
Ann Arbor-Downtown Detroit
Alternatives Analysis / Draft Environmental
Impact Statement
Transit Study

Detailed Screening of
Alternatives

Final Draft

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TABLE OF CONTENTS

TABLE OF CONTENTS	1
1.0 INTRODUCTION.....	2
1.1 ALTERNATIVES ANALYSIS.....	2
1.2 REPORT ORGANIZATION	3
2.0 SUMMARY DESCRIPTION OF ALTERNATIVES.....	5
2.1 TRANSPORTATION SYSTEM MANAGEMENT (TSM) ALTERNATIVE.....	5
2.2 BRT 5 (MICHIGAN AVENUE)	6
2.3 BRT 6 (I-94/MICHIGAN AVENUE)	7
2.4 LRT 5 (MICHIGAN AVENUE).....	8
2.5 CRT 1 (NORFOLK SOUTHERN MICHIGAN LINE).....	9
2.6 CRT 2 (I-94/NORFOLK SOUTHERN DETROIT DIVISION)	10
3.0 ALTERNATIVES EVALUATION METHODOLOGY	17
3.1 OVERVIEW OF EVALUATION PROCESS	17
3.2 DETAILED SCREENING CRITERIA	17
4.0 EVALUATION OF BUILD ALTERNATIVES.....	22
4.1 KEY EVALUATION CRITERIA.....	22
4.2 OTHER EVALUATION CRITERIA	23
4.3 SUMMARY OF SIGNIFICANT FINDINGS AND RECOMMENDATIONS	23
5.0 PUBLIC INVOLVEMENT.....	27
5.1 STEERING COMMITTEE FEEDBACK	28
5.2 PUBLIC FEEDBACK.....	28
6.0 RESPONSE TO SCREENING.....	30
6.1 DEFINITION OF CRT 1 MODIFIED.....	30
6.2 ANALYSIS OF CRT 1 MODIFIED.....	32
7.0 CONCLUSIONS AND RECOMMENDATIONS.....	34
8.0 NEXT STEPS.....	35

1.0 INTRODUCTION

The Ann Arbor to Downtown Detroit Alternatives Analysis and Draft Environmental Impact Statement Transit Study (Ann Arbor-Downtown Detroit AA/DEIS) is being conducted by the Southeast Michigan Council of Governments (SEMCOG) in cooperation with the Federal Transit Administration (FTA) and the Federal Highway Administration (FHWA) to evaluate potential rapid transit improvements in the 55-mile corridor between Ann Arbor and Downtown Detroit in Southeast Michigan. The proposed transit improvements are intended to:

- Begin implementing the regional transit plan, *Improving Transit in Southeast Michigan: a Framework for Action* (2001);
- Provide direct transit connections between Ann Arbor, Detroit, and Detroit Metropolitan Wayne County Airport (Metro Airport);
- Expand Southeast Michigan's transit network; and,
- Create an east-west spine on which to build a comprehensive, integrated regional transit network over time.

This AA/DEIS is the first step of the federal project development and environmental review process for a major transit investment. Overall, the purpose of the study is to help decision-makers select a Locally Preferred Alternative (LPA) for the corridor.

1.1 Alternatives Analysis

The Ann Arbor-Detroit AA/DEIS is currently in the Alternatives Analysis phase of study. In this phase, the full range of reasonable alternatives for the corridor are identified, evaluated, and documented. The purpose of the process is to evaluate the effectiveness of a wide range of transportation options in the Ann Arbor-Downtown Detroit corridor, narrowing the list of alternatives to a select few that would best meet the needs of the corridor. These few alternatives would then be carried forward for more detailed evaluation in the DEIS. The Alternatives Analysis process incorporates the views of corridor stakeholders and decision makers, including local, regional, and state interests.

Three different technologies (modes) were considered for their ability to provide direct service between Ann Arbor, Detroit, and Metro Airport: Bus Rapid Transit (BRT), Light Rail Transit (LRT), and Commuter Rail Transit (CRT). These three modes were combined with six "trunk lines" between Ann Arbor and Detroit to develop a set of ten initial alternatives, including three BRT alternatives, five LRT alternatives, and two CRT alternatives. These ten alternatives were evaluated relative to 20 screening criteria, including population and employment levels near stations, number of activity centers served, travel times, passenger capacity, potential environmental impacts, and conceptual-level capital and operating costs, among others.

As a result of this initial screening, five alternatives were recommended for further study:

- **BRT 5 (Michigan Avenue)** – The number of stations associated with this alternative offers a good opportunity to serve the population and employment centers along Michigan Avenue and Business Route 94. The ability to use general traffic lanes as part of the alignment would help to minimize capital costs.

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- **BRT 6 (I-94/Michigan Avenue)** – By using High Occupancy Vehicle (HOV) lanes along I-94, this alternative should offer travel time savings compared to auto travel time between Ann Arbor and Detroit.
 - **LRT 5 (Michigan Avenue)** – While the capital costs of LRT 5 are anticipated to be the highest of the five recommended alternatives, it should provide the same level of access to population and employment centers as BRT 5 because it has approximately the same station spacing.
 - **CRT 1 (Norfolk Southern Michigan Line)** – Using the existing railroad will minimize capital costs and improve travel times. This alternative would have fewer stations than the light rail or BRT alternatives.
 - **CRT 2 (I-94/Norfolk Southern Detroit Division)** – The number of stations associated with the BRT element of this alternative increase the overall population and employment which could be served relative to CRT 1. Travel time from Metro Airport to Detroit should be enhanced by the use of the existing railroad right-of-way; however, travel times between Detroit and Ann Arbor will be longer than CRT 1 due to the transfer required at Metro Airport. Capital costs will be minimized by the use of general travel lanes with the BRT alignment and existing railroads on the commuter rail portion of the alignment.

Most of the LRT alternatives that were not recommended for further study had higher costs and longer travel times associated with serving the long corridor. Therefore, only LRT 5 was carried forward for further evaluation. However, because light rail is well-suited to shorter corridors where it can provide better access to closely-spaced activity centers, light rail was also carried forward for consideration as a connector service for some of the alternatives.

Additional detail on the initial alternatives considered and the preliminary screening process and results can be found in the November 2005 report, *Initial Screening of Alternatives and Recommended Alternatives to be Retained for Detailed Study*.

1.2 Report Organization

This report documents the results of the second phase of the Alternatives Analysis, the Detailed Screening. The document is organized as follows:

- Section 1.0 provides an introduction to the project and this Detailed Screening Report;
- Section 2.0 provides a brief description of the alternatives considered for the detailed screening, including sub-alternatives associated with each alternative;
- Section 3.0 provides an overview of the evaluation methodology used for the alternatives analysis process;
- Section 4.0 presents the results for each of the detailed evaluation criteria, summarizes the significant findings of the evaluation, and presents recommendations for next steps;
- Section 5.0 identifies new alternatives recommended for additional study and opportunities for alternate funding approaches;
- Section 6.0 summarizes the public and agency comments received on the results of the detailed evaluation and the recommendations for next steps;

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- Section 7.0 presents overall conclusions and recommendations based on both the detailed evaluation results and public and agency comments.
 - Section 8.0 identifies the next steps in for the Ann Arbor-Downtown Detroit AA/DEIS.

The appendices provide additional detail on the alternatives considered and the public comments and responses.

2.0 SUMMARY DESCRIPTION OF ALTERNATIVES

Based on the Initial Screening conducted earlier in the Alternatives Analysis process and briefly summarized above, five candidate build alternatives were recommended for further evaluation:

- **BRT 5** – Bus Rapid Transit via Michigan Avenue;
- **BRT 6** – Bus Rapid Transit via I-94 and Michigan Avenue;
- **LRT 5** – Light Rail Transit via Michigan Avenue;
- **CRT 1** – Commuter Rail Transit via the Norfolk Southern Michigan Line; and,
- **CRT 2** – Commuter Rail Transit between Detroit and Metro Airport via the Norfolk Southern Detroit Division line and Bus Rapid Transit between Metro Airport and Ann Arbor via I-94.

These alternatives were then developed at a higher level of detail, resulting in several options or sub-alternatives for each candidate build alternative. Including the Transportation System Management Alternative—the baseline alternative against which the Build Alternatives were compared—a total of 23 sub-alternatives were considered for the Detailed Screening. Routes and operating plans for the alternatives were developed to be as comparable as possible, to avoid biasing the evaluation process.

The following sections provide an overview of the alternatives and sub-alternatives considered for the Detailed Screening. Table 2.1, at the end of this chapter, summarizes the service and configuration assumptions for the alternatives. Additional detail on the alternatives can be found in the *Detailed Definition of Alternatives Report* (June 2006).

2.1 *Transportation System Management (TSM) Alternative*

The TSM Alternative represents a set of relatively low-cost improvements which could be implemented in a short period of time. The alternative includes four premium bus routes:

- Route 1: Ann Arbor – Ypsilanti – Metro Airport
- Route 2: Ann Arbor – Ypsilanti – Detroit
- Route 3: Detroit – Metro Airport via I-94
- Route 4: Detroit – Metro Airport via Dearborn

Buses would operate on existing roadways with traffic signal priority, providing express service to key activity centers in the corridor, including Ann Arbor, Ypsilanti, Metro Airport, Dearborn, New Center, and Downtown Detroit. Figure 2.1 provides a basic diagram of the proposed routes for the TSM Alternative.

Each route would operate with 20-minute service frequencies (also called “headways”) during the peak period and 30-minute service frequencies during the off-peak period. The combined service on the common segments for the proposed routes would be more frequent.

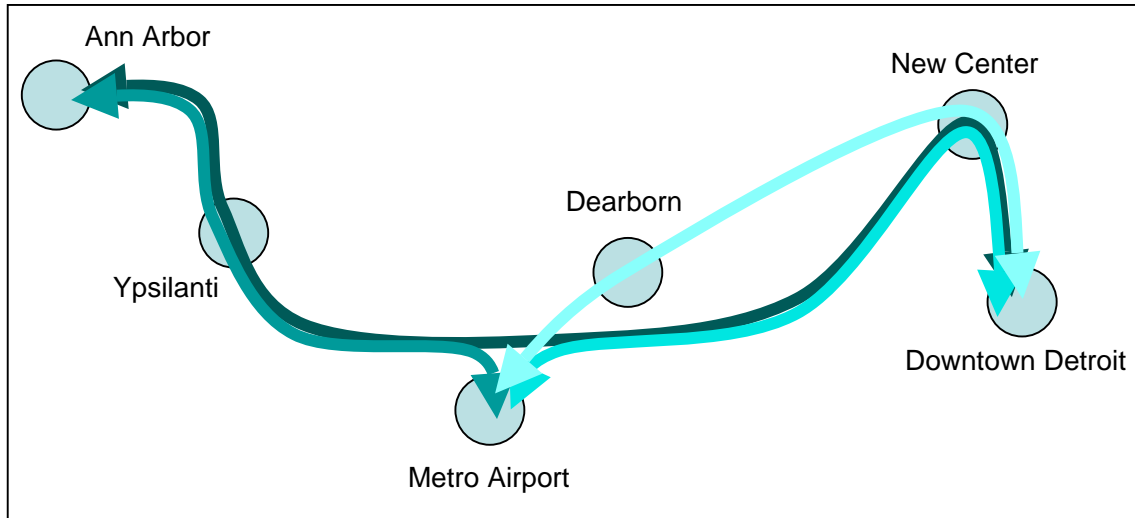


Figure 2.1: TSM Alternative

2.2 BRT 5 (Michigan Avenue)

BRT 5 is designed to follow Michigan Avenue for the majority of its alignment, beginning at the eastern terminus of Times Square in Downtown Detroit, where it would provide intermodal connections at the Rosa Parks Transit Center, which is currently under construction. The alignment would then continue west along Michigan Avenue to Ypsilanti.

Between Ypsilanti and Ann Arbor, there are two sub-alternatives under consideration:

- **BRT 5 – 1 Washtenaw Avenue:** This sub-alternative would continue from Michigan Avenue north along Huron Street, then continue northwest along Washtenaw Avenue. The alignment would follow Washtenaw Avenue into Ann Arbor to where it becomes Huron Street, continuing to 5th Avenue.
- **BRT 5 – 2 State Street/I-94:** This sub-alternative would turn south from Michigan Avenue down Hamilton Street, then continue west along high-occupancy vehicle (HOV) lanes proposed to be constructed for this alternative in the median of I-94. From I-94, the alignment would then turn north up State Street, then west along William Street to serve the Blake Transit Center. From the Blake Transit Center, the alignment would then continue north up 5th Avenue to connect with Huron Street.

Service would operate with low-floor BRT vehicles, which have a higher capacity than standard buses and are easier to board and exit. Vehicles would generally operate in mixed traffic on existing roadways, but would use dedicated BRT lanes, where possible. The operating plan includes three routes with departures every 20 minutes during the peak hours and every 30 minutes during off-peak hours. Figure 2.2 depicts the proposed routes for BRT 5.

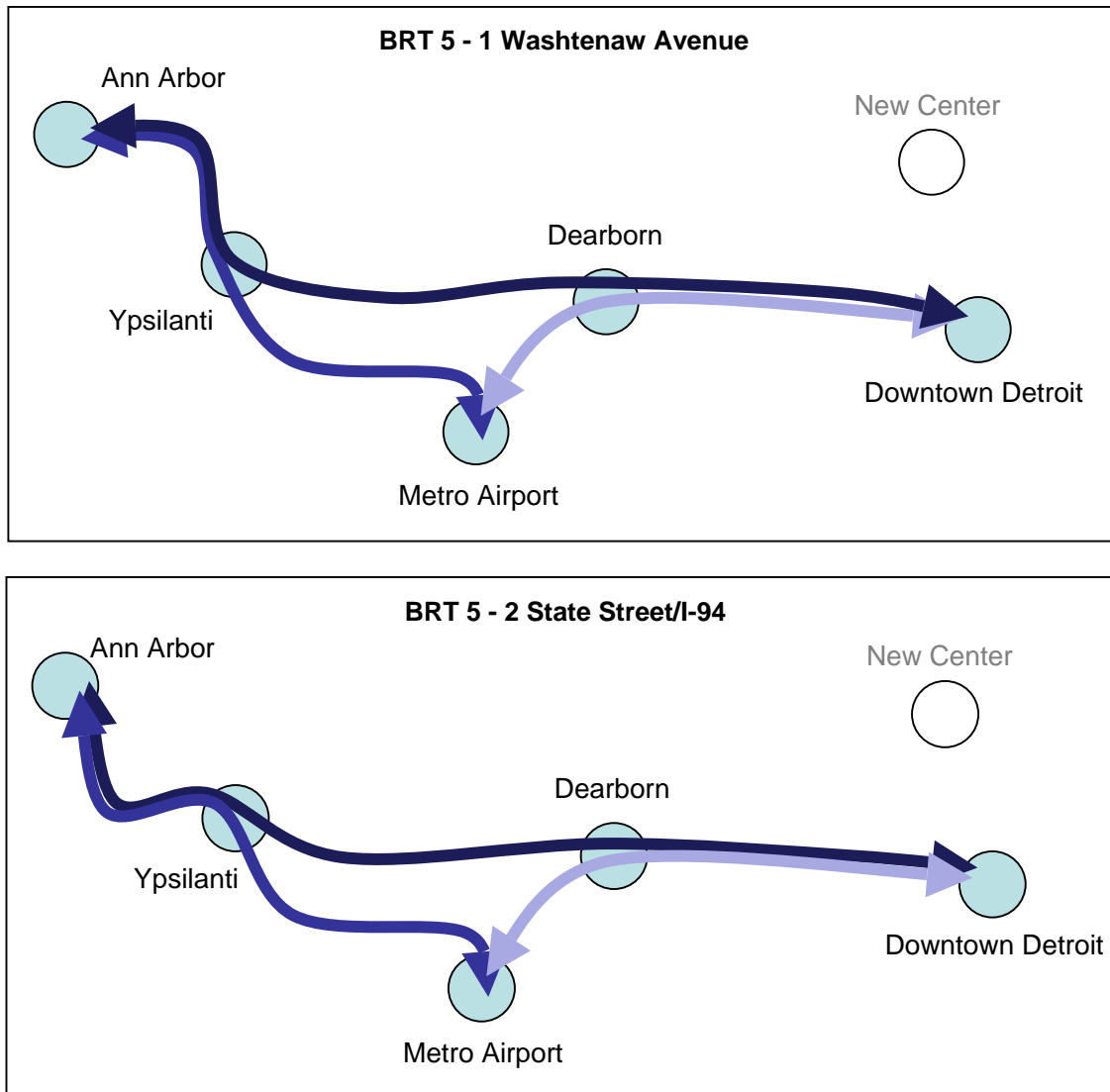


Figure 2.2 BRT 5 Alternatives

2.3 BRT 6 (I-94/Michigan Avenue)

BRT 6 is similar to BRT 5 except that it uses I-94 more extensively and includes four routes instead of three. Like BRT 5, two sub-alternatives are under consideration for service between Ann Arbor and Ypsilanti:

- **BRT 6 – 1 Washtenaw Avenue;**
- **BRT 6 – 2 State Street/I-94.**

Each of the four service routes would operate with 20-minute headways during peak periods and with 30-minute headways during off-peak periods. Combined service on common segments would be more frequent. Like BRT 5, service would be provided with low-floor BRT vehicles. For BRT 6, vehicles would operate in mixed traffic on existing roadways, in dedicated BRT lanes, and in new HOV lanes constructed for BRT use. Figure 2.3 shows the proposed routes for BRT 6.

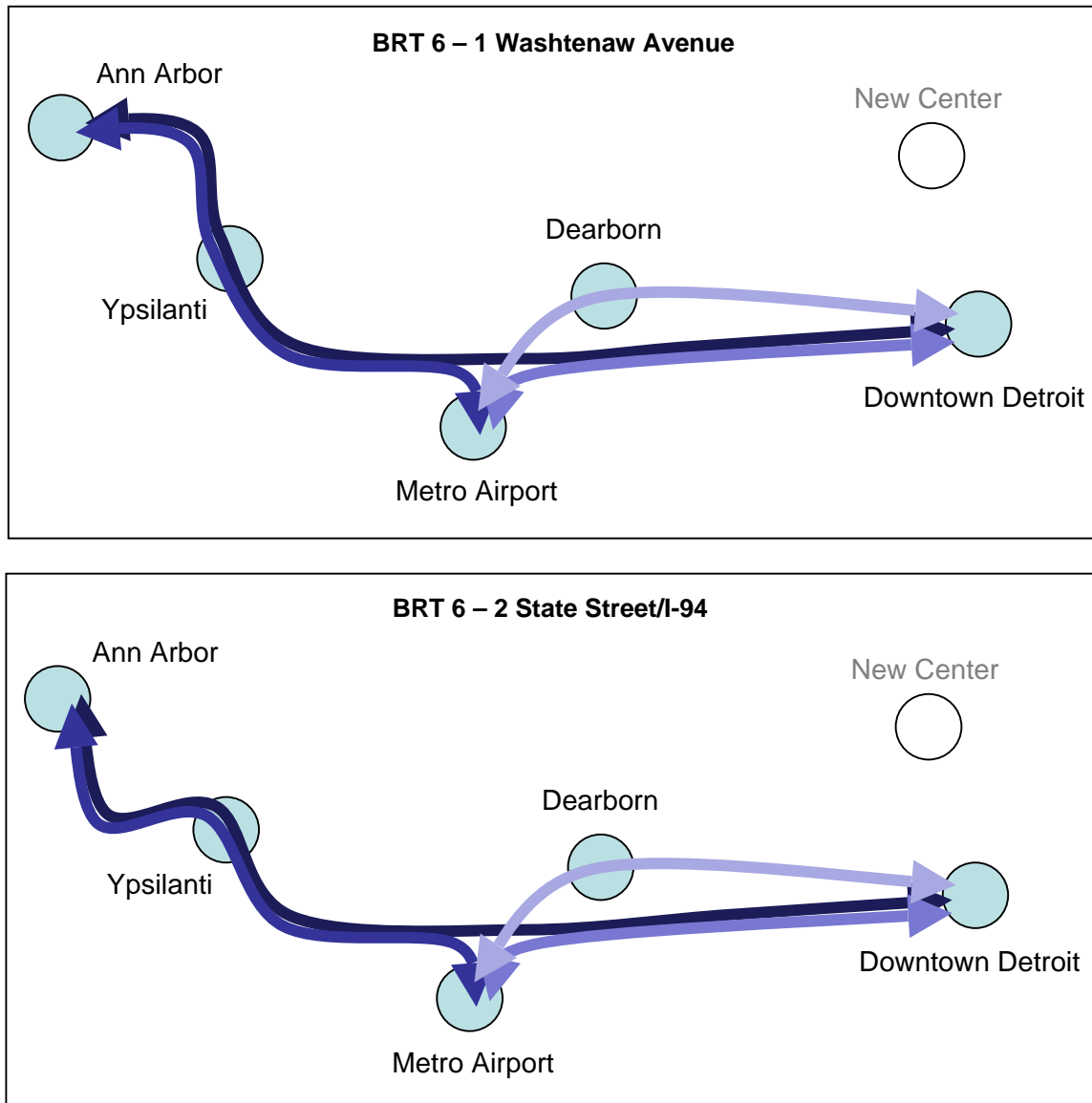


Figure 2.3 BRT 6 Alternatives

2.4 LRT 5 (Michigan Avenue)

LRT 5 would provide light rail service between Downtown Detroit and Ann Arbor. From east to west, the route would primarily follow Michigan Avenue, beginning at Times Square, where it would provide intermodal connections at the Rosa Parks Transit Center, which is currently under construction. In Ypsilanti, the alignment would continue from Michigan Avenue north along Hamilton Street. The alignment would split along Hamilton street, with the eastbound track continuing north to Cross Street and the westbound track running along Washtenaw Avenue. The two tracks would reunite where Cross Street and Washtenaw Avenue intersect then continue along Washtenaw Avenue into Ann Arbor. In Ann Arbor, the alignment would turn west where Washtenaw Avenue becomes Huron Street, then continue

along Huron Street and Jackson Avenue. The alignment would end at a Park and Ride lot in the vicinity of Jackson Avenue and Baker Road.

Two sub-alternatives are under consideration for service to Metro Airport:

- **LRT 5 – Bus Connector to DTW:** Connects to Metro Airport via a bus shuttle that provides direct service to the ground floor (arrivals) at the McNamara terminal and then continues to the single-level Smith terminal.
- **LRT 5 – Rail Connector to DTW:** Connects to Metro Airport via an LRT line operating in a dedicated right-of-way along Merriman Road. The line would terminate at the entrance to Metro Airport and passengers would transfer to circulator buses to reach the airport terminals.

LRT service would operate with 20-minute headways during the peak period and 30-minute headways at all other times. Trains would use low-floor LRT vehicles and would operate in a combination of dedicated lanes and the median of the roadway. Figure 2.4 depicts the LRT 5 alternative.

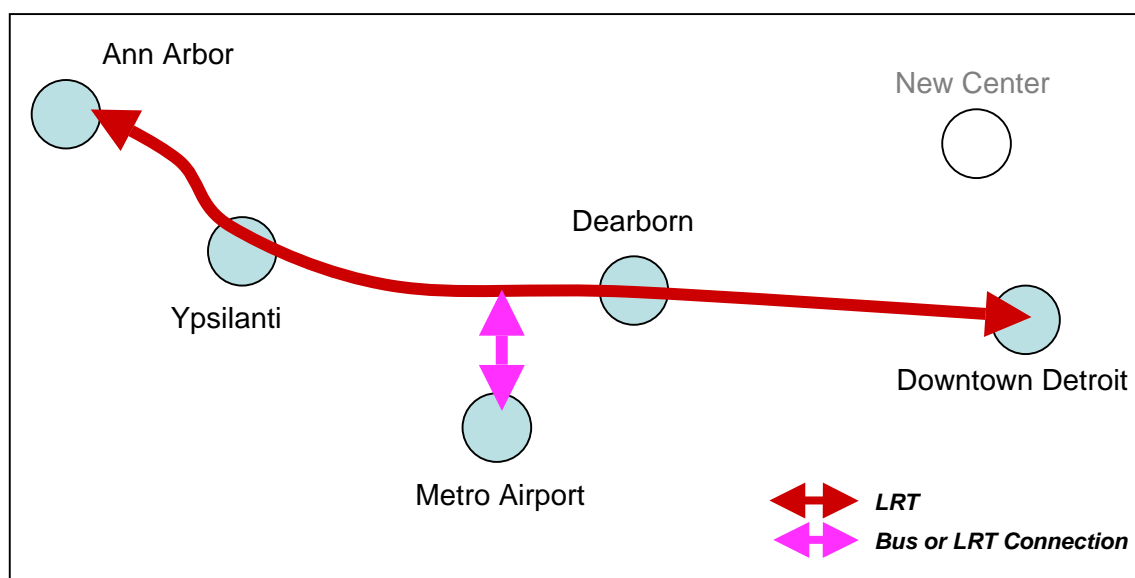


Figure 2.4 LRT 5 Alternatives

2.5 CRT 1 (Norfolk Southern Michigan Line)

The CRT 1 alternative would provide commuter rail service from Chelsea (west of Ann Arbor) to Ann Arbor, Dearborn, and Detroit using the Michigan Line of the Norfolk Southern Railroad. In addition to freight service, the Michigan Line currently supports Amtrak's passenger rail service between Chicago and Detroit (three round trips daily).

Beginning west of Chelsea, the CRT 1 alignment follows the Norfolk Southern Michigan Line until reaching the West Detroit interlocking in Detroit. From the interlocking, two primary options are under consideration: (1) the line would continue along the CNNA railroad to New Center, north of downtown, or (2) the line would continue along the Conrail and CN/CP rail lines to Joe Louis Arena in Downtown

Detroit. Additional sub-alternatives are under consideration for connections to Downtown Detroit and to Metro Airport. All together, eight options were evaluated for CRT 1:

- **CRT 1A:** Continues northeast from the West Detroit interlocking, north on the CNNA (formerly GTW) Shoreline Subdivision to New Center Amtrak Station. Connections to Downtown Detroit would be provided by either a BRT or LRT line operating in a dedicated lane along Woodward Avenue between New Center and Campus Martius, or by an LRT line operating in dedicated right-of-way along Michigan Avenue between The Henry Ford in Dearborn and the Rosa Parks Transit Center. Connections to Metro Airport would be provided either by a bus shuttle or by an LRT line operating in a dedicated right-of-way along Merriman Road.

Option	Ann Arbor to Detroit	Downtown Connection	Airport Connection
1	CRT to New Center	BRT Woodward	Bus Shuttle
2	CRT to New Center	BRT Woodward	LRT
3	CRT to New Center	LRT Woodward	Bus Shuttle
4	CRT to New Center	LRT Woodward	LRT
5	CRT to New Center	LRT Michigan	Bus Shuttle
6	CRT to New Center	LRT Michigan	LRT

- **CRT 1E:** Continues east along the CN/CP CASO Subdivision ('Tunnel Lead'), and then along new tracks on the former Michigan Central route until reaching Joe Louis Arena. The option would provide a direct connection to Downtown Detroit. Connections to Metro Airport would be provided by a bus shuttle or an LRT line along Merriman Road.

Option	Ann Arbor to Detroit	Downtown Connection	Airport Connection
7	CRT to Joe Louis	Direct	Bus Shuttle
8	CRT to Joe Louis	Direct	LRT

Figure 2.5, on the following page, shows the various options for the CRT 1 alternative. All options would have 20-minute service frequencies during peak periods and 30-minute service frequencies at all other times. The various connector services would be timed to meet CRT trains arriving at the transfer stations.

2.6 CRT 2 (I-94/Norfolk Southern Detroit Division)

CRT 2 is a hybrid alternative, using Bus Rapid Transit between Ann Arbor and Metro Airport and Commuter Rail Transit between Metro Airport and Downtown Detroit. The two segments of the line would meet at a station located immediately north of Metro Airport along the Norfolk Southern Detroit Division, in the vicinity of Merriman Road and Goddard Road.

The CRT portion of CRT 2 would follow the existing Norfolk Southern Detroit Division rail line between Metro Airport and the Delray interlocking west of downtown Detroit. From this interlocking, three options are under consideration for access to downtown: (1) the line would continue northeast to the West Detroit interlocking, then follow the CNNA railroad to New Center, north of downtown; (2) the line would continue northeast to the West Detroit interlocking, then follow the Conrail and CN/CP rail lines to Joe Louis Arena

in Downtown Detroit; or (3) the line would continue east along the Norfolk Southern Detroit Division line, then follow new tracks along the former Michigan Central route to Joe Louis Arena. Additional sub-alternatives are under consideration for connections to Downtown Detroit.

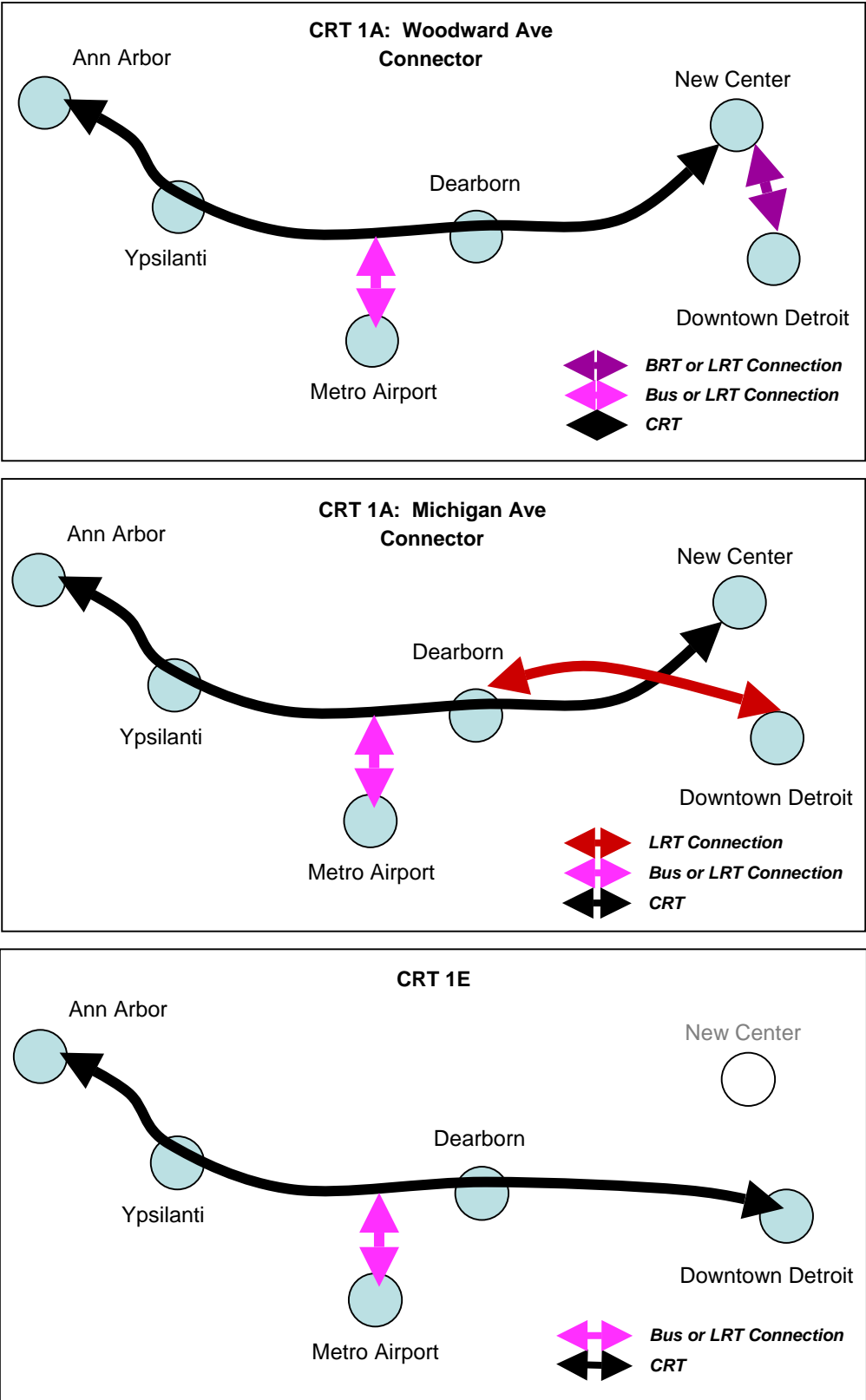


Figure 2.5 CRT 1 Alternatives

The BRT portion of CRT 2 would include one route, following the same alignment as the western portion of BRT 6. From Merriman Road, the alignment would continue north to I-94 along HOV lanes developed as part of this alternative. The alignment would then continue along I-94 to Ypsilanti, at which point the alignment would follow either the Washtenaw Avenue route option or the State Street/I-94 route option. These options would use the same routing as the routes described for BRT 5, and would then continue west along Huron Street to where it becomes Jackson Avenue. The alignment would terminate at a Park and Ride lot in the vicinity of Jackson Avenue and Baker Road.

All together, eight options were evaluated for CRT 2:

- **CRT 2A:** Continues northeast from the Delray interlocking to the West Detroit interlocking, north on the CNNA (formerly GTW) Shoreline Subdivision to New Center Amtrak Station. Connections to Downtown Detroit would be provided by either a BRT or LRT line operating in a dedicated lane along Woodward Avenue between New Center and Campus Martius.

Option	Ann Arbor to Metro Airport	Metro Airport to Detroit	Downtown Connection
1	BRT via Washtenaw Ave	CRT to New Center	BRT Woodward
2	BRT via State Street/I-94	CRT to New Center	BRT Woodward
3	BRT via Washtenaw Ave	CRT to New Center	LRT Woodward
4	BRT via State Street/I-94	CRT to New Center	LRT Woodward

- **CRT 2E:** Continues northeast to the West Detroit interlocking, then east along the CN/CP CASO Subdivision ('Tunnel Lead'), and then along new tracks on the former Michigan Central route until reaching Joe Louis Arena. The option would provide a direct connection to Downtown Detroit.

Option	Ann Arbor to Metro Airport	Metro Airport to Detroit	Downtown Connection
5	BRT via Washtenaw Ave	CRT to Joe Louis (CN/CP)	Direct
6	BRT via State Street/I-94	CRT to Joe Louis (CN/CP)	Direct

- **CRT 2F:** Continues east along the Norfolk Southern Detroit Division railroad (formerly Wabash Railroad), and then cross over Jefferson Avenue to new tracks on the former Michigan Central route until reaching Joe Louis Arena. The option would provide a direct connection to Downtown Detroit.

Option	Ann Arbor to Metro Airport	Metro Airport to Detroit	Downtown Connection
7	BRT via Washtenaw Ave	CRT to Joe Louis (NS)	Direct
8	BRT via State Street/I-94	CRT to Joe Louis (NS)	Direct

Figure 2.6, on the following page, shows the various options for the CRT 2 alternative. Both the CRT and BRT portions of the alternative would have 20-minute headways during the peak period and 30-minute headways at all other times. The service and configuration characteristics for all alternatives under consideration are summarized in Table 2.1.

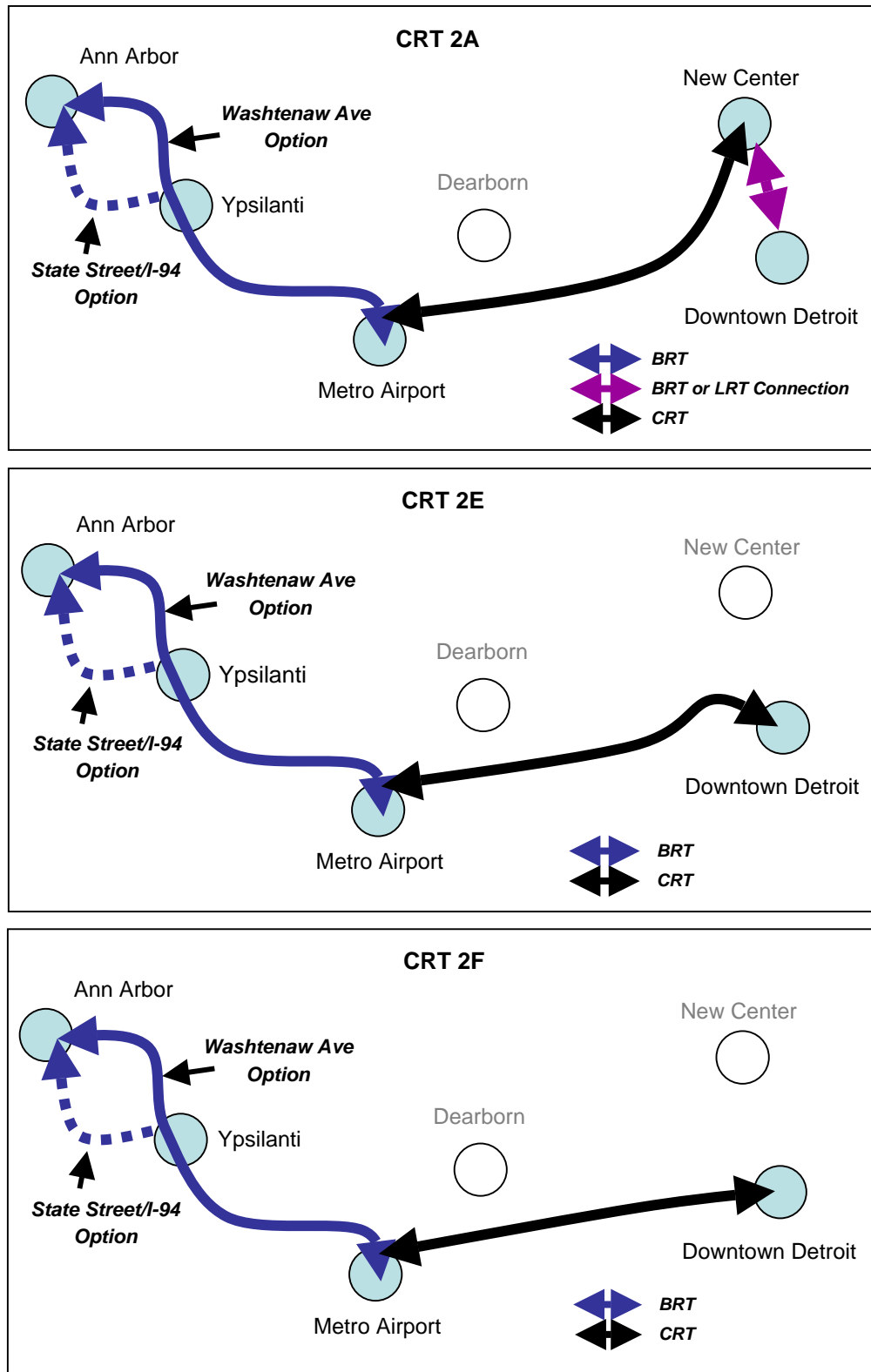


Figure 2.6 CRT 2 Alternatives

Table 2.1: Summary of Service and Configuration Assumptions for Alternatives

Characteristic	TSM	BRT 5	BRT 6	LRT 5	CRT 1	CRT 2
Headway: Weekday	20 minutes peak; 30 minutes off peak on each route (combined headways on common segments will be shorter)	20 minutes peak; 30 minutes off peak on each route (combined headways on common segments will be less)	20 minutes peak; 30 minutes off peak on each route (combined headways on common segments will be less)	20 minutes peak; 30 minutes at all other times	20 minutes peak; 30 minutes at all other times	20 minutes peak; 30 minutes at all other times
Headway: Weekend	60 minute headway on each route (combined headways on common segments will be shorter)	60 minute headway on each route (combined headways on common segments will be less)	60 minute headway on each route (combined headways on common segments will be less)	60 minutes all day	60 minutes all day	60 minutes all day
Vehicle	Over the road coach	Low-floor BRT vehicle	Low-floor BRT vehicle	"Sacramento" low-floor LRT vehicle	One (1) F59PH 3000 hp diesel locomotive; three (3) bi-level gallery cars per train; One (1) bi-level control cab car per train	<ul style="list-style-type: none"> CRT: One (1) F59PH 3000 hp diesel locomotive; three (3) bi-level gallery cars and one (1) bi-level control cab per train BRT: Low-floor BRT vehicle
Passenger capacity	45 passengers/vehicle	60 passengers/vehicle	60 passengers/vehicle	62 passengers/vehicle	574 passengers/train	<ul style="list-style-type: none"> CRT: 574 passengers/train BRT: 60 passengers/vehicle
Number of stations	No station facilities planned; limited stops	<ul style="list-style-type: none"> Washtenaw Ave sub-alternative: 30 stations State Street/I-94 sub-alternative: 31 stations 	<ul style="list-style-type: none"> Washtenaw Ave sub-alternative: 26 stations State Street/I-94 sub-alternative: 25 stations 	30 stations	<ul style="list-style-type: none"> CRT 1A: 9 commuter rail stations Woodward Avenue connector: 1 LRT or BRT station Michigan Avenue connector: 9 LRT stations CRT 1E: 10 commuter rail stations 	<ul style="list-style-type: none"> CRT 2A: 5 commuter rail stations (Woodward Avenue Connector – 1 LRT or BRT station) CRT 2E: 6 commuter rail stations. CRT 2F: 6 commuter rail stations BRT – Washtenaw Ave sub-alternative: 11 stations BRT – State Street/I-94 sub-alternative: 9 stations

Table 2.1: Summary of Service and Configuration Assumptions for Alternatives

Characteristic	TSM	BRT 5	BRT 6	LRT 5	CRT 1	CRT 2
Number of Park and Ride lots	Existing Park and Rides only	<ul style="list-style-type: none"> Washtenaw Ave sub-alternative: 9 stations State Street/I-94 sub-alternative: 12 stations 	<ul style="list-style-type: none"> Washtenaw Ave sub-alternative: 4 stations State Street/I-94 sub-alternative: 6 stations 	9 stations	<ul style="list-style-type: none"> CRT 1A: 8 commuter rail stations (Michigan Avenue connector: 1 LRT Park and Ride lot) CRT 1E: 7 commuter rail stations 	<ul style="list-style-type: none"> CRT 2A: 4 commuter rail stations CRT 2E: 3 commuter rail stations CRT 2F: 3 commuter rail stations BRT: Washtenaw Ave sub-alt.: 3 stations BRT: State Street/I-94 sub-alt. 4 stations
Access to DTW	Direct	Direct	Direct	Via connecting service (Bus shuttle or LRT)	Via connecting service (Bus shuttle or LRT)	Direct via BRT Route
Access to Downtown Detroit	Direct service to Rosa Parks Transit Center	Direct service to Rosa Parks Transit Center	Direct service to Rosa Parks Transit Center	Direct service to Rosa Parks Transit Center	<ul style="list-style-type: none"> CRT 1A: Via connecting service (BRT or LRT along Woodward or Michigan Avenue) CRT1E: direct service to Joe Louis 	<ul style="list-style-type: none"> CRT 2A: Via connecting service (BRT or LRT along Woodward Avenue) CRT 2E: Direct service to Joe Louis; direct connection to Detroit People Mover. CRT 2F: Direct service to Joe Louis; direct connection to Detroit People Mover.
Running way	Use existing running way	Combination of existing running way and dedicated BRT lanes	Combination of existing running way, HOV lanes, and dedicated BRT lanes	LRT operations in dedicated lanes/median of roadway	Existing freight railroads; limited new right-of-way	<ul style="list-style-type: none"> BRT: Combination of existing running way, HOV lanes, and dedicated BRT lanes CRT: Existing freight railroads; limited new right-of-way
Station dwell times	30 seconds	20 seconds	20 seconds	30 seconds	60 seconds	<ul style="list-style-type: none"> BRT: 30 seconds CRT: 60 seconds
Off-board fare collection?	No	Yes	Yes	Yes	Yes	Yes
Traffic signal priority?	Yes	Yes	Yes	Yes, also gated crossings for median u-turns	Yes, gated crossings at all at-grade intersections	Yes, also gated crossings at all at-grade intersections

3.0 ALTERNATIVES EVALUATION METHODOLOGY

The methodology for the Ann Arbor-Downtown Detroit AA/DEIS is fully documented in the *Evaluation Methodology Report* (March 2005). The following sections provide a summary of the overall approach used for the Alternatives Analysis and provide additional detail on the Detailed Screening criteria.

3.1 Overview of Evaluation Process

To determine which alternatives would best meet corridor needs and goals, the Alternatives Analysis used a multiple-step evaluation process. Each step in the process focused on the opportunities, constraints, and performance of the alternatives under consideration. Those alternatives that were determined to be fatally flawed or clearly less likely to meet corridor needs and goals were eliminated from further consideration.

For the Initial Screening, a few general criteria were used to assess the performance of a wide range of alternatives. For the Detailed Screening, a greater number of more detailed criteria were used to evaluate the smaller range of alternatives advanced from Initial Screening. Figure 3.1 illustrates the relationship between the number of alternatives and evaluation criteria as the study progresses.

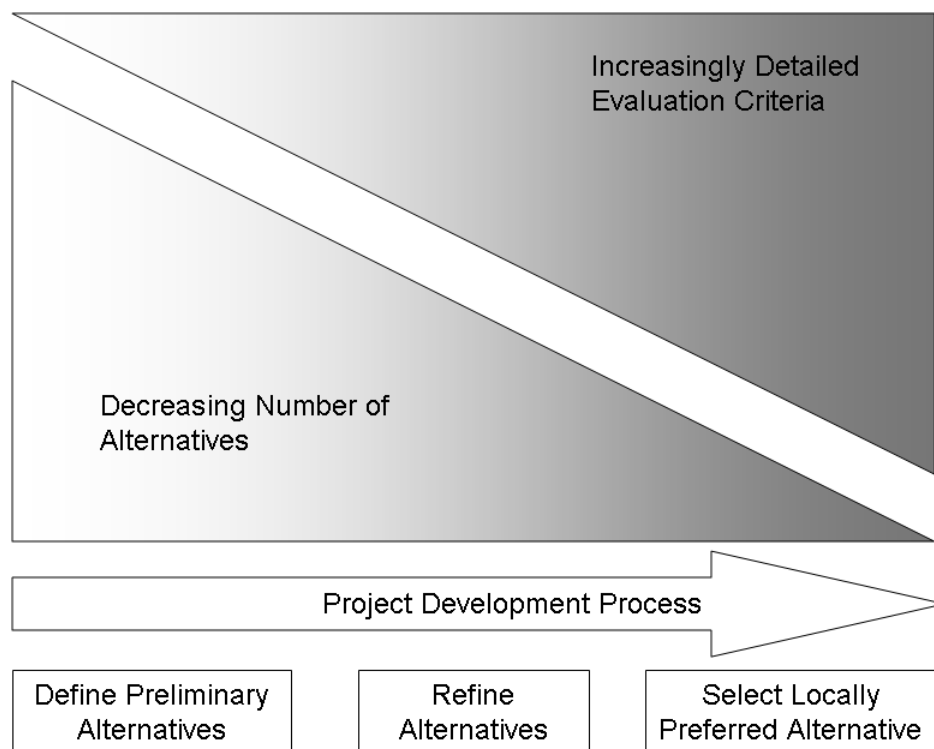


Figure 3.1 Study Evaluation Process

3.2 Detailed Screening Criteria

The evaluation criteria developed for the study correspond to the goals and objectives established for the proposed project, allowing the study team to measure how well each alternative meets the project

purpose. Among the factors considered were ridership potential, capital and operating costs, environmental constraints, station area land use, and operational issues. Table 3.1 presents the evaluation criteria considered for the Detailed Screening. Criteria are organized by their corresponding project goal. All together, 44 evaluation criteria were considered for the Detailed Screening; 23 criteria were based on output from the travel demand forecasting model for the project.

Table 3.1 Detailed Screening Criteria

Goal: Provide High-Level Transit Access to Corridor Opportunities. Provide high-capacity transit access to opportunities throughout the study corridor including communities, educational and other institutions, and Metro Airport.		
Objectives	Measure #	Measures
<ul style="list-style-type: none"> ▪ Provide frequent reliable and convenient transit service that links study area communities and activity centers. ▪ Increase access to corridor employment, educational, medical, tourist, visitor and shopping opportunities. ▪ Reduce travel time by transit including LRT, BRT, Enhanced bus and commuter rail. ▪ Provide reasonable alternatives to auto use by developing transit plans with strong intermodal connections. 	▪ Land Use - 1	▪ Number of activity centers within 1/2 mile walking distance of stations (universities, sport/cultural, casinos, hospitals, and retail centers over 500,000 SF)
	▪ Model - 1	▪ Transit travel times from selected communities to selected activity centers
	▪ Model - 2	▪ Population within 60 minutes by transit from selected locations
	▪ Model - 3	▪ Regional linked transit trips for the home-based work (HBW) trip purpose
	▪ Model - 4	▪ Regional linked transit trips for the home-based shopping (HBSH) trip purpose
	▪ Model - 5	▪ Regional linked transit trips for the home-based school (HBSC) trip purpose
	▪ Model - 6	▪ Regional linked transit trips for the home-based other (HBO) trip purpose
	▪ Model - 7	▪ Regional linked transit trips for the non-home-based other (NHBO) trip purpose
	▪ Model - 8	▪ Regional linked transit trips for the non-home-based work (NHBW) trip purpose
	▪ Model - 9	▪ Regional linked transit trips for the non-home-based school (NHBS) trip purpose
	▪ Model - 10	▪ Regional linked transit trips for the non-home-based university (NHBUS) trip purpose
	▪ Model - 11	▪ Regional linked transit trips for the sum of all trip purposes
	▪ Model - 12	▪ Total park-and-ride access trips in the study area

Table 3.1 Detailed Screening Criteria

Goal: Support Economic Development and Redevelopment Plans. Reinforces settings throughout the corridor where development and redevelopment efforts are being used to support land use planning and higher-density, transit oriented development.		
Objectives	Measure #	Measures
<ul style="list-style-type: none"> Locate stations consistent with land use and development plans that include or foster Transit Oriented Development. Provide transit linkages and services that support economic development and redevelopment investments. Coordinate transit planning and station siting with programs and projects that encourage employment growth and economic productivity. 	Land Use - 2	Number of stations where transit-supportive development has been identified as an objective for the station area in official county or municipal land use plans
	Land Use - 3	Number of stations where transit-supportive development and redevelopment is identified as a goal of a strategic or 'vision' plan (including business groups)
	Pop/Empl - 1	Employment within 1/2-mile walking distance of stations
	Bus - 1	Number of existing bus routes passing within 1/2-mile (1/4-mile requested) (airline) of stations
	Land Use - 4	Developable unoccupied land within 1/2-mile (airline) of stations (acres)
	Land Use - 5	Redevelopable 'brownfields' land within 1/2-mile (airline) of stations (number of sites)
	Land Use - 6	Difference between existing developed area and future developed area within 1/2-mile (airline) of stations (acres)
Goal: Expand the Mobility of Diverse Population and Market Groups Improve accessibility of the multi-ethnic and economically diverse population in the Ann Arbor–Metro Airport–Downtown Detroit corridor.		
Objectives	Measure #	Measures
<ul style="list-style-type: none"> Provide transit access to communities and neighborhoods with multi-ethnic and economically diverse population groups. Increase transit accessibility to major activity centers, institutions, shopping centers, stadiums and Metro and Willow Run Airports. Provide transit services, stations and facilities that promote intermodal connections. 	Pop/Empl - 2	Total multi-ethnic population within 1/2-mile walking distance of stations
	Pop/Empl - 3	Total economically diverse population within 1/2-mile walking distance of stations
	Model - 13a	Total daily work transit trips to/from Metro Airport
	Model - 13b	Total daily passenger transit trips to/from Metro Airport
	Model - 14	Total daily transfers between the high-capacity facility and the Detroit People Mover
	Bus - 2	Number of stations within paratransit service areas as defined in Improving Transit in Southeast Michigan, October 2001

Table 3.1 Detailed Screening Criteria

Goal: Improve the Environment Improve air quality, reduce energy consumption and reduce disruption of, or damage to, wetlands and natural habitats, and minimize the impact of major capacity improvements to the natural and built environment.		
Objectives	Measure #	Measures
<ul style="list-style-type: none"> Develop high capacity transit facilities that maximize the use of existing railroad and roadway rights-of-way. Minimize the requirement for completely new rights of way to provide transit facilities. Develop plans for transit stations and parking that avoid the need to displace existing development and natural features. Develop transit plans that help improve air quality by increasing ridership and capturing transit riders who would otherwise drive. 	Impact - 1	Potential number or residences impacted
	Impact - 2	Potential number or businesses impacted
	Impact - 3	Potential acres of impacts to wetlands and waters
	Impact - 4	Potential acres of impact to wildlife habitat
	Impact - 5	Potential acres of park and public open land impacts
	Impact - 6	Number of potentially impacted historical sites
	Impact - 8	Number of water crossings
	Model - 15	Annual vehicle emissions (tons of VOC)*
	Model - 16	Annual VMT*
Goal: Reduce Roadway Congestion Reduce the extent of highway congestion and reduce travel time for auto drivers.		
Objectives	Measure #	Measures
<ul style="list-style-type: none"> Develop a transit plan that attracts existing auto drivers, and serves projected trips that would otherwise be made by car. Provide transit station locations and parking, bus and drop off facilities positioned to maximize attraction of auto drivers. Develop transit operating plans and facilities that provide travel times competitive with equivalent auto trips. 	Model - 17a	Daily transit person trips
	Model - 17b	Daily transit work trips
	Model - 18	Change in daily auto VMT
	Model - 19	Regional highway vehicle-miles traveled (VMT)
	Model - 20	Study area VMT*
	Impact - 7	Potential impacts on street, highway and railroad capacity
	Model - 21	Highway vs. transit times for selected O-D pairs (Transit Time - Highway Time)

Table 3.1 Detailed Screening Criteria

Goal: Provide Cost Effective Transit Facilities and Service		
Objectives	Measure #	Measures
<ul style="list-style-type: none"> ▪ Demonstrate the local financial commitment and capacity necessary to receive federal funding support. ▪ Assure that the selected project meets a reasonable standard of total economic performance. 	CAP-1	Capital costs (\$M)
	O&M-1	Total annual operating and maintenance costs (\$M)

*After consideration, this criteria was not evaluated as part of the detailed screening, as the results were not anticipated to vary significantly between alternatives.

4.0 EVALUATION OF BUILD ALTERNATIVES

The five alternatives described above were evaluated against a total of 44 criteria. These measures and the performance of the alternatives relative to them are described in below in Section 4.1, Key Evaluation Criteria, and Section 4.2, Other Evaluation Criteria. Additional detail on the alternatives can be found in Appendix A and in the *Detailed Definition of Alternatives Report* (June 2006).

4.1 Key Evaluation Criteria

Three of the 44 criteria were considered to be particularly important as measures of an alternative's competitiveness for federal funding:

- Daily transit trips
- Capital costs
- Operations and Maintenance (O&M) costs

The performance of the alternatives against these criteria is summarized in Table 4.1 below.

Table 4.1: Screening Results Relative to Key Evaluation Criteria

Candidate Alternatives	Daily Transit Trips ¹	Cost (\$M)			
		Capital Cost		O&M Cost	
		Low	High	Low	High
TSM	6,193	\$43		\$25	
BRT 5 (Michigan Ave.)	5,834	\$879	\$969	\$23	\$24
BRT 6 (I-94/Michigan Ave.)	3,185	\$918	\$964	\$26	\$27
CRT 1 (NS Michigan Line)	2,131	\$618	\$1,474	\$93	\$111
CRT 2 (I-94/NS Detroit Division)	611	\$1,107	\$1,432	\$35	\$42
LRT 5 (Michigan Ave.)	3,405	\$2,641	\$2,870	\$54	\$59

Note:

¹ Includes daily transit trips using alternative

Overall, the daily transit trips generated by each of the alternatives are relatively modest. The TSM Alternative is forecast to have the greatest ridership, as it provides four separate routes that offer one-seat rides to each major destination (Ann Arbor, Detroit, Metro Airport) and have a combined frequency of service greater than those of the Build Alternatives. The BRT and LRT alternatives offer comparable ridership levels, as they have more stations than the CRT alternatives and offer more local service. CRT 1 ridership reflects the smaller travel market for medium-to-long range trips in the corridor. CRT 2 requires a transfer at Metro Airport, which reduces its overall ridership effectiveness. The ridership results appear to be reasonable based on the density of existing land uses in the corridor and are comparable with those found in the earlier Lansing to Detroit Alternatives Analysis.

The capital costs of the Build Alternatives are high, reflecting the fact that each alternative was developed to provide a high-quality, high-frequency service with minimal impact from train and automobile traffic in the corridor. LRT 5 has the highest capital costs due to the need to provide double-tracked service for

the entirety of the corridor. The CRT alternatives reflect the assumption that double-tracking would be necessary to offer a 20-minute peak hour service. BRT 5 and BRT 6 both reflect the use of dedicated lanes and HOV lanes along I-94. The TSM Alternative has the lowest capital costs, requiring only modest investments in vehicles and minor roadway and signal improvements.

The O&M costs for BRT are comparable with those of the TSM, and reflect the fact that there are existing bus operators and maintenance facilities in the region on which costs could be estimated. The higher LRT and CRT O&M costs reflect the need for new maintenance facilities and practices, and the greater number of systems associated with rail-based operations.

4.2 Other Evaluation Criteria

Table 4.2, located at the end of this chapter, provides a summary of the performance of each alternative against each of the other detailed screening criteria. Overall, the alternatives are all similar in their potential to provide high-level transit access to opportunities within the corridor, to support economic development plans, and to expand the mobility of diverse populations. They also have similar potential to affect public parks and open lands, known historic sites, and streams. The alternatives are comparable in terms of their ability to improve traffic congestion. The TSM Alternative would provide slightly fewer daily transit work trips compared to the other candidate alternatives, with BRT5 providing the most.

4.3 Summary of Significant Findings and Recommendations

The detailed screening results suggest that the alternatives developed in the Detailed Definition of Alternatives would not be cost-effective and competitive with other projects across the United States competing for FTA New Starts funding. However, as the TSM Alternative demonstrates, a low-capital, incremental approach to implementing service may be more appropriate.

It may be possible to develop a CRT 1 alternative that relies on the existing infrastructure and stations already in place, perhaps leasing vehicles and service from Amtrak or another provider. However, it is important to note that although such a low-capital alternative would reduce the costs of implementing service, it would also be likely to reduce the amount of service (and number of daily riders) provided.

It may also be possible to initiate BRT 5 and BRT 6 in a limited capacity where the proposed services could be initiated with fewer capital improvements (no HOV lanes, limited use of dedicated lanes, etc.).

As LRT 5 would require double-tracking for the majority of its length to provide reliable service, it is unlikely that a low-cost alternative could be developed without truncating the line to a Minimum Operating Segment. As a shorter line would reduce the number of destinations served, it is likely that ridership for such a line would drop to the point of making LRT non-competitive for New Starts funding. It may be more appropriate to allow ridership for such a line to grow by first implementing a less capital-intensive alternative in the corridor.

Table 4.2: Detailed Screening Results Relative to All Other Evaluation Criteria

Goal/ Measure #	Measure	Alternative					
		TSM	BRT 05	BRT 06	CRT 01	CRT 02	LRT 05
Provide High-Level Transit Access to Corridor Opportunities							
Land Use-1	Number of activity centers within 1/2 mile walking distance of stations	--	41 - 47	50 - 56	12 - 24	28 - 40	48
Model-1	Transit travel times from selected communities to selected activity centers ¹	--	35 - 130	35 - 143	41 - 116	35 - 130	35 - 136
Model-2	Population within 60 minutes by transit from selected locations (downtown Detroit) ²	1,495,819	1,297,800	1,315,200	1,289,900	1,203,800	987,100
Model-3	Regional linked transit trips for the home-based work (HBW) trip purpose	54,600	56,600	56,000	56,200	54,800	56,100
Model-4	Regional linked transit trips for the home-based shopping (HBSH) trip purpose	10,200	10,200	10,300	10,300	10,100	10,000
Model-5	Regional linked transit trips for the home-based school (HBSC) trip purpose	21,400	27,000	27,000	27,200	26,600	26,300
Model-6	Regional linked transit trips for the home-based other (HBO) trip purpose	28,400	28,800	28,800	28,800	28,500	28,600
Model-7	Regional linked transit trips for the non-home-based other (NHBO) trip purpose	9,500	9,700	9,700	9,800	9,600	9,700
Model-8	Regional linked transit trips for the non-home-based work (NHBW) trip purpose	10,100	10,400	10,400	10,400	10,300	10,400
Model-9	Regional linked transit trips for the non-home based school (NHBS) trip purpose	--	0	0	0	0	0
Model-10	Regional linked transit trips for the home-based university (NHBU) trip purpose	9,600	9,300	9,300	9,400	9,300	8,700
Model 11	Regional linked transit trips for the sum of all trip purposes	146,600	154,700	154,200	154,600	151,900	152,300
Model 12	Total park-and-ride access trips in the study area	0	500	200	600	100	900

Goal/ Measure #	Measure	Alternative					
		TSM	BRT 05	BRT 06	CRT 01	CRT 02	LRT 05
Support Economic Development and Redevelopment Plans							
Land Use -2	Stations where transit-supportive development has been identified as an objective in land use plans	--	35 - 35	10 - 26	5 - 10	16 - 21	10
Land Use -3	Stations where transit-supportive development/redevelopment is identified as a goal of a strategic or 'vision' plan	--	38 - 38	11 - 27	5 - 11	19-- 24	15
Pop/Empl -1	Employment within 1/2-mile walking distance of stations	--	137,400 - 142,500	132,000 - 138,400	54,700 - 98,300	80,300 - 106,900	147,100
Bus -1	Number of existing bus routes passing within 1/2-mile (1/4-mile requested) (airline) of stations	--	127 - 127	89 - 90	91 - 117	92 - 109	129
Land Use -4	Developable unoccupied land within 1/2-mile (airline) of stations (acres)	--	1,300 - 1,500	700 - 1,000	400 - 500	500 - 700	1,300
Land Use -5	Redevelopable 'brownfields' land within 1/2-mile (airline) of stations (number of sites)	--	14 - 16	12 - 16	12 - 18	5 - 15	14
Land Use -6	Difference between existing developed area and future developed area within 1/2-mile (airline) of stations (acres)	--	1,000 - 1,200	500 - 700	300 - 400	400 - 500	1,000
Expand the Mobility of Diverse Population and Market Groups							
Pop/Empl-2	Total multi-ethnic population within 1/2-mile walking distance of stations	--	31,000 - 33,800	30,000 - 33,900	13,500 - 22,900	13,800 - 24,600	36,300
Pop/Empl-3	Total economically diverse population within 1/2-mile walking distance of stations	--	7,000 - 7,100	6,500 - 6,500	2,400 - 4,400	3,800 - 4,800	7,400
Model-13a	Total daily work transit trips to/from Metro Airport	400	400	300	300	300	300
Model-13b	Total daily passenger transit trips to/from Metro Airport	2,700	2,700	2,700	2,600	2,600	2,600
Model-14	Total daily transfers between the high-capacity facility and Detroit People Mover	--	0	0	14	25	535
Bus-2	Number of stations within paratransit service	--	27 - 28	25 - 25	11 - 18	16 - 16	28

Goal/ Measure #	Measure	Alternative					
		TSM	BRT 05	BRT 06	CRT 01	CRT 02	LRT 05
Improve the Environment							
Impact-1	Potential number or residences impacted	--	1 - 1	0 - 0	0 - 1	1 - 1	1
Impact-2	Potential number or businesses impacted	--	14 - 14	1 - 1	12 - 25	1 - 1	14
Impact-3	Potential acres of impacts to wetlands and waters	--	0.02 - 0.02	0 - 0.02	0 - 0.065	0 - 0.02	0.02
Impact-4	Potential acres of impact to wildlife habitat	--	41.6 - 41.6	0 - 37.6	0 - 9.5	6.5 - 44.1	41.6
Impact-5	Potential acres of park and public open land impacts	--	0 - 0	0 - 0	0.94 - 0.94	0 - 0	0
Impact-6	Number of potentially impacted historical sites	--	0 - 0	0 - 0	1 - 2	0 - 1	1
Impact-8	Number of water crossings	--	9 - 10	7 - 8	7 - 7	5 - 6	6
Reduce Roadway Congestion							
Model-17a	Daily transit person trips	146,600	154,700	154,200	154,600	151,900	152,300
Model-17b	Daily transit work trips	64,700	67,000	66,400	66,600	65,100	66,400
Model-18	Change in daily auto VMT vs. No Build	1,523,000	1,510,800	1,547,300	1,513,100	1,550,600	1,522,600
Model-19	Regional highway vehicle-miles traveled (VMT)	162,179,900	162,167,800	162,204,200	162,170,000	162,207,500	162,179,600
Impact-7	Potential impacts to street, highway and railroad capacity	Low	Moderate	Moderate	Low	Low	High
Model-21	Highway vs. transit times for selected O-D pairs (Transit Time - Highway Time)	35 - 131	23 - 85	20 - 103	29 - 73	23 - 85	23 - 92
Provide Cost Effective Transit Facilities and Service							
CAP-1	Capital costs (\$M)	\$43	\$879 - \$969	\$918 - \$964	\$618 - \$1,474	\$1,107 - \$1,432	\$2,641-\$2,870
O&M-1	Total annual operating and maintenance costs (\$M)	\$25	\$23 - \$24	\$26 - \$27	\$93 - \$111	\$35 - \$42	\$54 - \$59

Notes:

1: Transit travel times for all O/D pairs and all time periods shown on following pages. Only range of AM peak times and AM peak times for select O/D pairs shown here.

2: Population for all selected locations shown on following pages

3: Travel time differences for all O/D pairs and all time periods shown following pages. Only range of AM peak times shown here.

5.0 PUBLIC INVOLVEMENT

Public involvement has been an integral part of the study, ensuring that the alternatives developed and analyzed reflect the concerns and desires of the people who will be affected by transit improvements in the study area. This section describes how the public involvement program for the study was carried out as part of the detailed screening of alternatives.

The alternatives evaluated each offer a different combination of travel times, costs, and accessibility to activity centers. The identification of the “right” alternative for the study area cannot be made by technical means alone; it is necessary to engage the public, particularly those persons or groups that might benefit or those who perceive they might not benefit from alternatives considered. It is also important to share qualitative and technical findings with business representatives and government and elected officials. Each group brings unique input that is factored into the analysis and selection of alternatives. Technical analysis alone constitutes only part of the decision-making equation.

As part of the detailed screening of alternatives, the study team employed an encompassing outreach program to present the alternatives to the public and receive feedback on the modes, alignments, and purpose of the project. Generally, the outreach program consists of the following components:

- **Steering Committee Input.** The Steering Committee consists of representatives of the local jurisdictions, county governments, railroad operators, and state agencies which will have a stake in the implementation of transit improvements in the corridor. The Steering Committee meets regularly throughout the duration of the study to provide input into the technical work being conducted by the study team. A list of the Steering Committee members is included in Appendix B of this report.
- **Public Meetings.** SEMCOG held a set of three meetings in December 2006 to present the project status to the public and explain the results of the detailed screening of alternatives. Meetings were geographically dispersed within the study corridor to make certain that those that might be affected by a transit improvement could easily access one or all of the meetings. The times and locations of the meetings were as follows:
 - Ann Arbor
Monday, December 4, 2006
4:30-8 p.m.
Washtenaw Community College
Morris Lawrence Building, Room 103
4800 E. Huron River Dr., Ann Arbor 48106
 - Dearborn
Tuesday, December 5, 2006
4:30-8 p.m.
University of Michigan-Dearborn
Fairlane Center – South Building, Dining Room D
19000 Hubbard Drive, Dearborn
 - Detroit
Wednesday, December 6, 2006
4:30-8 p.m.

SEMCOG offices in the Buhl Building
535 Griswold, Suite 300 (Ambassador Room), Detroit.

A PowerPoint presentation was given twice each night, allowing people who attended later in the evening to hear the same information as those who arrived earlier. The materials in the presentation were also displayed on a set of boards, allowing people to review the material after the presentation and ask questions to staff present at the meetings. Meeting attendees were asked to submit their comments via the project hotline, the project web site, or by mailing comments to SEMCOG's office; in addition, staff attending the meetings made extensive notes on the questions asked and the answers provided by staff.

The notices and advertisements for the meetings are included in Appendix C. The Power Point presentation and boards used in the meetings are included in Appendix D.

- **Web site.** The web site for the study has been used to inform the public about the study, provide notices of public meetings, disseminate study materials (including reports, newsletters, and presentations), and provide a means by which the public may send comments to SEMCOG. The web site is found at :

<http://www.annarbordetroitrapidtransitstudy.com>.

- **Hotline.** A project telephone hotline was established to allow members of the public to send comments and ask questions about the latest developments in the project. The hotline will be kept operational throughout the duration of the study.

The feedback from these efforts is described below.

5.1 Steering Committee Feedback

The detailed screening results were presented to the Steering Committee on November 8, 2006. Steering Committee members commented as described below. A list of steering committee members can be found in Appendix B.

While the Steering Committee expressed concerns about the capital costs and operating costs estimated for the alternatives, there was a general consensus that there was still a transportation need in the corridor for premium transit. Members of the Steering Committee requested that SEMCOG continue to pursue a rail alternative and seek out other means of implementing such a service. Discussions were held with the Steering Committee regarding the potential for a less capital intensive approach to commuter rail.

It should be noted that the committee's support for rail voiced at the meeting was previously reflected in letters of support for the project. Each jurisdiction within the study corridor expressed support for a rail alternative. These letters have been included as part of Appendix E.

5.2 PUBLIC FEEDBACK

Public meetings were held to obtain feedback on the findings from the detailed screening on December 4th, 5th, and 6th in Ann Arbor, Dearborn, and Detroit, respectively. More than 100 people attended the

meetings. A summary of the comments received at the meetings is included below. Public meeting notification methods and meeting materials are included in Appendices C and D.

Generally, the public applauded and supported efforts to introduce rapid transit to the corridor and stated that they considered transit to be a key element in the economic vitality of the area. Some noted that the cost of transit is high, but questioned what the cost of not pursuing transit might be. Strong support for the project was voiced.

Several attendees noted that the results of the five remaining alternatives indicated that ridership relative to the estimated cost of the project along the corridor is not competitive in the Federal Transit Administration's New Starts process. Others noted that the gas tax would not be a sufficient funding mechanism for a rapid transit project and that new sources of funding must be identified.

Some people were concerned about the economic and environmental benefits and impacts of each mode/alternative studied. It was noted that suburban sprawl was occurring in the outer reaches of the corridor and that rapid transit would spur more highly concentrated development along the corridor.

Project staff was urged to research areas that are implementing new transit systems and to apply techniques used by these areas, where applicable. Finally, project staff was asked to update the project's web site.

6.0 RESPONSE TO SCREENING

While the detailed screening indicated that the alternatives presented to the public would not be cost effective candidates for New Starts funding, feedback from the Steering Committee, the general public, and local policy makers indicated that there was still a strong desire to implement rail transit in the study area. In response to both the screening results and the strong support for rail, SEMCOG began to evaluate possible strategies to implement a rail line that could either be made competitive for New Starts funding or that could be implemented without New Starts funding.

Under this new direction, CRT 1 was selected as the most viable alternative for implementation. CRT 1 was selected for the following reasons:

- Political support for rail. As documented in Appendix E, each of the jurisdictions along CRT 1 has expressed support for a rail alternative. CRT 1 provides an opportunity to implement a solution likely to retain strong local support from the jurisdictions it serves.
- Existing rail infrastructure. As the existing Michigan Line already serves Amtrak, it would be possible to implement a CRT solution that leverages the existing investment in track, systems, and stations. Unlike CRT 2 and the BRT 2 solutions, it may be possible to utilize an operator (Amtrak) that already has the authority to operate along the alignment through the entire study area, allowing for faster implementation.
- Geographic coverage. The Michigan Line provides access to the center of most jurisdictions within the study area. This being the case, an initial CRT 1 service could be developed that could serve the entire length of the corridor, with infill stations and additional service added as local jurisdictions are ready and able to support the service. From a political perspective, this is a more viable alternative than a minimum operating segment in which service would be limited to one portion of the study area, creating potential issues with retaining area wide political support for the alternative.

The sections below describe the approach used to redefine and reevaluate CRT 1.

6.1 *Definition of CRT 1 Modified*

The overall intent of CRT 1 Modified was to develop a demonstration service for CRT 1, using the existing Norfolk Southern and Amtrak infrastructure to the greatest degree possible. To this end, the following assumptions were made:

- CRT 1 Modified would use the existing railroad infrastructure between Ann Arbor and New Center (CRT 1A), eliminating the capital costs associated with a connection to Joe Louis Arena.
- There would only be five stations: the two existing Amtrak stations at Ann Arbor and New Center, the relocated Amtrak station at Greenfield Village, and two new stations at Merriman Road (Metro Airport) and Depot Town (Ypsilanti.)
- The initial service would operate using an eight-train schedule. This schedule is provided in Table 6.1.

Table 6.1: Existing and Proposed Services along the Norfolk Southern Michigan Line

Eastbound							
	AMTRAK Existing	AMTRAK Existing	AMTRAK Existing	DMU New	DMU New	DMU New	DMU New
Station	350	352	354	002	004	106	208
ANN ARBOR	1:29 PM	6:47 PM	11:30 PM	6:25 AM	7:35 AM	10:30 AM	5:30 PM
YPSILANTI	1:39 PM	6:57 PM	11:40 PM	6:37 AM	7:47 AM	10:42 AM	5:42 PM
MERRIMAN	1:53 PM	7:11 PM	11:54 PM	6:53 AM	8:03 AM	10:58 AM	6:03 PM
GREENFIELD	2:01 PM	7:19 PM	12:02 AM	7:02 AM	8:12 AM	11:07 AM	6:12 PM
NEW CENTER	2:14 PM	7:32 PM	12:15 AM	7:15 AM	8:25 AM	11:20 AM	6:25 PM
Westbound							
	AMTRAK Existing	AMTRAK Existing	AMTRAK Existing	DMU New	DMU New	DMU New	DMU New
Station	351	353	355	001	103	205	207
NEW CENTER	7:23 AM	11:46 AM	5:13 PM	8:00 AM	2:30 PM	4:30 PM	5:30 PM
GREENFIELD	7:36 AM	11:59 AM	5:26 PM	8:14 AM	2:44 PM	4:44 PM	5:44 PM
MERRIMAN	7:43 AM	12:06 PM	5:33 PM	8:22 AM	2:52 PM	4:52 PM	5:52 PM
YPSILANTI	7:58 AM	12:21 PM	5:48 PM	8:39 AM	3:09 PM	5:09 PM	6:09 PM
ANN ARBOR	8:08 AM	12:31 PM	5:58 PM	8:50 AM	3:20 PM	5:20 PM	6:20 PM

- For purposes of this evaluation, it was assumed that the six Amtrak trains operating along the Michigan Line would be a separate service; therefore, the effect of these trains on ridership and costs were not taken into account as part of the initial evaluation of CRT 1 Modified (although they could be incorporated into a demonstration service operated by Amtrak.)
- It was assumed that there would no major capital improvements to the Michigan Line, with the exception of two:
 - A new passing siding west of Metro Airport to allow trains to pass one another
 - An improved connection at Springworks. This improvement has been evaluated by MDOT and Amtrak, and is anticipated to reduce travel speeds by as much as 10 minutes.
- Connections to Metro Airport and downtown Detroit would be provided with buses scheduled to meet each train. For the purposes of this evaluation, it was assumed that these connections would be made via new shuttle services, although existing SMART routes could be adapted to provide this service.

A detailed description of this alternative, its feeder network, and their associated costs may be found in Appendix A.

6.2 Analysis of CRT 1 Modified

As CRT 1 Modified follows the same alignment as CRT 1A, the environmental and socioeconomic impacts of the alternative were considered to be comparable to those of CRT 1A, and were not re-evaluated. Instead, analysis of CRT 1 Modified focused on its costs, potential ridership, and viability as a New Starts project.

Table 6.2 summarizes the estimated costs for CRT 1 Modified. As would be expected, the costs associated with CRT 1 Modified are significantly lower than those associated with CRT 1A, as fewer infrastructure improvements are necessary to maintain a reliable, 8-train revenue service.

Table 6.2: CRT 1 Modified Capital and Operating Costs

	Capital Cost (\$M)	Annual O&M Cost (\$M)
Commuter Rail	\$93.86	\$5.59
Bus Connections	\$1.68	\$0.68
Total	\$95.54	\$6.27

Applying the travel forecasting model to CRT 1 Modified yielded an average weekday ridership of 268 passengers a day. In short, using 14% of CRT 1A's capital cost and 7% of its operating costs, it may be possible to retain 13% of CRT 1A ridership, assuming patterns of land use and transit usage remain consistent with those applied to the regional travel demand model.

To understand the cost-effectiveness of CRT 1 Modified, the study team developed a sketch estimate of the cost-effectiveness ratio (CE ratio) established by the FTA New Starts program. Table 6.3 shows the calculations of the FTA Cost Effectiveness Ratio. Annualized capital and operating costs are summed, and divided by 300 to derive weekday costs. A seven percent discount rate is then applied to result in a \$3,298 total annualized cost for an average weekday.

Table 6.3: CRT 1 Modified Capital and Operating Costs

Numerator	Annualized Capital Costs	\$7,858
	Annualized Operating Costs	\$6,278
	Total Annualized Costs	\$14,136
	Total Annualized Costs converted to average weekday (discounted)	\$3,298
Denominator	Average Weekday Ridership	268
	Assumed Average Travel Time Savings (minutes/trip)	10
	Estimated Total User Benefit Hours	45
CE Ratio	(\$3,298 / 45)	\$73.85

This analysis assumes a 10-minute time savings on an average trip. The original CRT 1 alternative resulted in a total travel time (including access time and wait time) of 82 minutes between Ann Arbor and

Downtown Detroit. The original TSM (on the express route) resulted in a total travel time (including access time and wait time) of 93 minutes. The difference in travel time for these two alternatives is therefore 11 minutes. This analysis uses 10 minutes since many of the trips are assumed to be shorter trips (not traveling the full length between Ann Arbor and Detroit).

With 268 average weekday passengers and an assumed 10 minute travel time savings per trip, the total user benefit hours are 45 and the resulting CE ratio is \$73.85. As shown in Figure 6.4, compared against New Starts criteria, this CE ratio would give CRT 1 Modified a “Low” rating.

Table 6.4: Cost Effectiveness Breakpoints

High	\$11.49 and under
Medium-High	\$11.50-\$14.99
Medium	\$15.00-\$22.99
Medium-Low	\$23.00-\$28.99
Low	\$29 and over

To understand what circumstances would allow CRT 1 Modified to achieve a “Medium” rating, the study team calculated the time savings and ridership that would be required to achieve a CE ratio of \$22.00. Assuming the capital and operating costs were held constant, 141 hours of total user benefit would be required to achieve a CE ratio of \$22.00. This would require either:

- Total average weekday ridership of 900 riders (assuming 10 minutes of travel time savings); or,
- Travel time savings of 34 minutes (assuming 268 average daily riders.)

While 34 minutes of additional travel time savings is not technically feasible using the infrastructure available under CRT 1 Modified (or CRT 1A), CRT 1 Modified does provide sufficient passenger capacity to achieve 900 riders a day; therefore, if a demonstration project is able to grow ridership, it is possible that it could evolve into a system that could be competitive for New Starts funding.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the detailed screening, the alternatives considered as part of this study would not be competitive against other projects in the United States currently seeking New Starts funding. However, as the travel demand model used to forecast ridership for each alternative was calibrated using information on existing patterns of transit usage, it is possible that a premium transit service providing a substantial travel time savings could become a more competitive New Starts project.

In order to test the market for rail transit, it is recommended that a demonstration project be considered, using CRT 1 Modified as a model for implementation. A demonstration service could be contracted out to Amtrak or another rail provider and utilize the existing rail infrastructure and stations along the Michigan Line. Such a service could provide significant travel time savings over automobile travel between Ann Arbor and Detroit. As demand for commuter rail services grows in the corridor, it would be possible to incrementally improve the Michigan Line, adding trains, trackwork, and signals as appropriate to meet service needs, and adding in-fill stations in jurisdictions interested in participating in the service.

Once a demonstration project has had the opportunity to prove the ridership market for rail in the study area, it would be appropriate to revisit the travel demand model and recalibrate it using documented rail passenger information. This will lead to more accurate forecasts of future rail ridership which may in turn make it easier to apply for New Starts funding for improvements or extensions of the existing service (as well as improving the ridership forecasts for other rail lines in the region.)

8.0 NEXT STEPS

The New Starts application for the Ann Arbor to Downtown Detroit will be put on hold until such time that a demonstration project provides a better basis for assessing the true benefits and impacts of a rail alternative in the study area. The results of the detailed screening will be discussed with MDOT and FTA to understand the implications, both for a demonstration project and for future New Starts applications in the study area.

SEMCOG will work with MDOT, Amtrak, and Norfolk Southern to implement a demonstration rail project based on CRT 1 Modified. Preliminary estimates of costs and schedule will be developed. Contractual arrangements for operating the service and adding, improving, and maintaining stations will be developed in partnership with local jurisdictions. Discussions will also be held with elected officials to identify what sources of federal, state, and local funds are available to implement the demonstration service. It is envisioned that revenue service could begin as early as 2008.

Once a demonstration service has been in operation for more than a year, it would be appropriate to reassess the transit needs in the corridor. Using a travel demand model calibrated using actual rail ridership, the benefits of extending the line, improving service, or adding stations should be considered. Local jurisdictions and major employers should participate in this assessment to identify potential partners who are interested in service and willing to participate in funding, constructing, and/or operating new stations along the line.

APPENDIX A: DETAILED DEFINITION OF CRT 1 MODIFIED

APPENDIX B: STEERING COMMITTEE MEMBERS

APPENDIX C: PUBLIC MEETING NOTICES

APPENDIX D: PUBLIC MEETING MATERIALS

APPENDIX E: PUBLIC FEEDBACK