City of Bellevue

Post Office Box 90012 ▪ Bellevue, Washington ▪ 98009 9012

DATE: December 1, 2011

TO: Bellevue Transportation Commission

FROM: Kevin McDonald, AICP, Senior Transportation Planner, 452-4558
kmcdonald@bellevuewa.gov

SUBJECT: Downtown Transportation Plan Update

INTRODUCTION

The update to the Downtown Transportation Plan will address mobility issues and challenges and support Downtown growth forecasts looking out to 2030.

On December 8, staff and Plan update consultant DKS Associates will propose "measures of effectiveness" that have been refined based on the Commission's comments during the November 10 meeting, and will also present two hypothetical scenarios to use measures of effectiveness to help make a project recommendation. Commission direction is requested on the proposed measures of effectiveness.

MEASURES OF EFFECTIVENESS

Purpose of Measures of Effectiveness

Measures of effectiveness (MOEs) will be useful in the Downtown Transportation Plan Update to help identify and prioritize project ideas that address mobility issues. MOEs can provide information on the performance of each project relative to doing nothing or to another project. They can inform on the performance of each mode of mobility, and can identify potential trade-offs among the suite of projects being considered. Various measures can be combined to achieve an aggregate transportation system performance for a corridor or for the Downtown Subarea. Finally, MOEs can help in packaging complementary or synergistic projects to maximize mobility.

Two types of MOEs may be used in the Downtown Transportation Plan Update:

- **Core MOEs:** These are measures that will be generally considered in developing projects for the Plan update. For this purpose, we propose to "personalize" mobility – measuring the affect of projects on the private vehicle occupant, pedestrian, bicyclist, and transit rider, as opposed to describing the mobility for the different modes and vehicle types.
- **Supplemental MOEs:** These are measures that may be considered if warranted by plan development. They would address unique situations and may not be applicable to all modes or all types of projects. Use of supplemental MOEs will depend on types of project ideas generated and the potential for packaging of compatible or complimentary projects.

Proposed "Core" Measures of Effectiveness

Based on international best practices, the Downtown Bellevue context, and input from the Transportation Commission at the November 10, 2011 meeting, these are the recommended core measures of effectiveness that would be used in developing project recommendations for the update of the Downtown Transportation Plan.

The "measure" of the effectiveness for a project can be expressed in a number of ways. For the simple hypothetical scenarios provided, we propose using a -1, 0, +1 score to indicate whether a project reduces mobility, is neutral, or enhances mobility. As project options get narrowed down, decision-making can be aided by assigning of "weights" to the scores to indicate the relative importance of one mobility mode relative to another at various locations or corridors.

- **Private Vehicle Occupant Mobility**
  - Intersection or Location
    - Average intersection delay in seconds per private vehicle occupant. This is the typical and familiar level of service (LOS) calculation that is used nationally.
  - Corridor
    - Average travel time in seconds per private vehicle occupant per mile of travel corridor.
    - Number of on-street spaces for parking + loading
  - Subarea
    - Aggregate intersection delay in seconds per private vehicle occupant
    - Number of daily vehicle trip ends
- **Pedestrian Mobility**
  - Intersection or Location
    - Intersection crosswalk score. This is a score based upon a level of service determination that is used nationally and takes into consideration such factors as pedestrian delay, crosswalk quality and capacity (width), number of travel lanes to be crossed, and the volume and speed of vehicles.
  - Corridor:
    - Walkway quality score. This is a score based upon a level of service determination that is used nationally and takes into consideration factors such as the number and grade of driveway crossings, obstructions, buffers from traffic, on-street parking occupancy, walking surface quality and capacity (width), weather protection pedestrian delay, and directness of travel.
    - Average travel time in seconds for pedestrians per mile.
  - Subarea
    - Number of internal Downtown walking trips
    - Percent of total daily person trip ends
- **Bicyclist Mobility**
  - Intersection or Location

        - No MOEs are proposed to evaluate site – specific issues as these may not significantly change mobility of bicyclists as a whole in Downtown.
    - Corridor
        - Bicycle facility score. This is a score based upon a level of service determination that is used nationally and takes into consideration factors such as the type of bicycle facility, pavement quality, width of adjacent lanes and shoulders, number of through lanes, percent heavy vehicles, on-street parking occupancy, and speed and volume of adjacent vehicles.
    - Subarea
        - Percent of arterial streets served by preferred bicycle facilities. Bicycle facility preference is based on the 2009 *Pedestrian and Bicycle Transportation Plan*.
        - Percentage of total daily trip ends
- **Transit Rider Mobility**
    - Intersection or Location
        - Bus stop locations that provide preferred components. The components preferred at each bus stop location will vary depending on the bus stop use level and function. Use level is determined by the number of daily boardings, and function considers whether the stop is an important origin, destination and/or transfer point. Components such as shelter, seating, and real-time information, are appropriate for high-volume stops, and additional components such as wayfinding and bicycle parking are appropriate for transfer points.
    - Corridor (Transit route)
        - Travel time in seconds per transit rider per mile of travel corridor. This measure is used to evaluate the effectiveness of various transit speed and reliability treatments.
    - Subarea:
        - Percent of total daily person trip ends.
- **Sustainability Outcomes**
    - Subarea
        - Percent non-SOV trips – daily work trips
        - Percent non-SOV trips – total daily trips
        - Percent non-SOV trips – total trips internal to Downtown
        - Vehicle hours of delay
        - Transportation greenhouse gas emissions

NEXT STEPS

January 13, 2012: Transportation Commission

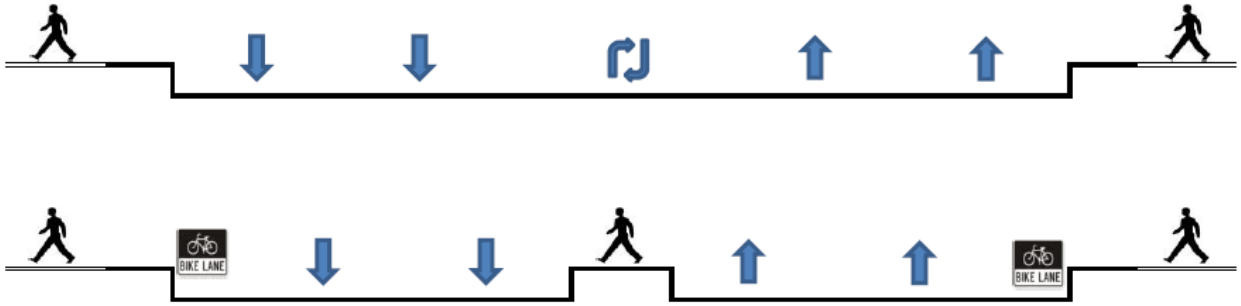
- Scoping Report

ATTACHMENTS

- Hypothetical scenarios
- December 8, 2011 Staff presentation on measures of effectiveness (draft)

Hypothetical Scenario A:

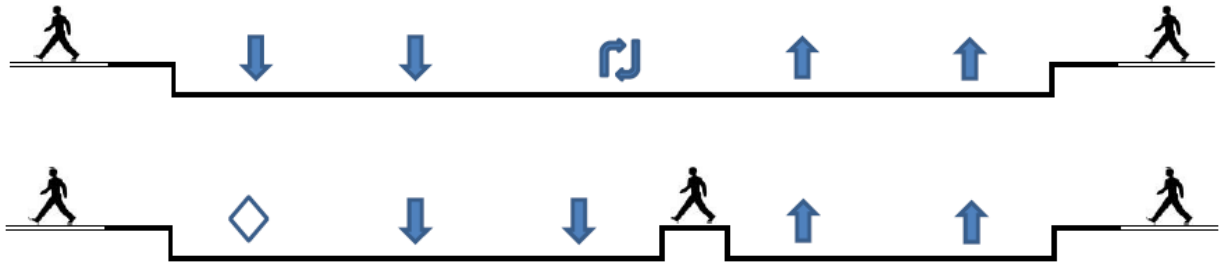
Eliminate two-way-left-turn-lane on Downtown arterial and add a median and bicycle lanes



MODE	LOCATION	MEASURE OF EFFECTIVENESS	SCORE -1, 0, +1	SUM
Private Vehicle Occupants	Intersection or location	Average intersection delay in seconds per private vehicle occupant	**0**	**0**
	Segment or corridor	Average travel time in seconds per private vehicle occupant per mile of travel corridor	**-1**	
		Number of on-street parking + loading spaces in off-peak hours (midday, evenings and weekends)	**0**	
	Subarea	Aggregate intersection delay (seconds) per vehicle occupant	**0**	
		Percent of daily vehicle trip ends in Downtown	**+1**	
Pedestrians	Intersection or location	Intersection crosswalk score	**+1**	**+**
	Segment or corridor	Walkway quality score	**+1**	
		Average Travel Time (seconds) for pedestrians per mile	**0**	
	Subarea	Number of internal Downtown walking trips	**+1**	
		Percent of total daily person trip ends	**+1**	
Bicyclists	Intersection or location	N/A	**N/A**	**+**
	Segment or corridor	Bicycle facility score	**+1**	
	Subarea	Percent of arterial streets served by preferred bicycle facilities	**+1**	
		Percent of total daily person trip ends	**+1**	
Transit	Intersection or location	Bus stop locations that provide preferred components	**0**	**0**
	Segment or corridor	Travel time in seconds per transit rider per mile	**-1**	
	Subarea	Percent of total daily person trip ends within 5 minute walk of 15-minute transit service	**0**	
		Percent of total daily person trip ends	**0**	
Sustainability	Subarea	Percent non-SOV daily work trips	**+1**	**+**
		Percent non-SOV total daily trips	**+1**	
		Percent non-SOV trips internal to Downtown	**+1**	
		Vehicle hours of delay	**-1**	
		Transportation - source greenhouse gas emissions	**=**	

Hypothetical Scenario B:

Eliminate two-way-left-turn-lane on Downtown arterial and add a median and transit lane



MODE	LOCATION	MEASURE OF EFFECTIVENESS	SCORE	SUM
Private Vehicle Occupants	Intersection or location	Average intersection delay in seconds per private vehicle occupant	**-1**	**0**
	Segment or corridor	Average travel time in seconds per private vehicle occupant per mile of travel corridor	**-1**	
		Number of on-street parking + loading spaces in off-peak hours (midday, evenings and weekends)	**0**	
	Subarea	Aggregate intersection delay (seconds) per vehicle occupant	**0**	
		Percent of daily vehicle trip ends in Downtown	**+1**	
Pedestrians	Intersection or location	Intersection crosswalk score	**+1**	**+**
	Segment or corridor	Walkway quality score	**0**	
		Average Travel Time (seconds) for pedestrians per mile	**0**	
	Subarea	Number of internal Downtown walking trips	**+1**	
		Percent of total daily person trip ends	**+1**	
Bicyclists	Intersection or location	N/A	**N/A**	**0**
	Segment or corridor	Bicycle facility score	**0**	
	Subarea	Percent of arterial streets served by preferred bicycle facilities	**0**	
		Percent of total daily person trip ends	**0**	
Transit	Intersection or location	Bus stop locations that provide preferred components	**0**	**+**
	Segment or corridor	Travel time in seconds per transit rider per mile	**+1**	
	Subarea	Percent of total daily person trip ends within 5 minute walk of 15-minute transit service	**+1**	
		Percent of total daily person trip ends	**+1**	
Sustainability	Subarea	Percent non-SOV daily work trips	**+1**	**+**
		Percent non-SOV total daily trips	**+1**	
		Percent non-SOV trips internal to Downtown	**+1**	
		Vehicle hours of delay	**-1**	
		Transportation - source greenhouse gas emissions	**+1**	

TRANSPORTATION COMMISSION
DECEMBER 8, 2011

MEASURES OF EFFECTIVENESS

MEASURES OF EFFECTIVENESS

Discussion Outline

- Recommended refined Measures of Effectiveness
- Hypothetical Scenarios

Measures of Effectiveness

Purpose

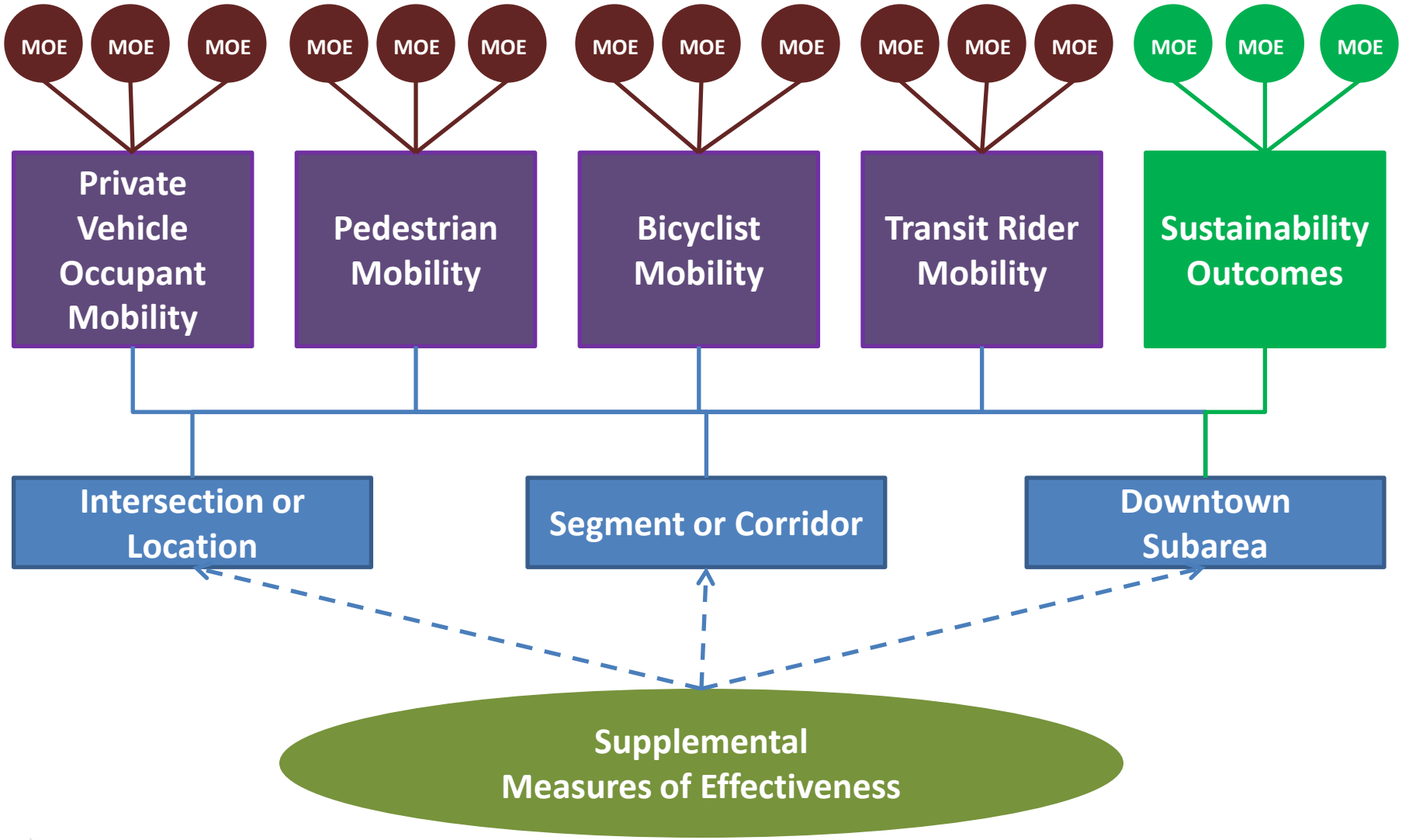
- Inform on the performance of each project
- Inform performance of each mode
- Identify potential trade-offs for projects
- Combine measures to achieve an aggregate transportation system performance for Downtown
- Package complementary projects for implementation

Measures of Effectiveness

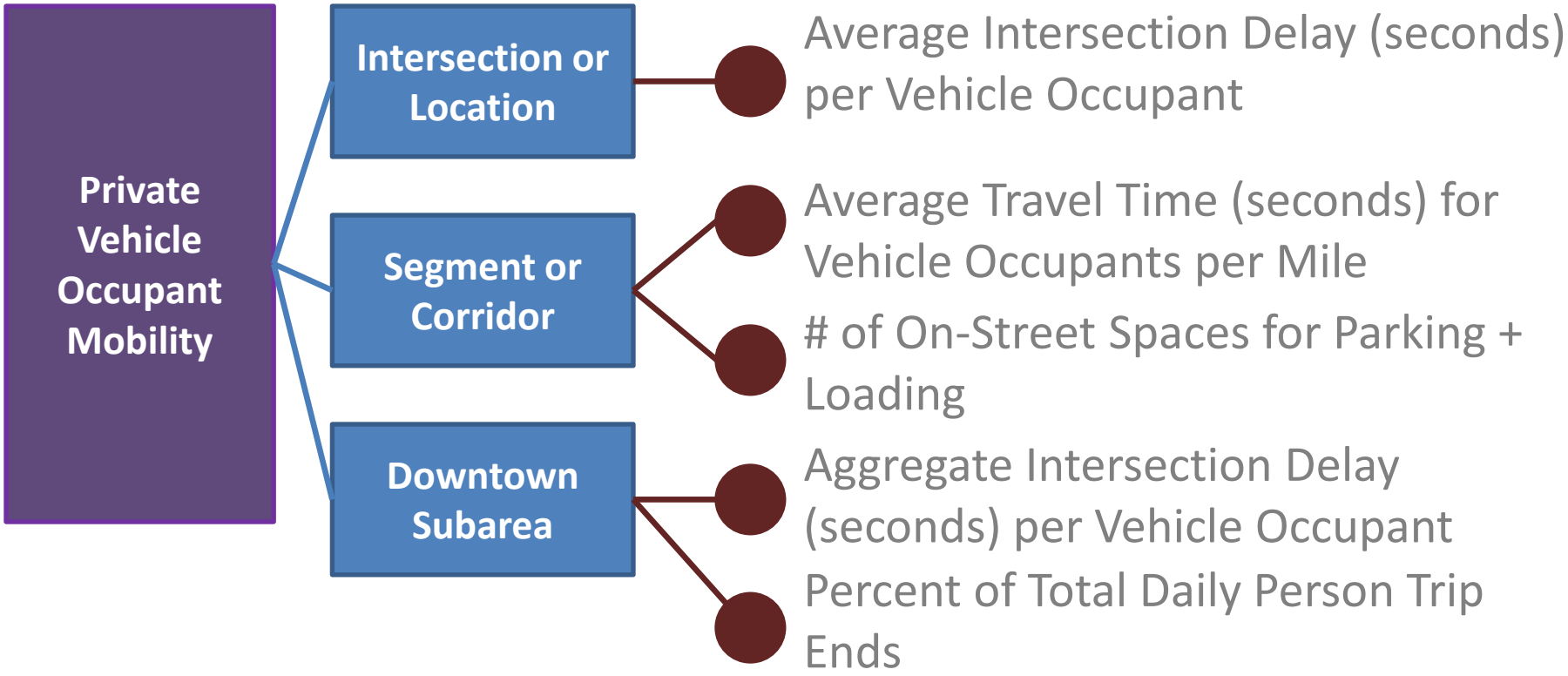
Two Types

- **Core MOEs:** Measures that are generally considered in plan development- these we will discuss with Commission at the December 8 meeting
- **Supplemental MOEs:** Measures that may be considered if warranted by plan development
  - May or may not be applicable to all modes or all types of projects
  - Use will depend on project ideas generated and the potential for packaging of compatible projects

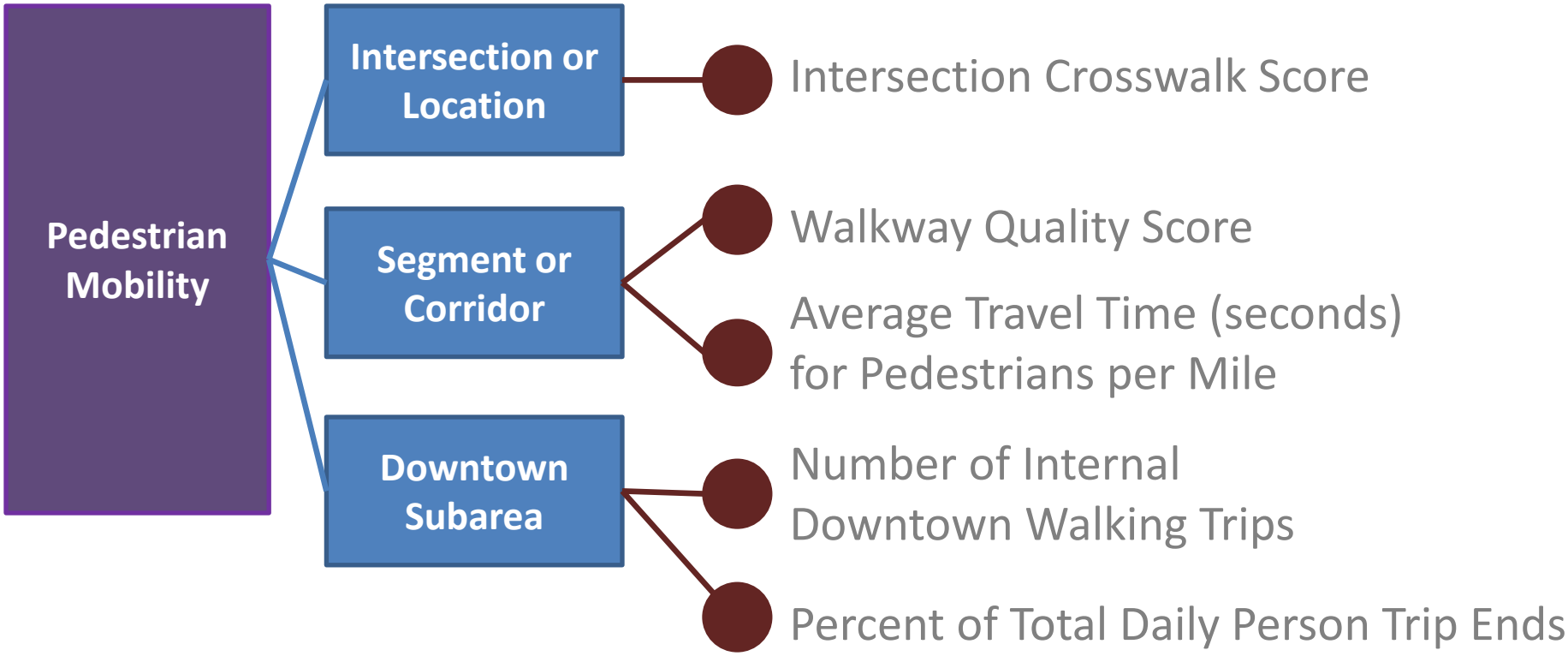
Measures of Effectiveness: Tiered Framework



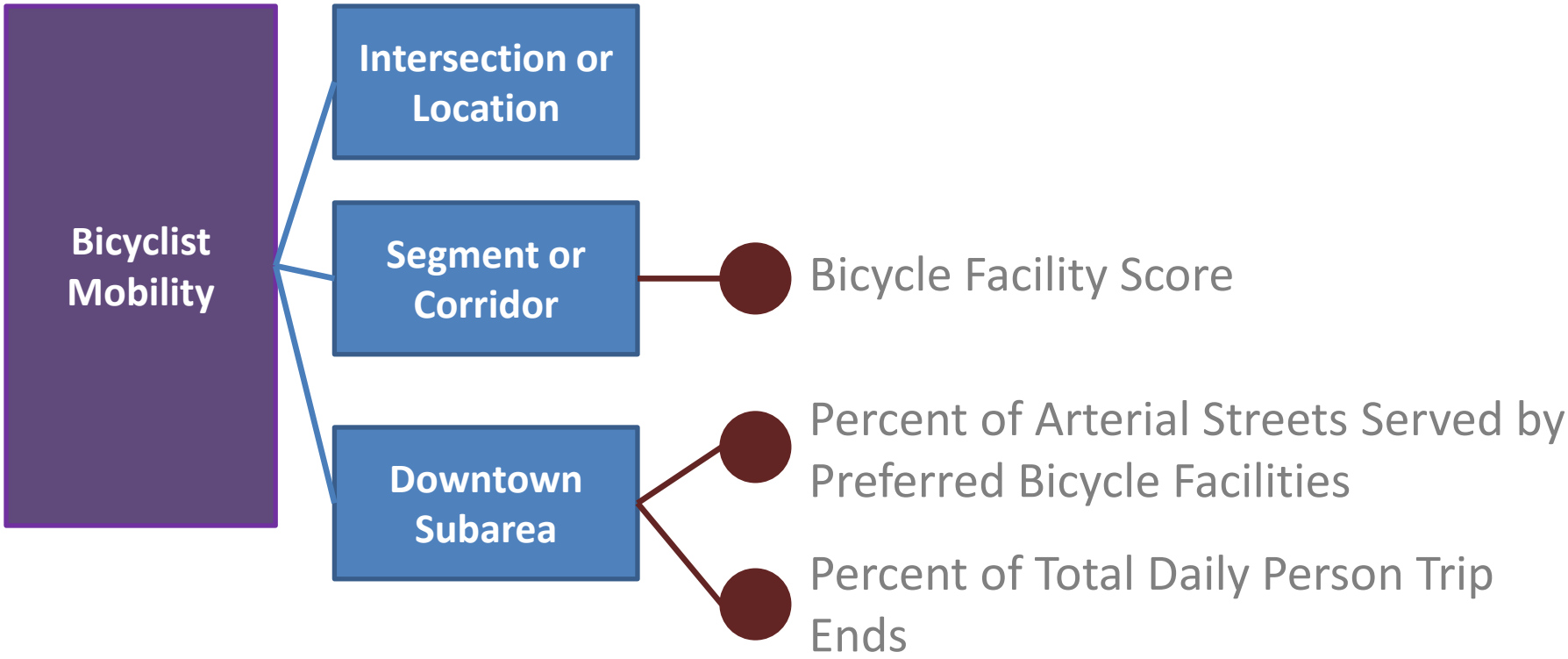
Core MOE: Private Vehicle Occupant Mobility



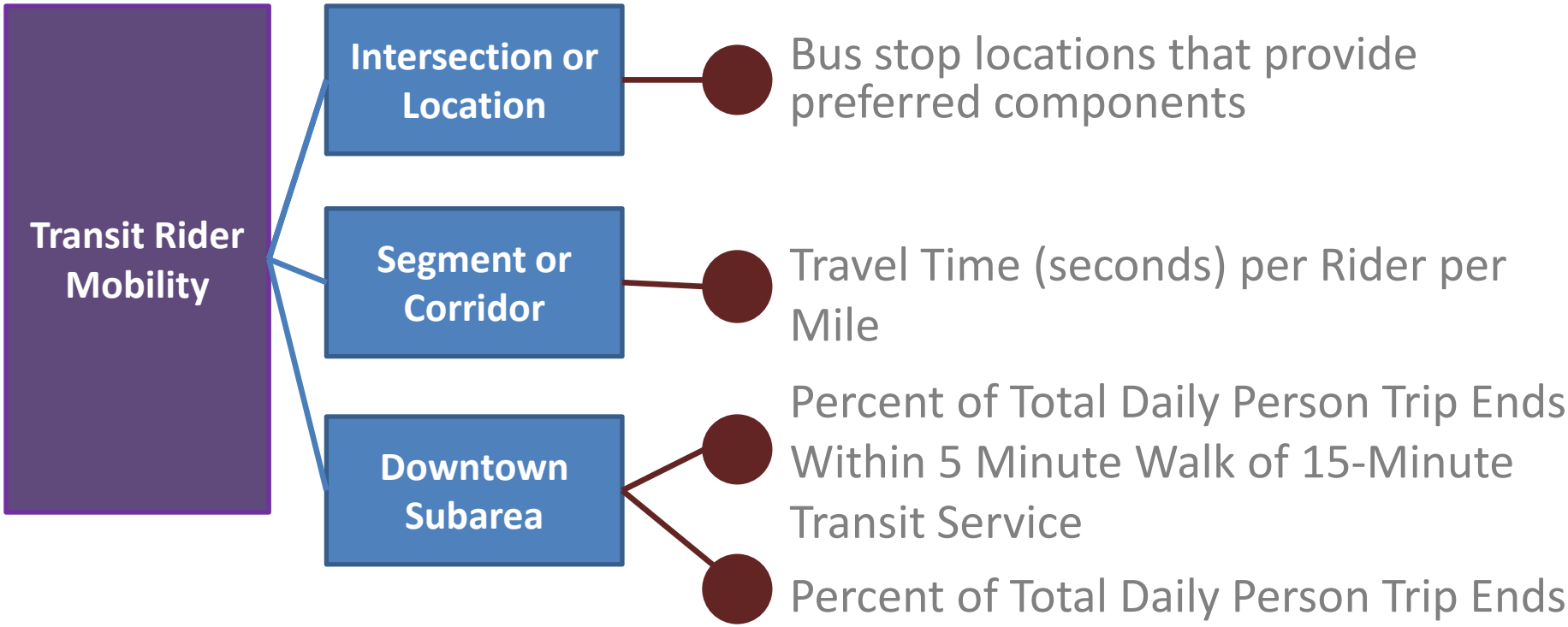
Core MOE: Pedestrian Mobility



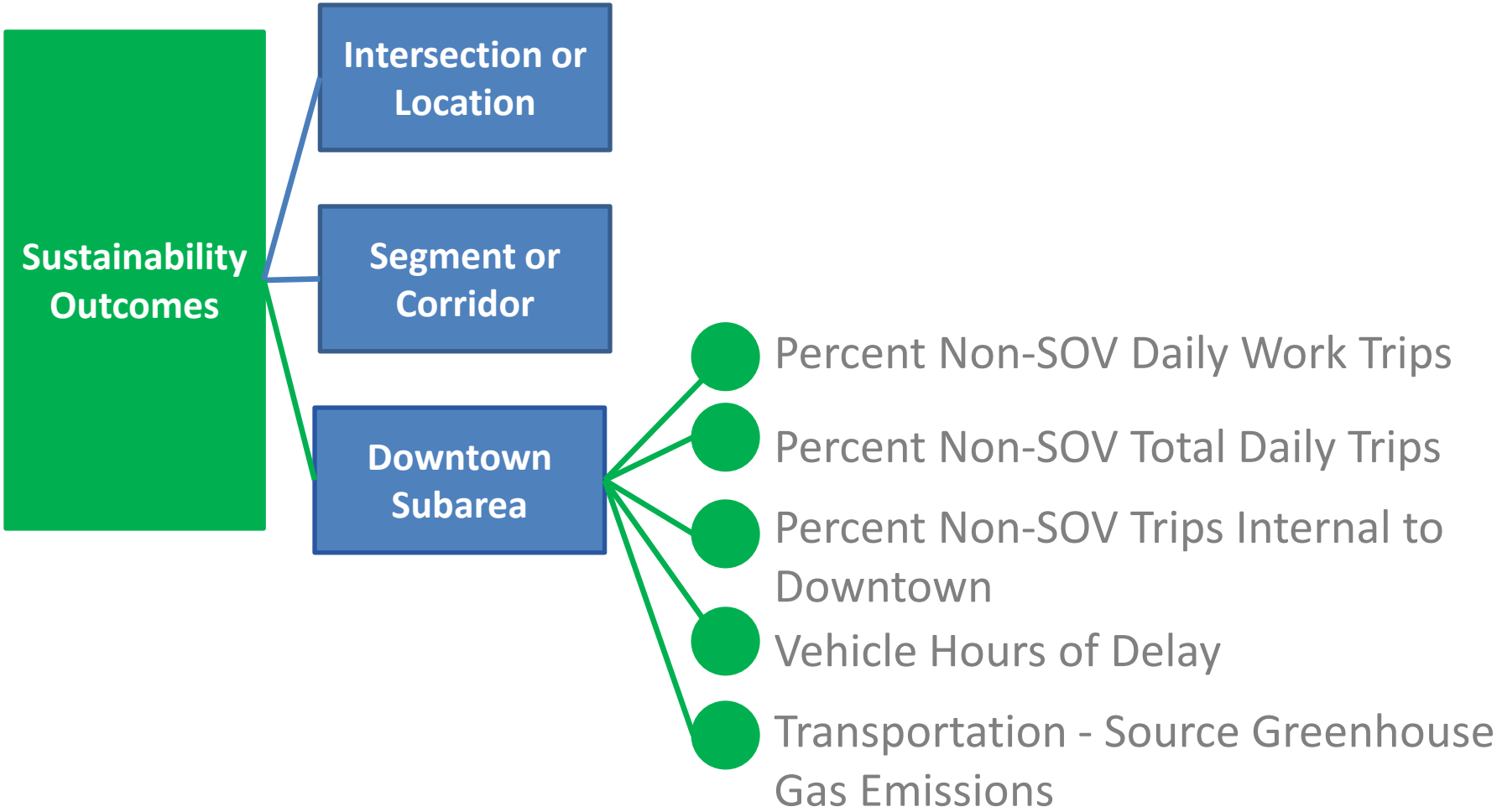
Core MOE: Bicyclist Mobility



Core MOE: Transit Rider Mobility



Core MOE: Sustainability Outcomes



Hypothetical Scenarios

Hypothetical Changes to a Roadway Cross-Section

- **Scenario 1**:

  Eliminate two-way left-turn lane

  Add bicycle lanes and landscaped median + pedestrian refuge

- **Scenario 2:**

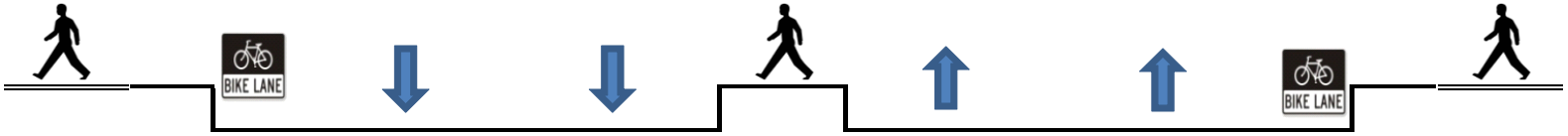
  Eliminate two-way left-turn lane

  Add transit lane and landscaped median + pedestrian refuge

Scenario 1:
Remove Turn Lane
Add Median and Bicycle Lane

Existing Cross Section

Modified Cross Section

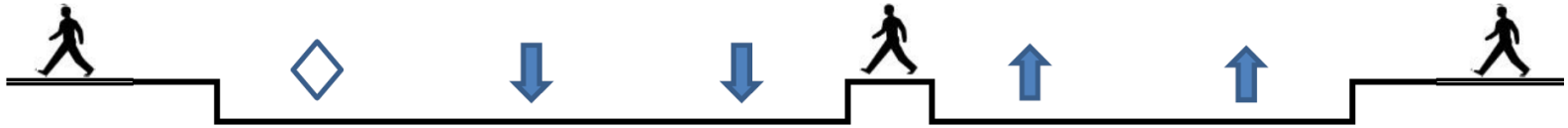


Refer to evaluation matrix in agenda materials and handout

Scenario 2:
Remove Turn Lane
Add Transit Lane

Existing Cross Section

Modified Cross Section



Refer to evaluation matrix in agenda materials and handout

Next Steps

January 2012

- Scoping Report – review major issues identified by the community through the various public involvement events conducted through the late-Summer and Fall of 2011

Q1 – Q3 2012

- Use measures of effectiveness to help identify projects to address transportation issues documented in the scoping report