10. FINDINGS AND RECOMMENDATIONS

This section summarizes the findings and recommendations to identify and select a Locally Preferred Alternative, based on the results of the detailed evaluation of alternatives described in Section 9. **Figures 10-1, 10-2** and **10-3** (see pages 10-3 through 10-5) present select evaluation results of the three TSM and Build alignments.

10.1 Transportation and Mobility

- Transit ridership on Woodward Avenue is the highest – compared to Gratiot and Michigan Avenues – in all aspects: trunk line, corridor total and the number of new riders. Woodward LRT ridership is highest compared to all Build alternatives analyzed.

- Similarly, travel time savings associated with LRT on Woodward Avenue is the highest compared to all Build alternatives.

- LRT and BRT on Woodward Avenue would reduce auto travel speeds by approximately 4 mph. The range in reduction in auto travel speeds is 4 to 6 for all Build alternatives relative to TSM alternatives.

- The range of order-of-magnitude capital costs is $3.1 million (Michigan No-Build) to $523 million (Gratiot LRT) in Year 2007 dollars. Build alternatives on Woodward Avenue are the lowest cost under each transit mode category (BRT and LRT).

  - Of the three No-Build alternatives, Michigan Avenue has the lowest estimated capital cost.

  - The range of capital costs of the three TSM alternatives is $14.1 million (Michigan) to $26.0 million (Gratiot). The estimated capital cost of the Woodward TSM alternative is $14.9 million.

  - The range of capital costs of the three BRT alternatives is $213.0 million (Woodward) to $292.0 million (Michigan). The estimated capital cost of the Gratiot BRT alternative is $280 million. These costs are in Year 2007 dollars.

  - The range of capital costs of the three LRT alternatives is $371.0 million (Woodward) to $523.0 million (Gratiot). The estimated capital cost of the Michigan LRT alternative is $521.0 million.

- The range of order-of-magnitude O&M costs is $1.6 million (Michigan TSM) to $11.0 million (Gratiot LRT).

  - The low level of transit service currently on Michigan Avenue results in low O&M costs under the No-Build and TSM alternatives. The same is true when the cost is measured relative to DDOT's systemwide O&M cost.

  - Woodward BRT has the lowest O&M cost of all three BRT alternatives. Similarly, Woodward LRT has the lowest O&M cost of all three LRT alternatives.

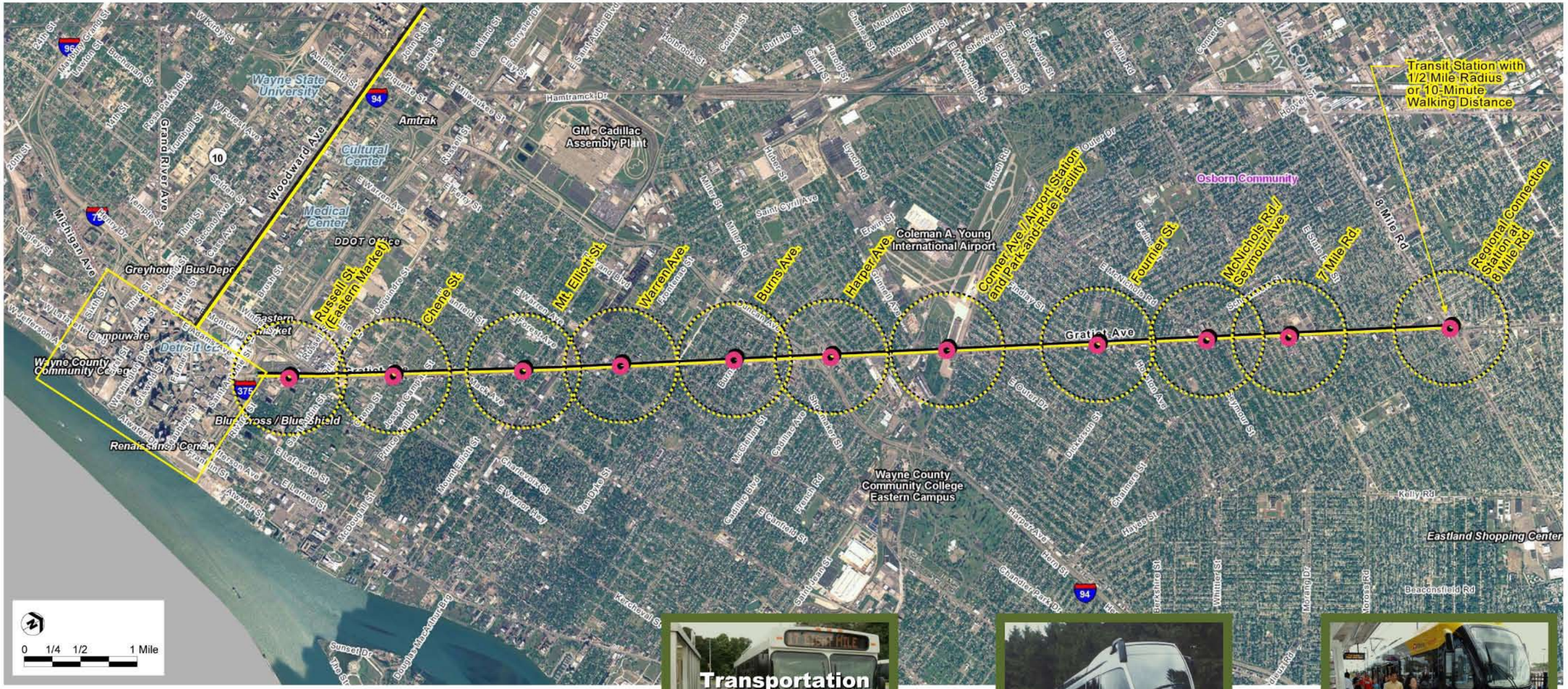
  - The incremental costs of operating BRT or LRT on Woodward Avenue relative to DDOT's systemwide O&M cost are $1.3 million and $3.5 million, respectively. These incremental costs are significantly lower than for No-Build and TSM on Woodward -- $9.0 million and $11.1 million, respectively. This suggests that additional bus improvements are likely to yield diminishing returns in additional ridership.

  - Similarly, the operating cost per passenger mile decreases significantly relative to the TSM alternatives under the Gratiot and Woodward Build alternatives. The cost ranges from $0.39 (Woodward BRT) to $0.70 (Gratiot LRT) compared to $9.35 (Gratiot TSM) to $21.04 (Woodward TSM) per passenger mile.

Based on these findings, the Woodward BRT and LRT alternatives appear to best meet the performance measures defined under the Transportation and Mobility criterion.

Figure 10-1

Gratiot Avenue Alignment



* TSM ridership includes local (trunk) and skip-stop routes

FTA New Starts Benchmarks			
Cost Effectiveness Index Relative to TSM (needs to be under $23)	Not applicable	$22.49	$29.35
Transportation & Mobility			
Improve Mobility			
*Year 2030 Daily Ridership on Alternative**	*6,400*	*8,200*	*9,900*
Year 2030 Daily Ridership Total Corridor	*15,600*	*18,100*	*19,800*
Year 2030 Daily New Riders	*680*	*3,280*	*4,090*
Year 2030 Level of Service - Average travel speed for autos	*25 MPH*	*19 MPH*	*19 MPH*
Cost Effective & Efficient Travel Options			
Year 2007 Order-of-Magnitude Capital Cost	*$26.0 million*	*$280 million*	*$523 million*
Year 2007 Operating Cost	*$2.6 million (skip-stop service)*	*$7.7 million*	*$11.0 million*
Parking Impacts - Number of on-street spaces	2,670	1,820	1,780
Change (relative to TSM)	*Not applicable*	*(850)*	*(890)*
Percent Change (relative to TSM)	*Not applicable*	*(32%)*	*(33%)*
Communities and Environment			
Year 2000 Transit Dependent Population within 1/2 Mile of Stations	21,810	19,100	19,100
2030 Change in Daily Regional Vehicle Miles Travelled (relative to TSM)	Not applicable	(18,700)	(31,900)
2030 Change in Annual CO2 Emissions - Relative to TSM (tons)	Not applicable	(2,320 tons)	(3,955 tons)
Population Potentially Affected by Noise & Vibration within 100' of Alignment	2,590	2,590	2,590
Public Involvement			
Community Sentiment - Through July 2007 Scoping Meetings			
Alignment Preference	*Medium*	*Medium*	*Medium*
Mode Preference	*Low*	*Medium*	*High*

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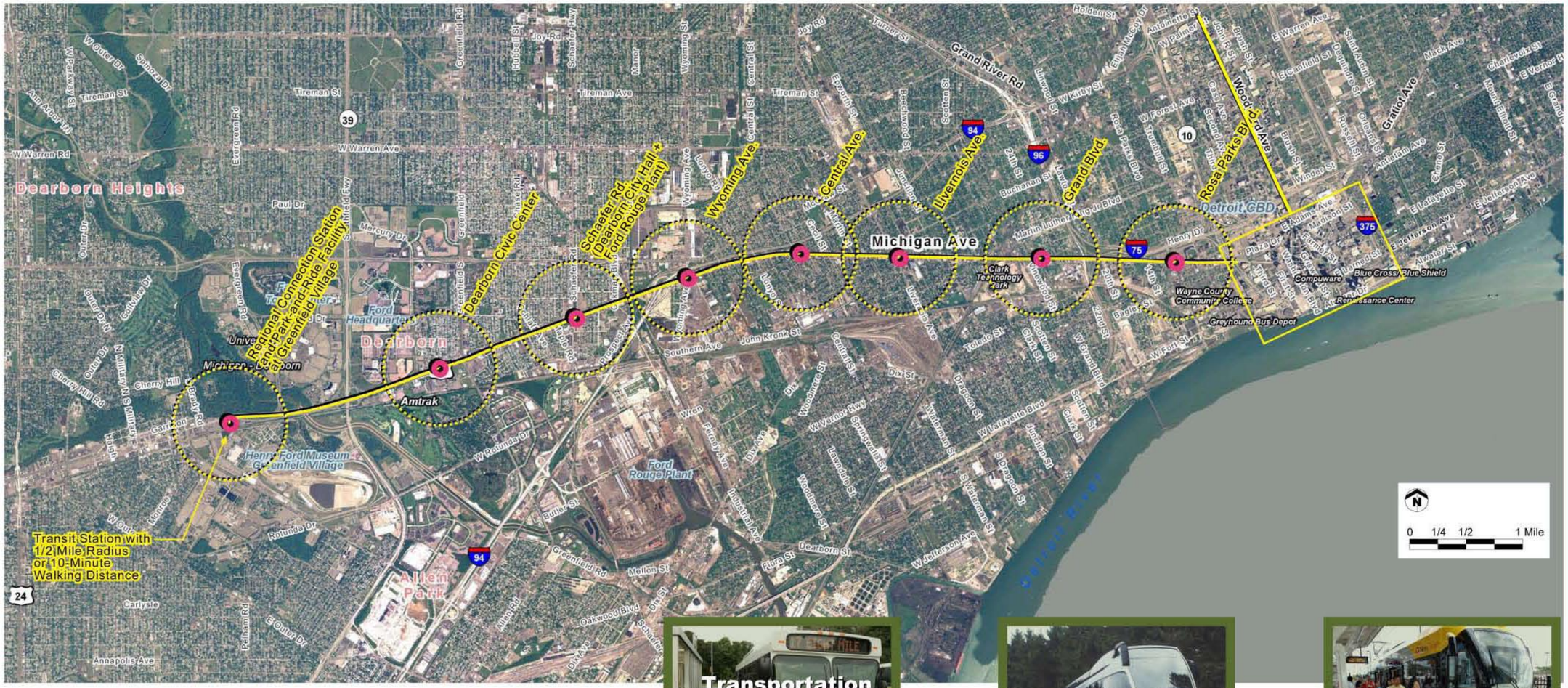
Figure 10-2

Michigan Avenue Alignment



** TSM ridership includes local (trunk) and skip-stop routes*

	Transportation System Management (Required by FTA)	Bus Rapid Transit (Required by FTA)	Light Rail
FTA New Starts Benchmarks			
Cost Effectiveness Index Relative to TSM (needs to be under $23)	Not applicable	$25.00	$32.79
Transportation & Mobility			
Improve Mobility			
*Year 2030 Daily Ridership on Alternative**	*2,500*	*5,200*	*6,400*
Year 2030 Daily Ridership Total Corridor	*5,600*	*8,600*	*9,700*
Year 2030 Daily New Riders	*430*	*2,530*	*3,140*
Year 2030 Level of Service - Average travel speed for autos	*27 MPH*	*23 MPH*	*23 MPH*
Cost Effective & Efficient Travel Options			
Year 2007 Order-of-Magnitude Capital Cost	*$14.1 million*	*$292 million*	*$521 million*
Year 2007 Operating Cost	*$1.6 million (skip-stop service)*	*$5.6 million*	*$8.0 million*
Parking Impacts - Number of on-street spaces	1,510	860	860
Change (relative to TSM)	*Not applicable*	*(650)*	*(480)*
Percent Change (relative to TSM)	*Not applicable*	*(43%)*	*(43%)*
Communities and Environment			
Year 2000 Transit Dependent Population within 1/2 Mile of Stations	12,390	11,400	11,400
2030 Change in Daily Regional Vehicle Miles Travelled (relative to TSM)	Not applicable	(21,300)	(29,000)
2030 Change in Annual CO2 Emissions - Relative to TSM (tons)	Not applicable	(2,640 tons)	(3,595 tons)
Population Potentially Affected by Noise & Vibration within 100' of Alignment	2,300	2,300	2,300
Public Involvement			
Community Sentiment - Through July Scoping Meetings			
Alignment Preference	*Medium*	*Medium*	*Medium*
Mode Preference	*Low*	*Medium*	*High*

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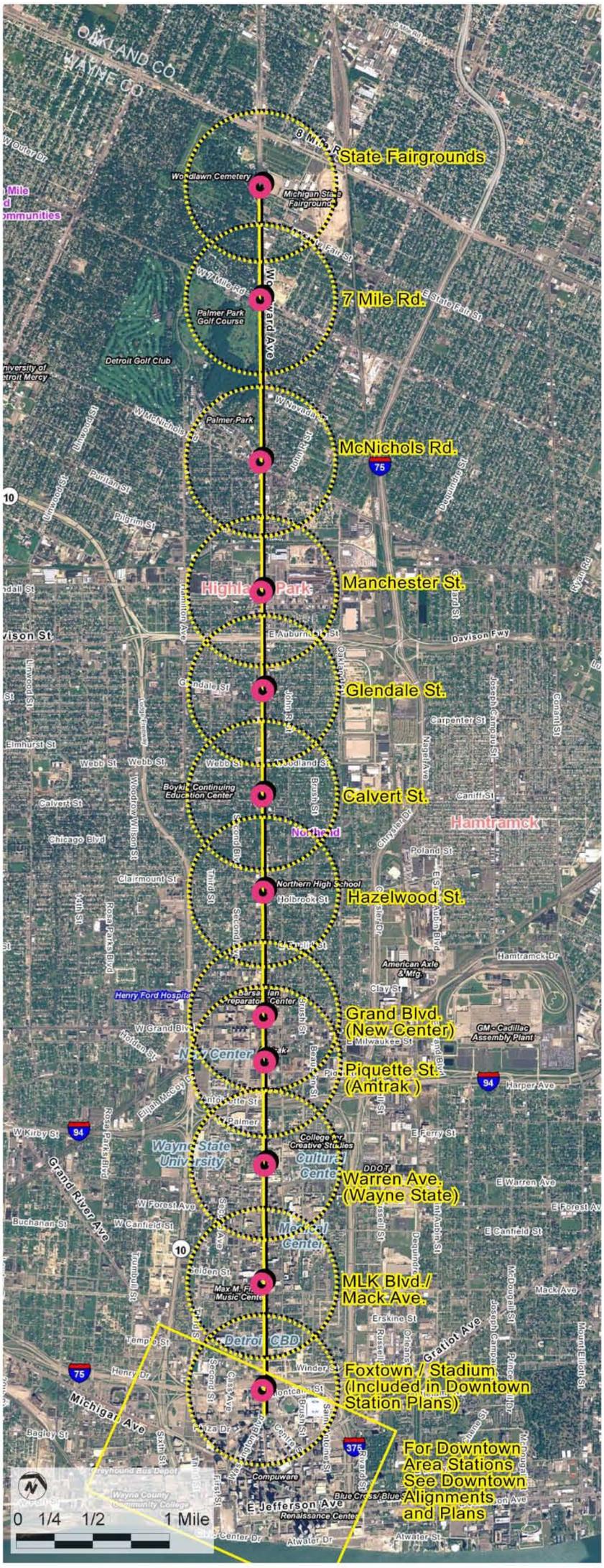

FTA New Starts Benchmarks			
Cost Effectiveness Index Relative to TSM (needs to be under $23)	Not applicable	$16.12	$20.69
Transportation & Mobility			
Year 2030 Daily Ridership on Alternative*	8,600	9,200	11,100
Year 2030 Daily Ridership Total Corridor	20,000	20,900	22,800
Year 2030 Daily New Riders	780	3,420	4,250
Year 2030 Level of Service - average travel speed for autos (MPH)	24 MPH	20 MPH	20 MPH
Year 2007 Order-of-Magnitude Capital Cost	$14.9 million	$213.0 million	$371.5 million
Year 2007 Operating Cost	$1.9 million*	$5.1 million	$7.4 million
Parking Impacts - Number of on-street spaces	1,420	480	470
Parking Impacts Change (relative to TSM)	Not applicable	(940)	(950)
Parking Impacts Percent Change (relative to TSM)	Not applicable	(66%)	(67%)
Communities and Environment			
Year 2000 Transit Dependent Population within 1/2 Mile of Stations	15,650	15,650	15,650
2030 Change in Daily Regional Vehicle Miles Travelled (Compared to No Build, Year 2030)	Not applicable	(25,500)	(33,700)
2030 Change in Annual CO2 Emissions - Relative to TSM (tons)	Not applicable	(3,160 tons)	(4,180 tons)
Population Potentially Affected by Noise & Vibration within 100' of Alignment	2,180	2,180	2,180
Public Involvement			
Community Sentiment - Through July Scoping Meetings			
Alignment Preference	High	High	High
Mode Preference	Low	Medium	High

** TSM ridership includes local (trunk) and skip-stop routes*

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Figure 10-3

Woodward Avenue Alignment

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10.2 FTA New Starts Benchmarks

The CEI determined for this Alternatives Analysis used the FTA's former definition, prior to the FTA's use of Transportation User Benefits (TSUB) in 2005/2006. The earlier definition indicated a CEI of $22.99 or less for a project to obtain a Medium rating from the FTA New Starts program. (Coordination with FTA and a review of projects that advanced in the New Starts program indicated that projects with a CEI of $22.99 or less ultimately resulted in a full funding grant agreement.) Because of the detailed analysis entailed in the calculation of TSUB, the earlier CEI definition was utilized as a proxy in the DTOGS project that further distinguished the various alternatives from one another.

As previously stated, a CEI of less than $23.00 is desired for a TSM or Build alternative to be considered likely to meet FTA New Starts benchmarks. Based on the calculations described in Section 8, BRT and LRT on Woodward Avenue are expected to meet this New Start benchmark ($16.12 and $20.69, respectively). BRT on Gratiot Avenue is also expected to meet this benchmark ($22.49).

As part of the application to enter preliminary engineering, a new CEI utilizing TSUB would have to be developed, consistent with current FTA guidelines.

10.3 Economic Opportunity and Investment

The Woodward alignment scored highly in several categories, including redevelopment potential.

- The Michigan and Woodward alignments scored highly under redevelopment potential. The middle segment of the Gratiot alignment is hampered by a declining base of residential population and a lack of commercial activity. Opportunities along Gratiot Avenue are highest in the growing neighborhoods closer to downtown Detroit or in the more stable residential neighborhoods at the far northern edge of the alignment.

- All but one of the proposed station areas along the Woodward Alignment were determined to have a medium or high potential for TOD.

- The Gratiot and Michigan alignments would serve more jobs (11 percent and 20 percent, respectively) than the Woodward Alignment.

- Approximately 50 percent more people live within one-half mile of proposed stations on the Gratiot alignment than the Michigan and Woodward alignments.

- Despite the relatively lower population and employment along the Woodward alignment, it is still expected to have the highest levels of ridership.

- The greatest parking impacts are associated with the Woodward BRT and LRT alternatives. Under the LRT alternative, approximately two-thirds of existing on-street parking spaces on the segment between Montcalm and the State Fairgrounds would be removed or relocated. The loss in on-street parking spaces is largely associated with the 100-foot-wide right-of-way between Grand Boulevard and Manchester Street through Highland Park – a 2.8-mile segment.

- Relative to the Michigan and Woodward Build Alternatives, the Gratiot Build Alternatives have the least impact on on-street parking due to its relatively wide right-of-way. The right-of-way of Gratiot Avenue between Broadway and Eight Mile Road varies from 120 feet to 135 feet.

- Two-thirds of the on-street parking on Woodward Avenue may need to be eliminated. **Appendix N** presents additional analysis of on-street parking along Woodward to identify possible opportunities to mitigate the reduction in parking.

10.4 Communities and Environment

All three alignments were similar in the number of people potentially impacted by noise, number of community facilities served, intermodal connections, and right-of-way impacts. Woodward Avenue scored highly in several categories, including consistency with plans and decreases in 2030 VMT and CO_2 emissions. Although all three alignments would potentially serve large, transit-dependent populations, a higher percentage of the residents living along Woodward Avenue are transit-dependent. Therefore, the Woodward alignment appears to best meet the DTOGS project goals for communities and environment.

10.5 Public Involvement

Repeatedly through the numerous public outreach activities conducted for the DTOGS project, public sentiment showed a preference for both LRT and for Woodward Avenue. Outreach activities included stakeholder interviews, open houses, Early Environmental Scoping meetings, and surveys.

10.6 Recommendation

The results of the detailed evaluation indicated LRT on Woodward Avenue as the LPA. Based on the New Starts project development process, the selection of LRT on Woodward Avenue as the LPA entails detailed definition and further analysis of Baseline and BRT alternatives. Required actions after selection of an LPA for the DTOGS project are discussed in Section 11 of this report. **Figure 10-4** at the end of this section presents the 2030 stations boardings for the Woodward LRT alternative. As previously stated, selection of a specific downtown alignment will be completed during PE.

The selection of LRT on Woodward Avenue as the DTOGS project LPA is a means to prioritize the various transit improvement needs in the DTOGS area. This means that the next priorities for developing major transit improvements in the area are Gratiot and Michigan Avenues. Further, SEMCOG's transit system plan identifies Woodward, Gratiot and Michigan Avenues as rapid transit corridors. The DTOGS project acknowledges this and has ensured that it has followed the framework developed by local and regional bodies in the SEMCOG area.

Appendix O presents the LRT station plans for Woodward Avenue between downtown Detroit and the Michigan State Fairgrounds. The downtown station plans are based on the three alignment concepts identified in the DTOGS project. Downtown stations plans will be refined during PE when a preferred downtown alignment is identified.

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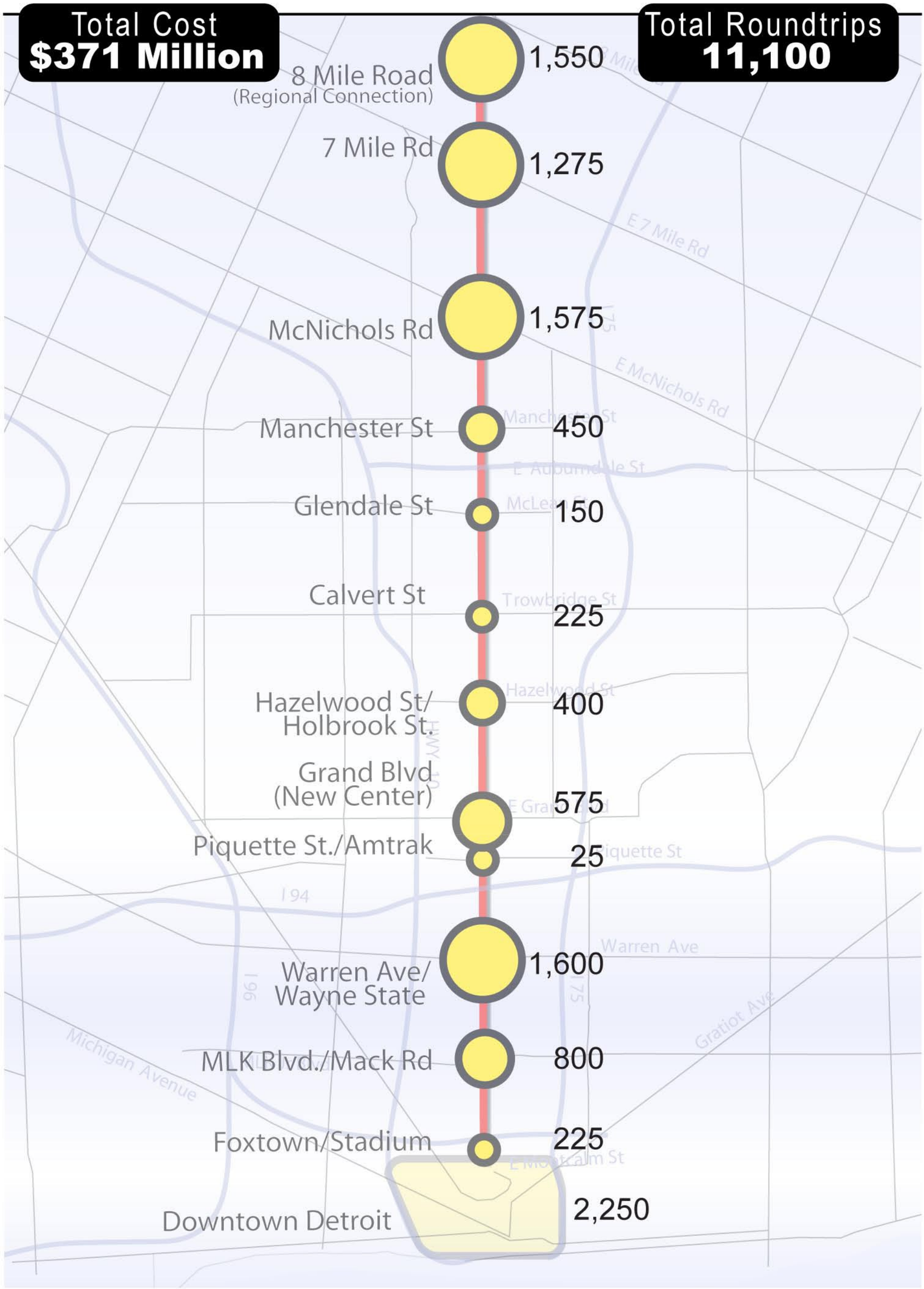
Estimated Capital Cost
(Year 2007 Dollars)

2030 Daily Roundtrips Forecast
(by Station)



Legend:

- 250 or Fewer
- 251 - 500
- 501 - 1,000
- Over 1,000

* Includes ridership at Grand Boulevard Station

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Figure 10-4
Locally Preferred Alternative
2030 Daily Roundtrips for Woodward LRT

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