



# DMC

TRANSPORTATION  
INFRASTRUCTURE  
PROGRAM MANAGEMENT

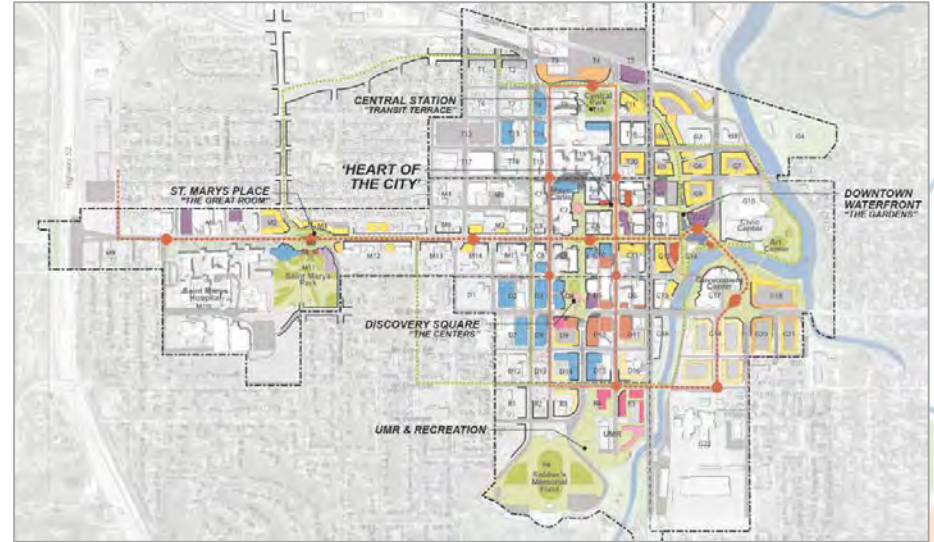
October 27, 2016



Transit Technology Workshop

# Purpose of Workshop

- Review Project Goals
- Review Potential Transit Modes
- Identify Next Steps



# Transportation Goals

- Bring 23-30% of the workforce downtown by transit in 2035
- Connect downtown districts and park-once system with frequent, pedestrian-oriented downtown circulator
- Create a world-class place for regional transit arrival and departure (Transit Terrace)

# Workshop Goals

- Present transportation technology options
- Discuss potential use of options to meet long-term downtown transit needs



# Workshop Questions

- What types of travel would the technology serve well?
- How does the technology “fit” the downtown environment?
- How long would it take to implement?
- What unique opportunities or risks are associated with the technology?

# Existing Rochester Transit Services

- Rochester Public Transit
- Rochester City Lines
- Mayo Shuttle
- Private Shuttles



# Mode: Tram



# Mode: Tram

## Goals

- Provide premium service
  - Look
  - Speed
  - Reliability
- Influence development patterns
- Attract new transit riders



# Mode: Tram

## Tram Cities

- Baltimore
- Boston
- Dallas
- Houston
- Minneapolis
- Norfolk
- Phoenix
- Portland
- Salt Lake City
- Seattle
- Tacoma
- Tuscon

# Mode: Tram

## Overlapping/Emerging Technologies: Vehicles

- Size
- Power
- Power Supply



# Mode: Tram

## Overlapping/Emerging Rail Technologies: Construction Methods



# Mode: Tram

## Example Applications

- Kansas City
- Cincinnati





# Mode: Tram

## Service Characteristics

- Routes
- Connections



# Mode: Tram

## Service Characteristics

- Coverage: downtown, adjacent activity areas
- Frequency: 10/15 min peak, 16/18 min off-peak
- Span: all day
- Markets: downtown employees, residents, visitors

# Mode: Tram

## Vehicle Characteristics

- Length: 60 – 82 feet
- Width: 8 – 8.7 feet
- Minimum Turning Radius: 60 – 82 feet
- Capacity: 125 – 149
- Cost: \$5 – 8 million



# Mode: Tram

## Vehicle Characteristics (continued)

- Maximum Grade: 6 – 8%
- Power: Electric
- Control: Operator
- Availability: Buy American manufacturers



# Mode: Tram

## Guideway (downtown)

- Vehicle Interface: steel wheel on steel rail
- At grade width: 11 – 12 feet each direction
- Grade separated width: 30 – 34 feet
- Cost per mile: \$60 – 80 million/mile

# Mode: Tram

## Station/Stops (downtown)

- Platform height: 10 – 14”
- Platform length: 60 – 80’
- Amenities: Shelter, some real time, fare vending
- ADA: Level, near level



# Mode: Tram

## Operation

- Guideway Use: mixed traffic
- Traffic Control: signal priority
- Reliability: high in exclusive lane, dependent upon traffic flow otherwise



# Mode: Tram

## Unique Characteristics

- Image
- High visibility
- Major infrastructure commitment
- Development influence



# Mode: Tram

## Advantages

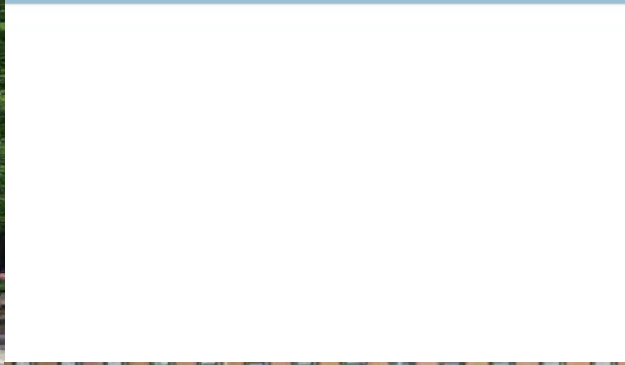
- Perception as premium service
- Easy to understand for non-transit riders
- Attracts non-transit riders to transit system
- Permanent investment attractive to development community

# Mode: Tram

## Disadvantages

- Construction impacts
- Possible noise, vibration and EMI impacts
- Capital cost
- Operating costs

# Mode: Bus Rapid Transit (BRT)



# Mode: Bus Rapid Transit (BRT)

## Goals

- Achieve rail-like performance
  - Look
  - Speed
  - Reliability
- Influence development patterns
- Reduced capital and operating costs



# Mode: Bus Rapid Transit (BRT)

Wide range of characteristics

- Off-board fare collection
- Branding
- Traffic signal priority
- Exclusive guideway
- Level boarding



# Mode: Bus Rapid Transit (BRT)

## BRT Cities

- Boston
- Eugene
- Grand Rapids
- Los Angeles
- Las Vegas
- Minneapolis
- Orlando
- Phoenix
- Reno
- Salt Lake City
- San Antonio
- Seattle

# Mode: Bus Rapid Transit (BRT)

## Example Applications

- Orlando Lymmo
- Cleveland HealthLine



# Mode: Bus Rapid Transit (BRT)

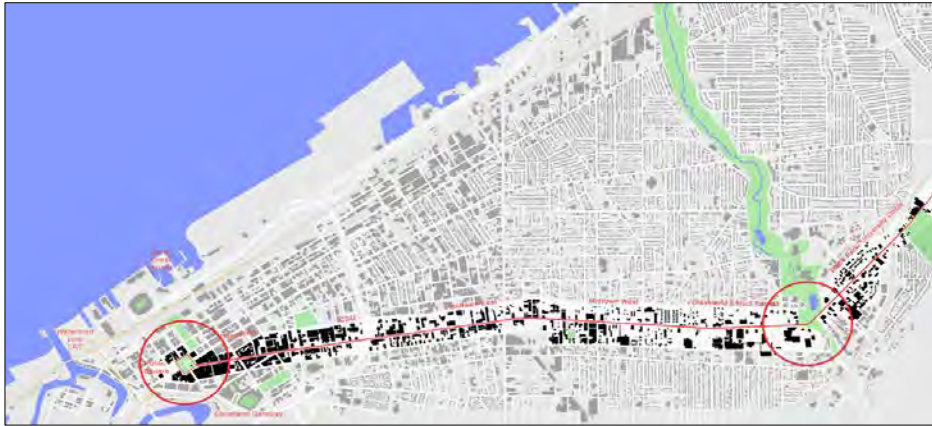
## Service Characteristics

- Coverage: downtown, adjacent activities
- Frequency: 4/10 min peak, 10/15 min off-peak
- Span: generally all day
- Markets: downtown and activity center employees, residents, visitors

# Mode: Bus Rapid Transit (BRT)

## Service Characteristics

- Routes
- Connections





# Mode: Bus Rapid Transit (BRT)

## Vehicle Characteristics

- Length: 40 - 60 feet
- Width: 8.5 feet
- Minimum Turning Radius: 50 feet
- Capacity: 68 - 100
- Cost: \$430,000 - \$850,000



# Mode: Bus Rapid Transit (BRT)

## Vehicle Characteristics (continued)

- Maximum Grade: 6 – 10%
- Power: Diesel, CNG, Electric
- Control: Operator
- Availability: US manufacturers

# Mode: Bus Rapid Transit (BRT)

## Guideway

- Vehicle Interface: rubber tire on pavement
- At grade width: 11 – 12'
- Cost per mile: \$5 – 35 million/mile

# Mode: Bus Rapid Transit (BRT)

## Station/Stops (Lymmo)

- Platform height: Uses sidewalk, normal curb
- Platform length: Uses sidewalk
- Amenities: Shelter, some real time, branding
- ADA: low floor/kneeling vehicles, slow boarding and alighting



# Mode: Bus Rapid Transit (BRT)

## Station/Stops (HealthLine)

- Platform height: 10"
- Platform length: 60'
- Amenities: Shelter, real time, branding, fare vending
- ADA: Level boarding



# Mode: Bus Rapid Transit (BRT)

## Operation

- Guideway Use: dedicated lanes
- Traffic Control: signal priority
- Reliability: high in dedicated lanes, subject to traffic flow otherwise

# Mode: Bus Rapid Transit (BRT)

## Unique Characteristics

- Development influence
- Dedicated lanes
- Transit signal priority
- “Rail look”





# Mode: Bus Rapid Transit (BRT)

## Advantages

- May be easy, inexpensive to implement
- Easy for non-transit users to understand
- Can attract non-transit users to regular service
- Travel speed and reliability attractive to riders
- May influence development patterns

# Mode: Bus Rapid Transit (BRT)

## Disadvantages

- Somewhat subject to traffic conditions
- Possible noise and vibration impacts
- Development influence related to level of investment

# Mode: Conventional Bus



# Mode: Conventional Bus

## Goals

- Enhance accessibility in downtown area
- Provide service at a reduced price
- Introduce new riders to public transit

# Mode: Conventional Bus

## Service Characteristics

- Coverage: downtown, adjacent activities
- Frequency: 7/8 min peak, 20/30 min off-peak
- Span: generally all day
- Markets: downtown employees, residents, visitors, parking



# Mode: Conventional Bus

## Service Characteristics

- Routes
- Connections



# Mode: Conventional Bus

## Unique Characteristics

- Branding
- Fare



# Mode: Conventional Bus

## Advantages

- Easy to implement
- Easy for non-transit users to understand
- Can attract non-transit users to regular service
- Conventional equipment, easy to maintain

# Mode: Conventional Bus

## Disadvantages

- Subject to traffic conditions
- No speed or reliability advantage
- No development impact
- Slow ADA boarding and alighting

# Next Steps

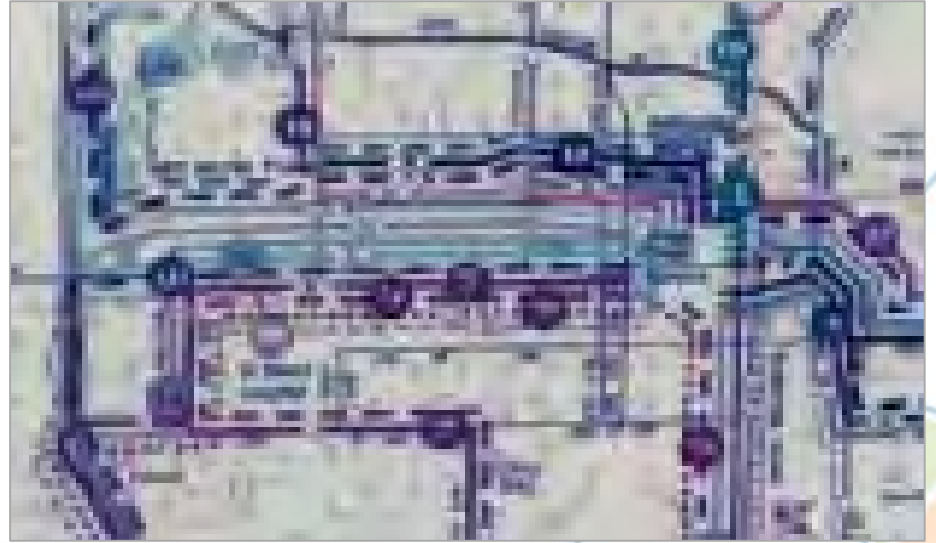
- Develop initial range of alternatives
- Develop and apply evaluation criteria
- Identify final alternatives
- Evaluate final alternatives
- Develop implementation strategy
- Implement/operate



# Existing Downtown Circulator Option

## Rochester Public Transit

- 4 minute effective frequency on 2<sup>nd</sup> Street
- \$2 fare
- Complicated for new rider



# Existing Downtown Circulator Option

## Rochester City Lines

- Peak Hour, Peak Direction only
- Fare \$10+

## Mayo Shuttle

- Employee only