UW-Milwaukee Bus Rapid Transit Workshop
Monday, December 14, 2015, 5:30 to 7:30 p.m.
First Floor, School of Architecture and Urban Planning Building

5:30-5:45 p.m.—Welcome and course background (Dr. Ivy Hu and Dr. Robert Schneider)

5:45-6:45 p.m.—Presentations of final analysis and recommendations (Students)
This period included a formal presentation and 15 minutes for general questions from guests.

- Management & Economic Team
- Planning & Equity Team
- Engineering Team
- Corridor & Station Design Team

6:45-7:30 p.m.—Questions and discussion with four student teams (All Guests)
Each team set up at a station to display and discuss more detailed materials (e.g., drawings, maps, spreadsheets). Guests had the opportunity to rotate between stations, ask questions, and provide feedback to students.

*We recognize that the ultimate decisions to develop a BRT system will be made by elected officials and agencies. In fact, we are very excited that Milwaukee County, the Cities of Milwaukee and Wauwatosa, WisDOT, SEWRPC and others are already working to make BRT a reality. We hope that our ideas can help support these efforts and contribute to the public discussion around creating a high-quality rapid transit system that becomes a signature feature of the Milwaukee region.
Welcome slides presented by

Robert J. Schneider, PhD
Assistant Professor
School of Architecture and Urban Planning
University of Wisconsin-Milwaukee
E-mail: rjschnei@uwm.edu

Lingqian (Ivy) Hu, PhD
Associate Professor
School of Architecture and Urban Planning
University of Wisconsin-Milwaukee
E-mail: hul@uwm.edu
Welcome All!
Acknowledgements

Guest Speakers* (alphabetical)

- Bob Bauman, Alderman 4th District
- Brian Dranzik, Milwaukee County
- Carolyn Esswein, UW-Milwaukee
- Kirk Harris, UW-Milwaukee
- Rob Henken, Public Policy Forum
- Nik Kovac, Alderman 3rd District
- Dan Meyers, AECOM
- Kevin Muhs, Southeastern Wisconsin Regional Planning Commission
- Joe Peterangelo, Public Policy Forum
- Jim Piwoni, American Design
- Jeff Polenske, City of Milwaukee
- Jennifer Sarnecki, Wisconsin Department of Transportation
- Kerry Thomas, MetroGO
- Scott Williams, American Design

*Note: We are extremely grateful to the guest speakers who shared their knowledge and opinions with our class throughout the semester. Please be aware that the final student products reflected in this presentation and other products are the opinions of our class and do not necessarily represent the views of our guest speakers.
**Management and Economics**
- Josh Handrich, Jocelyn Kroetz-Jones, Alex Snyder, Lydia Statz, Kristian Vaughn, Richard Barbieri (Audit)

**Planning and Equity**
- Danny Benson, Ryan Guetschow, Mitch Harris, Tyler Roloff, Lu Zhu

**Engineering**
- Liz Anderson, Aaron Rowe, Elliot Skrobis, Joe Stefanich, Kevan Toby

**Corridor and Station Design**
- John Barac, Jassim Fakhroo, Jake Jordan, Zech Krueger, Marissa Meyer, Zach Ziemba
Our Vision

- The reasons that we wanted to teach this course
- The components
- Products
- Agenda & logistics
Proportion of Milwaukee Region Millennials Citing Service as “Important”
(Recent headlines have focused on Millennial respondents indicating more support for automobile travel than public transit.)

<table>
<thead>
<tr>
<th>Service</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Streets &amp; highways that are well-maintained</td>
<td>80%</td>
</tr>
<tr>
<td>Streets &amp; highways that are relatively uncongested</td>
<td>74%</td>
</tr>
<tr>
<td>Transit to connect downtown attractions</td>
<td>56%</td>
</tr>
<tr>
<td>Transit between downtown and suburbs</td>
<td>56%</td>
</tr>
</tbody>
</table>

Image Source: Classroom Clipart. classroomclassroomclipart.com.
Source: Public Policy Forum. My Generation: Surveying the Views of Millennials in Metro Milwaukee, December 2015, p. 22
### Proportion of Milwaukee Region Millennials Citing Service as “Important”

(Recognize context: Responses are not surprising because of the existing automobile-oriented transportation system in our region)

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<tr>
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</tr>
<tr>
<td>Transit to connect downtown attractions</td>
<td>56%</td>
</tr>
<tr>
<td>Transit between downtown and suburbs</td>
<td>56%</td>
</tr>
<tr>
<td>Public transit</td>
<td>4%</td>
</tr>
</tbody>
</table>

*American Community Survey, 2010-2014.

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</tr>
<tr>
<td>Transit between downtown and suburbs</td>
<td>56%</td>
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</tbody>
</table>

(We see another important story: Despite the current prevalence of automobile travel, a large portion think better transit is important…)

Many looking for better transit options!

*American Community Survey, 2010-2014.
Source: Public Policy Forum. My Generation: Surveying the Views of Millennials in Metro Milwaukee, December 2015, p. 22
Main presentation slides presented by student teams
All Aboard: Bus *Rapid* Transit in Milwaukee

University of Wisconsin-Milwaukee
Introduction

Problem Statement

The Milwaukee metro area lacks an **efficient**, **attractive**, and **rapid** transit system that connects the region’s many communities.
What is BRT?

- Runs faster and more frequently than regular bus service
- Wider stop spacing
- Unique bus design
- Not express bus service
- Features same key design elements of light rail
Introduction
Key Design Elements

1. Dedicated right-of-way
2. Center busway alignment
3. Off-board fare collection
4. Intersection treatments
5. Platform-level boarding

Introduction
Key Design Elements

1. Dedicated right-of-way
2. Center busway alignment
3. Off-board fare collection
4. Intersection treatments
5. Platform-level boarding

Introduction

Key Design Elements

1. Dedicated right-of-way
2. **Center busway alignment**
3. Off-board fare collection
4. Intersection treatments
5. Platform-level boarding

Introduction
Key Design Elements

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2. Center busway alignment
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Key Design Elements

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Introduction

Key Design Elements

1. Dedicated right-of-way
2. Center busway alignment
3. Off-board fare collection
4. Intersection treatments
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Faster travel times

BRT quadrupled in size (length) between 2004-2014

Introduction

BRT in the U.S.

19 cities with 34 BRT lines

Introduction

BRT in the U.S.

19 cities with 34 BRT lines

Ridership: Half million passengers daily

BRT in the U.S.

Introduction

19 cities with 34 BRT lines

New projects planned for Boston, Chicago, Cleveland, Indianapolis, Minneapolis, and Pittsburgh.

Ridership: Half million passengers daily

Public Policy Forum (2015)
SEWRPC (2010)
Milwaukee County (2008)
City of Milwaukee (2008)
SEWRPC (since the 1960s)
Introduction

Past Recommendations

- Public Policy Forum (2015)
- SEWRPC (2010)
- Milwaukee County (2008)
- City of Milwaukee (2008)
- SEWRPC (since the 1960s)
East-West Corridor
Starter Line
Design, Engineering &
Economic Considerations

Broader System MRT
Planning & Equity
Considerations
Introduction

Presentation Overview

East-West Corridor
Starter Line
Design, Engineering & Economic Considerations

Broader System
Planning & Equity Considerations
East-West Corridor
Starter Line
Design, Engineering & Economic Considerations

Broader System
Planning & Equity Considerations
East-West Corridor Starter Line

Design, Engineering & Economic Considerations
East/West Corridor
• **Alternative 1: No Build**
• Alternative 2: Median-Based
• Alternative 3: Curbside
Alternative 1: No Build
Alternative 2: Median-Based
Alternative 3: Curbside
- Alternative 1: No Build
- Alternative 2: Median-Based
- **Alternative 3: Curbside**
Engineering & Design
Station Placement

- 87th Street
- Hawley Rd.
- 35th Street
- 27th Street
- 16th Street
- 4th Street
- Prospect Ave.

Regional Medical Center

Downtown
Design Concerns
- Multimodal Accessibility
- Safety & Comfort
- Cohesive & Attractive Image

Engineering Concerns
- Travel Times
- Traffic Impacts
- Parking Impacts
- Cost Efficiency
- Safety
- Mode Shift Projections
Engineering & Design
No-Build Alternative

Source: http://onmilwaukee.com/images/articles/ne/newmctsbuses/newmctsbuses_fullsize_story1.jpg
Engineering & Design
No-Build Alternative Wisconsin & 16th

[Diagram showing street layout with labels for 16th Street, 17th Street, Wisconsin Ave, and parking and travel areas.]
Engineering & Design
No-Build Alternative Wisconsin & 4th

Image source: maps.google.com
Engineering & Design
No-Build Alternative Travel Times

Eastbound

- Auto on Wisconsin: Morning 32, Afternoon 32
- Auto on I-94: Morning 27, Afternoon 24
- Transit on Wisconsin: Morning 55, Afternoon 57

Westbound

- Auto on Wisconsin: Morning 30, Afternoon 33
- Auto on I-94: Morning 18, Afternoon 25
- Transit on Wisconsin: Morning 50, Afternoon 52

Minutes

Morning Afternoon
Alternative 1: Directional Capacity, Peak Flow Rates, and Design Hourly Volume for Automobile Traffic

Source of peak flow data: http://www.topslab.wisc.edu/
Current MCTS Ridership in the Wisconsin Avenue Corridor: **21,902 unlinked transit trips daily**

Source: [http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml](http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml)
### Mode Share for Census Tracts within 1/2 mile of Wisconsin Ave.

<table>
<thead>
<tr>
<th>Commute Mode</th>
<th>Total Trips</th>
<th>Mode Share %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto</td>
<td>203,139</td>
<td>69%</td>
</tr>
<tr>
<td>Transit</td>
<td>21,902</td>
<td>7.4%</td>
</tr>
<tr>
<td>Bike</td>
<td>3,157</td>
<td>1.1%</td>
</tr>
<tr>
<td>Walk</td>
<td>54,452</td>
<td>18.4%</td>
</tr>
<tr>
<td>Other</td>
<td>13,478</td>
<td>4.6%</td>
</tr>
</tbody>
</table>

Source: American Community Survey Milwaukee County Transit System
Engineering & Design
Median Alternative
- Landscaping buffers along median
- Ramp access rises 14" from crosswalk
- Left turn lanes
- Maximizes amount of street parking
Engineering & Design
Median Alternative Wisconsin & 27th
Engineering & Design
Median Alternative Wisconsin & 16th

- Landscaping buffers align with Marquette
- Ramp access rises from 14” from crosswalk
- No separate left turn lane
- Maximizes amount of street parking
Engineering & Design
Median Alternative Travel Times

**Eastbound**

<table>
<thead>
<tr>
<th>Mode</th>
<th>Morning</th>
<th>Afternoon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto on Wisconsin</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>Auto on I-94</td>
<td>27</td>
<td>24</td>
</tr>
<tr>
<td>Transit on Wisconsin</td>
<td>39</td>
<td>40</td>
</tr>
</tbody>
</table>

**Westbound**

<table>
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<tr>
<th>Mode</th>
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<th>Afternoon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto on Wisconsin</td>
<td>30</td>
<td>33</td>
</tr>
<tr>
<td>Auto on I-94</td>
<td>18</td>
<td>25</td>
</tr>
<tr>
<td>Transit on Wisconsin</td>
<td>36</td>
<td>38</td>
</tr>
</tbody>
</table>
Alternative 2: Directional Capacity, Peak Flow Rates, and Design Hourly Volume for Automobile Traffic

Source of peak flow data: http://www.topslab.wisc.edu/
Observed Impact of BRT systems (EMBARQ, 2015)

- 33% reduction in crashes
- 41% reduction in injury-related crashes

<table>
<thead>
<tr>
<th></th>
<th># of Crashes (2010-2014)</th>
<th># of Crashes (Annual Average)</th>
<th>Predicted # of Reduced Crashes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Crashes on Wisconsin Ave.</td>
<td>1377</td>
<td>275.4</td>
<td>90.9</td>
</tr>
<tr>
<td>Total Crashes with Injury Reported</td>
<td>453</td>
<td>90.6</td>
<td>37.1</td>
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### Observed Impact of BRT systems (EMBARQ, 2015)

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Median-based systems offer additional benefits through:

- The presence of a central median
- Strategic left turn prohibition
- A shorter crosswalk

7,665 new transit riders in the corridor

<table>
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<th>Commute Mode</th>
<th>Total Trips</th>
<th>Mode Share %</th>
</tr>
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<tr>
<td>Auto</td>
<td>201,223</td>
<td>67%</td>
</tr>
<tr>
<td>Transit</td>
<td>29,568</td>
<td>10%</td>
</tr>
<tr>
<td>Bike</td>
<td>3,157</td>
<td>1.0%</td>
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<td>13,478</td>
<td>4.5%</td>
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Source: American Community Survey, Milwaukee County Transit System SF, CTA Van Ness Corridor Study, Federal Transit Administration
New Buses - $9.36 Million
Bus Stops - $5.28 Million
Roadway Construction - $33.07 Million

Total Capital Cost = $47.71 Million
Engineering & Design
Curbside Alternative Wisconsin & 27th

- Landscaping along medians and curbs
- Ramp access rises 8” from sidewalk
- Left turn lanes
- Maximizes amount of street parking
Engineering & Design
Curbside Alternative Wisconsin & 16\textsuperscript{th}

- Landscaping buffers align with Marquette
- Ramp access rises 8” from sidewalk
- Left turn lanes
- Maximizes amount of street parking
Engineering & Design
Curbside Alternative Wisconsin & 16th
- Large hub station
- Landscaping buffers along curbs and sidewalks
- Ramp access rises 8" from sidewalk
Engineering & Design
Curbside Alternative Wisconsin & 4th

MRT
4th Street – Looking NW
Engineering & Design
Curbside Alternative Travel Times

Eastbound

- Auto on Wisconsin: Morning 32, Afternoon 32
- Auto on I-94: Morning 27, Afternoon 24
- Transit on Wisconsin: Morning 42, Afternoon 42

Westbound

- Auto on Wisconsin: Morning 30, Afternoon 33
- Auto on I-94: Morning 18, Afternoon 25
- Transit on Wisconsin: Morning 38, Afternoon 39
Alternative 3: Directional Capacity, Peak Flow Rates, and Design Hourly Volume for Automobile Traffic

Source of peak flow data: http://www.topslab.wisc.edu/
Estimated **1%** total on-street parking loss
(50 total spaces)
**Observed Impact of BRT systems (EMBARQ, 2015)**

- 33% reduction in crashes.
- 41% reduction in injury-related crashes.

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<td>Total Crashes with Injury Reported</td>
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6,133 new transit riders in the corridor

### Mode Share for Census Tracts within 1/2 mile of Wisconsin Ave.

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<td>67%</td>
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<td>Transit</td>
<td>28,035</td>
<td>9.3%</td>
</tr>
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<td>Bike</td>
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<td>1.0%</td>
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Sources: American Community Survey Milwaukee County Transit System SF CTA Van Ness Corridor Study Federal Transit Administration
New Buses - $9.36 Million
Bus Stops - $5.28 Million
Roadway Construction - $31.3 Million

Total Capital Cost = $45.94 Million
## Median & Curbside Operating Costs

<table>
<thead>
<tr>
<th>Operating Hours</th>
<th>Weekday</th>
<th>Weekend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Hours</td>
<td>712</td>
<td>192</td>
</tr>
<tr>
<td>Annual Cost*</td>
<td>$3,200,00</td>
<td>$850,000</td>
</tr>
</tbody>
</table>

**Total** | **$4 million**

*Based on current MCTS cost projections of approximately $85 per revenue hour*
<table>
<thead>
<tr>
<th></th>
<th>No-Build Alternative</th>
<th>Median Alternative</th>
<th>Curbside Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto Travel Time</td>
<td>30-32 minutes</td>
<td>30-32 minutes</td>
<td>30-32 minutes</td>
</tr>
<tr>
<td>Public Transit / BRT Travel Time</td>
<td>50-55 minutes*</td>
<td>36-40 minutes</td>
<td>38-42 minutes</td>
</tr>
<tr>
<td>Headways (Peak Travel Times)</td>
<td>16 minutes</td>
<td>10 minutes</td>
<td>10 minutes**</td>
</tr>
<tr>
<td>Traffic Impacts: Volume/ Capacity Ratio (Level of Service)</td>
<td>0.26 – 0.76 (LOS A to D)</td>
<td>0.57 – 0.83 (LOS C to D)</td>
<td>0.57 – 0.80 (LOS C to D)</td>
</tr>
<tr>
<td>Corridor Transit Ridership</td>
<td>21,902</td>
<td>29,568</td>
<td>28,035</td>
</tr>
<tr>
<td>Cost of Implementation</td>
<td>$0</td>
<td>$47.71 Million</td>
<td>$45.94 Million</td>
</tr>
</tbody>
</table>

*Current Gold Line average time through the corridor

**Curb-based alternative headways are subject to greater variation due to increased opportunities for interference from turning and parking vehicles
Engineering & Design

Modular Station Design

FLOOR DIMENSIONS: LENGTH=12'  WIDTH=5'
ROOF DIMENSIONS:  LENGTH=16'  WIDTH=8'
HEIGHT=10'

FLOOR DIMENSIONS: LENGTH=24'  WIDTH=5'
ROOF DIMENSIONS:  LENGTH=28'  WIDTH=8'
HEIGHT=12'

FLOOR DIMENSIONS: LENGTH=36'  WIDTH=5'
ROOF DIMENSIONS:  LENGTH=40'  WIDTH=8'
HEIGHT=12'
Materials

- Steel
- Aluminum
- Laminated glass
- Concrete
- Wood
Engineering & Design
Station Amenities

- Seating
- Lighting
- Maps and Wayfinding
- Real-Time Displays
- Bike Racks
- Ticket Vending Machines
Station Amenities – Common Examples

- Seating
- Wayfinding
- Map
- Real-Time Display
- Ticket Vending Machine
- Lighting

Station Amenities – Common Examples

Bike Racks
Typical Station Costs

- Small: $25,000
- Medium: $35,000
- Large: $50,000
- Hub Station: $750,000
Engineering & Design
System Branding
Focus Areas:

- Travel-Time Savings
- Safety Savings
- Job Creation
- Transit-Oriented Development
## Economic Benefits

### Travel-Time Savings

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Time Savings</th>
<th>Estimated Average Weekday Ridership</th>
<th>Daily Savings (Valued at $13.26/hr)</th>
<th>Annual Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>No-Build Alternative</td>
<td>--</td>
<td>21,902</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Curbside Alternative</td>
<td>25 mins (round trip)</td>
<td>28,035</td>
<td>$155,000</td>
<td>$48.5 Million</td>
</tr>
<tr>
<td>Median Alternative</td>
<td>28 mins (round trip)</td>
<td>29,568</td>
<td>$183,000</td>
<td>$54.3 Million</td>
</tr>
<tr>
<td>Type of Injury</td>
<td>Crashes Prevented</td>
<td>Valued at</td>
<td>Savings</td>
<td></td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>-------------------</td>
<td>------------</td>
<td>------------</td>
<td></td>
</tr>
<tr>
<td>Property-Damage Only</td>
<td>60.9</td>
<td>$4,006</td>
<td>$243,937</td>
<td></td>
</tr>
<tr>
<td>Minor Injuries</td>
<td>24.8</td>
<td>$28,764</td>
<td>$713,347</td>
<td></td>
</tr>
<tr>
<td>Moderate Injuries</td>
<td>10.4</td>
<td>$450,636</td>
<td>$4,686,614</td>
<td></td>
</tr>
<tr>
<td>Severe Injuries</td>
<td>1.9</td>
<td>$2,550,408</td>
<td>$4,845,775</td>
<td></td>
</tr>
<tr>
<td><strong>Total annual savings</strong></td>
<td><strong>$10.5 million</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Economic Benefits

### Reduction in Vehicle Miles Traveled (VMT)

<table>
<thead>
<tr>
<th></th>
<th>Reduction in VMT/year</th>
<th>Per-Mile Valuation</th>
<th>Annual Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curbside Alternative</td>
<td>3,223,680</td>
<td>$0.58</td>
<td>$1.87 million</td>
</tr>
<tr>
<td>Median Alternative</td>
<td>4,029,600</td>
<td>$0.58</td>
<td>$2.33 million</td>
</tr>
</tbody>
</table>
### Economic Benefits

#### CO2 Reductions

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Reduction in CO₂ (ton/year)</th>
<th>Valued at (per ton)</th>
<th>Savings (per year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curbside Alternative</td>
<td>1058.7</td>
<td>$62</td>
<td>$65,642</td>
</tr>
<tr>
<td>Median Alternative</td>
<td>1656.2</td>
<td>$62</td>
<td>$102,682</td>
</tr>
</tbody>
</table>
### Economic Benefits

#### Short-Term Job Creation

<table>
<thead>
<tr>
<th></th>
<th>Median Alternative</th>
<th>Curbside Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital Cost</td>
<td>$47.7 million</td>
<td>$45.9 million</td>
</tr>
<tr>
<td>Direct/Indirect Jobs Created</td>
<td>758</td>
<td>730</td>
</tr>
</tbody>
</table>
1. Government Support
2. Strength of Land Market
3. Quality of Transit Investment

## Economic Benefits

### Transit-Oriented Development

<table>
<thead>
<tr>
<th></th>
<th>Land Potential</th>
<th>Government Support</th>
<th>TOD Investment</th>
<th>TOD Investment Per $ of Transit Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleveland HealthLine BRT</td>
<td>Emerging</td>
<td>Strong</td>
<td>$5.8 Billion</td>
<td>$114.54</td>
</tr>
<tr>
<td>Boston Silver Line</td>
<td>Emerging</td>
<td>Moderate</td>
<td>$650 Million</td>
<td>$20.97</td>
</tr>
<tr>
<td>Pittsburgh MLK East Busway</td>
<td>Emerging</td>
<td>Moderate</td>
<td>$903 Million</td>
<td>$3.59</td>
</tr>
<tr>
<td>Eugene/Springfield EmX</td>
<td>Emerging</td>
<td>Moderate</td>
<td>$100 Million</td>
<td>$3.96</td>
</tr>
</tbody>
</table>

### Economic Benefits

#### Transit-Oriented Development

<table>
<thead>
<tr>
<th>Project</th>
<th>Land Potential</th>
<th>Government Support</th>
<th>TOD Investment</th>
<th>TOD Investment Per $ of Transit Investment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleveland HealthLine BRT</td>
<td>Emerging</td>
<td>Strong</td>
<td>$5.8 Billion</td>
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<td>Eugene/Springfield EmX</td>
<td>Emerging</td>
<td>Moderate</td>
<td>$100 Million</td>
<td>$3.96</td>
</tr>
</tbody>
</table>

- **New Starts**: Projects more than $250 million
- **Small Starts**: Projects less than $250 million
- **TIGER**: $500 million total available in 2015
- **WisDOT**: Tie-in with I-94 corridor project
Transit Authority
- 0.5% sales tax = $69 million annually
- Requires approval of state legislature

County Wheel Tax
- $10 Fee = $5.4 million annually
<table>
<thead>
<tr>
<th>Evaluation</th>
<th>Relative Cost of BRT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BRT East-West Starter Line</strong></td>
<td><strong>Milwaukee Streetcar</strong></td>
</tr>
<tr>
<td>Project Cost (millions)</td>
<td>$45.94 - $47.71</td>
</tr>
<tr>
<td>Total Miles</td>
<td>6.4</td>
</tr>
<tr>
<td>Per Mile Cost (millions)</td>
<td>$7.2 - $7.5</td>
</tr>
</tbody>
</table>
Evaluation

BRT Standard Rating

85+ Points

70-84 Points

55-69 Points

Evaluation

BRT Standard Rating

Median Alternative

71 Points

Beyond the East-West Corridor
Planning & Equity Considerations
Beyond the East-West Corridor
Key Considerations

What will a BRT system look like in 2035? In 2050?

Where will it run?
Who will it serve?
Where will it take you?

Beyond the East-West Corridor
Planning Considerations

Activity Center Connection
Commercial, Employment, Institutional, Cultural/Entertainment

- Efficiency
- Equity
- Redevelopment

Beyond the East-West Corridor

Job Density and Commercial Activity

**Job Density**

- Legend:
  - Job (1,000)
  - 4 - 8
  - 8 - 15
  - 15 <

Data Source: U.S. ACS 2009-2013 5 Year Estimates

**Commercial Activity**

Data Source: Esri ARCGIS Business Analysis
Beyond the East-West Corridor
What Didn’t Make It?

Sources: Region Forward, The Transit Coalition, NJTOD, KPBS
Beyond the East-West Corridor

No-Build Alternative MCTS Express Routes

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>432,383</td>
</tr>
<tr>
<td>Transit Users</td>
<td>74,468</td>
</tr>
<tr>
<td>Jobs</td>
<td>295,165</td>
</tr>
<tr>
<td>Sales Volume</td>
<td>$230 million</td>
</tr>
<tr>
<td>Redevelopable Vacant Land</td>
<td>X</td>
</tr>
<tr>
<td>Poverty</td>
<td>210,000</td>
</tr>
<tr>
<td>Racial Diversity</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>225,970 (54%)</td>
</tr>
<tr>
<td>Black</td>
<td>152,112 (36%)</td>
</tr>
<tr>
<td>Asian</td>
<td>17,460 (4%)</td>
</tr>
<tr>
<td>Other Races</td>
<td>20,111 (6%)</td>
</tr>
</tbody>
</table>

Data Source: U.S. ACS 2009-2013 5 Year Estimates
## Beyond the East-West Corridor

### Alternative I

<table>
<thead>
<tr>
<th>Routes</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mileage</td>
<td>79</td>
</tr>
</tbody>
</table>

**Features:**

- Resource Efficiency
- East/West Corridor – State St.
- Special Event Route
### Beyond the East-West Corridor

**Alternative I**

<table>
<thead>
<tr>
<th>Category</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>348,498</td>
</tr>
<tr>
<td>Jobs</td>
<td>279,767</td>
</tr>
<tr>
<td>Sales Volume</td>
<td>$165 million</td>
</tr>
<tr>
<td>Redevelopable Vacant Land</td>
<td>700 acres</td>
</tr>
<tr>
<td>Poverty</td>
<td>190,000</td>
</tr>
</tbody>
</table>

| Racial Diversity               |                |
|                                 |               |
| White                           | 184,292 (55%)  |
| Black                           | 119,412 (35%)  |
| Asian                           | 11,883 (4%)    |
| Other Races                     | 18,728 (6%)    |

Data Source: U.S. ACS 2009-2013 5 Year Estimates
Beyond the East-West Corridor

**Alternative II**

<table>
<thead>
<tr>
<th>Routes</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mileage</td>
<td>130</td>
</tr>
</tbody>
</table>

**Features:**

- Expansive System
- Forked East/West Corridor
### Beyond the East-West Corridor

**Alternative II**

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>456,671</td>
</tr>
<tr>
<td>Transit Users</td>
<td>87,973*</td>
</tr>
<tr>
<td>Jobs</td>
<td>323,342</td>
</tr>
<tr>
<td>Sales Volume</td>
<td>$375 million</td>
</tr>
<tr>
<td>Redevelopable Vacant Land</td>
<td>1,400 acres</td>
</tr>
<tr>
<td>Poverty</td>
<td>225,000</td>
</tr>
</tbody>
</table>

#### Racial Diversity

<table>
<thead>
<tr>
<th>Race</th>
<th>Population</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>254,301</td>
<td>55%</td>
</tr>
<tr>
<td>Black</td>
<td>144,233</td>
<td>35%</td>
</tr>
<tr>
<td>Asian</td>
<td>17,345</td>
<td>4%</td>
</tr>
<tr>
<td>Other Races</td>
<td>22,702</td>
<td>6%</td>
</tr>
</tbody>
</table>

Data Source: U.S. ACS 2009-2013 5 Year Estimates
## Beyond the East-West Corridor
### Alternatives Evaluation

<table>
<thead>
<tr>
<th></th>
<th>No-Build Alternative</th>
<th>Alternative I</th>
<th>Alternative II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Routes</td>
<td>7</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Mileage</td>
<td>112</td>
<td>79</td>
<td>137</td>
</tr>
<tr>
<td>Transit Users</td>
<td>74,468</td>
<td>50,266</td>
<td>86,879*</td>
</tr>
<tr>
<td>Population</td>
<td>432,383</td>
<td>348,498</td>
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<td>Redevelopable Vacant Land</td>
<td>X</td>
<td>700 acres</td>
<td>1,400 acres</td>
</tr>
<tr>
<td>Poverty</td>
<td>210,000</td>
<td>190,000</td>
<td>225,000</td>
</tr>
<tr>
<td>Non-White</td>
<td>46%</td>
<td>45%</td>
<td>45%</td>
</tr>
</tbody>
</table>
Beyond the East-West Corridor

Enhancing Current Services

- Expands the reach of the local system
- Adds needed service to heavily used corridors
- Station placement benefits local routes
- Local service is flexible
Beyond the East-West Corridor

Where Will MRT Take You?

Regional Attractions
- Bucks Arena & Miller Park
- State Fair
- Milwaukee Art Museum
- Potowatomi Hotel & Casino
- Wisconsin Center

TOD & Redevelopment
- 30th Street Corridor
- Westlawn Gardens
- Northridge Mall
- Park East

Beyond Milwaukee
- Mitchell Airport
- Intermodal Station
- Waukesha
Thank You for Coming!
## Summary of Benefits

### General
- **Length**: 6.4 miles
- **Capital Cost**: $47.7 million
- **Per mile cost**: $7.5 million
- **Estimated ITDP Rating**: Silver (71 Points)
- **Annual Operating/Maintenance Costs**: $4 million

### Benefits
- **New Riders**: 7,665
- **Direct/Indirect Jobs Created**: 758
- **Time Savings**: $54.3 million
- **Annual Crash & Injury Savings**: $10.5 million
- **Annual VMT Savings**: $2.3 million
- **Annual Emission Reductions Savings**: $102,682