and Minnetonka was due to their location within the highway right-of-way which made them relatively inaccessible for employees working in the Golden Triangle, Opus, and downtown Hopkins.

Rather than recommending that LRT 3A be removed from consideration, the Southwest TAC decided to recommend to the Southwest Policy Advisory Committee (PAC) that LRT 3A be modified to reroute it to more directly serve the employment concentrations located near the Eden Prairie Center Mall, the Golden Triangle, Opus, and downtown Hopkins. The Southwest TAC recommended that this modified alignment be included in future studies along with LRT 1A, LRT 2A, and LRT 4A.

Alternatives NOT Recommended for Further Study

Diesel Multiple Unit (DMU) Technology (Alternative 5)

The Southwest TAC rationale for excluding the Diesel Multiple Unit (DMU) technology from further consideration because they determined that the DMU alternative did not provide a lower-cost alternative to LRT when both capital and operating/maintenance costs were considered. The Southwest TAC also found that due to the annual lease agreement requirements with three private freight rail companies, DMU service might not be able to be implemented more quickly than LRT. Other issues related to DMU service include the lack of a seamless connection to downtown Minneapolis, the University of Minneapolis, the Minneapolis-St. Paul Airport, the Mall of America, and downtown St. Paul; the slower travel times; the additional wear and tear on the Aero DMU vehicle which is not designed to stop every 1/2 to 1 mile; and, finally that the Aero DMU vehicle is still in the demonstration phase and is not in operation anywhere in the world.

Lyndale Avenue options (LRT Alternatives 1B, 2B, 3B, and 3B)

The Southwest TAC rationale for excluding the Lyndale Avenue LRT alternatives (i.e., LRT 1B, LRT 2B, LRT 3B, and LRT 4B) included traffic, business, visual/aesthetic, and cost impacts.

In terms of traffic impacts, a median running Lyndale Avenue LRT line will mean the elimination of the center two lanes of traffic on Lyndale Avenue. In addition, the Bryant and Aldrich bridges over the Midtown Greenway Corridor would be removed in order to allow the light rail vehicles sufficient space to accomplish the grade change that exists between the Midtown Greenway Corridor and Lyndale Avenue.

In terms of business impacts, the 300 on-street parking spaces on Lyndale Avenue would be removed and consolidated into one to two parking structures along Lyndale Avenue from 28th Street to Franklin Avenue. In addition, due to the required structure for the LRT to climb over the Hennepin/Lyndale Avenue exit ramps from I-94 there will be access restrictions to Lyndale Avenue businesses in the vicinity of Franklin Avenue.

In terms of visual/aesthetic impacts, an LRT structure would be required from south of Franklin Avenue to the Basilica. This structure would be elevated to carry the LRT over the Hennepin/Lyndale Avenue exit ramps from I-94 and the Harriet Irene Huxley pedestrian bridge between Loring Park and the Walker Sculpture Gardens.

In terms of capital costs, the Lyndale Avenue LRT option is estimated to cost approximately \$100 million more than the Kenilworth option.

Figure 5.4 Screen 2 Evaluation Results

