OUTLINE

1. Summary of March 10, 2016 Transportation Commission MMLOS Discussion

2. Review Existing LOS Metrics and Standards for Vehicles

3. Recommended LOS Metrics and Standards for:
   - Pedestrians – sidewalks, intersections, mid-block crossings
   - Bicycles – priority network, arterial network
   - Transit – stops and stations, speed and reliability

4. Next Steps
General agreement with the fundamentals of the recommended MMLOS metrics

• Mix of qualitative and quantitative measures

Desire to retain vehicle LOS metrics and standards

Concerns about level of complexity to calculate and apply MMLOS

Need to be mindful of funding constraints and setting standards appropriately

Focus on the quality of the environment for peds/bikes

Focus on elements of transit that City has control over
HOW WILL THIS ALL WORK TOGETHER?

Adopt LOS Metrics and Standards

• Update Transportation Element of the Comprehensive Plan
• Update Traffic Standards Code and Transportation Development Code
WHAT ARE WE LOOKING FOR FROM THE COMMISSION?

Discussion, input, and concurrence on the staff-recommended metrics and standards
VEHICLE LOS

1. Retain existing LOS metrics and standards for vehicles
2. Metric is volume/capacity (v/c) ratio (for Concurrency) and intersection delay (for long-range planning)
3. Standards for v/c and delay vary by Mobility Management Area (MMA)
4. Standards vary based on the urban form and mobility options available
5. May consider revising MMA boundaries in the next phase of this project
## MMA AND VEHICLE LOS STANDARDS

<table>
<thead>
<tr>
<th>Mobility Management Area (MMA)</th>
<th>MMA Average LOS Standard (Maximum v/c Ratio)</th>
<th>Congestion Allowance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional Center</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MMA #3 Downtown</td>
<td>0.950</td>
<td>9</td>
</tr>
<tr>
<td>Activity Area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MMA #12 BelRed/Northup</td>
<td>0.950</td>
<td>7</td>
</tr>
<tr>
<td>MMA #13 Factoria</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Residential Areas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MMA #4 Wilburton</td>
<td>0.900</td>
<td>3</td>
</tr>
<tr>
<td>MMA #5 Crossroads</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>MMA #10 Eastgate</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Residential Group 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MMA #1 North Bellevue</td>
<td>0.850</td>
<td>3</td>
</tr>
<tr>
<td>MMA #7 South Bellevue</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>MMA #8 Richards Valley</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>MMA #9 East Bellevue</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Residential Group 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MMA #2 Bridle Trails</td>
<td>0.800</td>
<td>4</td>
</tr>
<tr>
<td>MMA #6 NE Bellevue</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>MMA #11 SE Bellevue</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>MMA #14 Newport Hills</td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

*No system intersections are currently identified in this mobility management area*
VEHICLE LOS

Discussion
PEDESTRIAN LOS

1. LOS standards recommended for arterial streets and consider:
   - Sidewalks
   - Intersections
   - Arterial Crossings

2. Adapted from City of Bellevue Street Design Standards and Land Use Code

3. Recommended LOS standards recognize land use context and the street environment, which define types of design components
PEDESTRIAN NETWORK
LAND USE CONTEXT

1. Downtown

2. Activity Center
   • BelRed
   • Crossroads
   • Factoria
   • Wilburton
   • Eastgate

3. Neighborhood Shopping Center
   • Norhtowne
   • Lake Hills
   • Newport Hills
   • Other similar centers

4. Pedestrian Destination
   • School
   • Park
   • Community Center
   • Frequent Transit Network Stop
   • Trail Crossing
   • Library

5. Elsewhere in the City
PEDESTRIAN LOS: STREET DESIGN MANUAL SIDEWALK WIDTH AND BUFFER

Source: Modified from the Transportation Design Manual, March 16, 2015

Sidewalk 6-8 feet

Landscape buffer typically 4 feet

Total: 10-12 feet

Level-of-Service in Bellevue Toward a Multimodal Approach to Mobility
PEDESTRIAN LOS: DOWNTOWN TRANSPORTATION PLAN
SIDEWALK WIDTH AND BUFFER
PEDESTRIAN LOS:
DOWNTOWN TRANSPORTATION PLAN INTERSECTION TYPES

## PEDESTRIAN LOS RECOMMENDED STANDARDS

<table>
<thead>
<tr>
<th>Context:</th>
<th>Downtown</th>
<th>Activity Centers</th>
<th>Neighborhood Shopping Center</th>
<th>Pedestrian Destinations</th>
<th>Elsewhere</th>
</tr>
</thead>
<tbody>
<tr>
<td>Component</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sidewalk and Buffer Width</td>
<td>Meets Downtown Land Use Code</td>
<td>Meet Land Use Code* or 16 feet for designated arterials in activity center.</td>
<td>13 feet adjacent to shopping center</td>
<td>13 feet adjacent to pedestrian destination or within 100 feet of a FTN stop</td>
<td>No Change: Meet Design Manual (6-8 foot sidewalk and 4 foot buffer = 10-12 feet)</td>
</tr>
<tr>
<td>Arterial Crossing Frequency**</td>
<td>≤ 300 feet</td>
<td>≤ 800 feet: Factoria ≤600 feet: Elsewhere</td>
<td>At least one crossing every 600 feet or less within shopping center area</td>
<td>Within 600 feet of destination. Within 300 feet of bus stop pair on FTN.</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>

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* Meets BelRed Land Use Code in BelRed Subarea
** Must be an appropriate marked and potentially signalized crossing as determined by the Transportation Department.
*** Downtown Transportation Plan
PEDESTRIAN LOS CROSS-SECTION EXAMPLES

[Diagram showing examples of pedestrian cross-sections for different types of destinations: Pedestrian Destination, Activity Center, Neighborhood Shopping Center, Standard Arterial. Each example includes labeled sections for sidewalks, buffers, and travel lanes.]
PEDESTRIAN LOS

Discussion
BICYCLE LOS

1. Bicycle LOS standards apply to arterial streets in the Bicycle Master Plan network

2. Adapt Level of Traffic Stress (LTS) methodology from (Furth/Mekuria 2011), Montgomery County, MD, and WSDOT Bicycle Design Manual

3. Components that affect Bicycle LOS are based on standard City designs, Bicycle Master Plan recommendations, and Bicycle Rapid Implementation Plan recommendations

4. Method focuses on comfort-level of cyclists of different types and riding ability on a type of facility

5. Standards vary based on urban form and the priority of the bicycle route
BICYCLE LOS

WSDOT Bike Level of Service

Exhibit 1520-6a  Bicycle Facility Selection Chart – Interested, but Concerned Cyclists

Note: Adapted from Montgomery County Bicycle Planning Guidance, Montgomery County Department of Transportation, 2014.

Level-of-Service in Bellevue
Toward a Multimodal Approach to Mobility
BICYCLE LOS

WSDOT Bike Level of Service

Exhibit 1520-6b  Bicycle Facility Selection Chart – Confident Cyclists

- Separated Buffered Bike Lane or Railed and Curb Separated
- Shared Use Path or Shoulder Accommodations (rural highways)
- Buffered Bike Lane
- Bike Lane
- Shared Lane Markings

Motor Vehicle Target Speed (mph)

Level-of-Service in Bellevue
Toward a Multimodal Approach to Mobility
BICYCLE LEVEL OF TRAFFIC STRESS (LTS)

LTS 1
Interested but Concerned – Children and Older Adults

LTS 2
Interested but Concerned – Adults

LTS 3
Enthused and Confident

LTS 4
Strong and Fearless
## BICYCLE LOS RECOMMENDED STANDARDS ALONG STREETS

<table>
<thead>
<tr>
<th>Speed Limit (mph)</th>
<th>Arterial Traffic Volume</th>
<th>No marking</th>
<th>Sharrows</th>
<th>Striped Bike Lane</th>
<th>Buffered Bike Lane</th>
<th>Protected Bike Lane</th>
<th>Physically Separated Bikeway</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤25</td>
<td>&lt;3k</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>3-7k</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>≥7k</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>30</td>
<td>&lt;15k</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>15-25k</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>≥25k</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>35</td>
<td>&lt;25k</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>≥25k</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>40</td>
<td>Any volume</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

Number in each cell represents Bicycle LOS
<table>
<thead>
<tr>
<th>Crossing Treatment:</th>
<th>Signal Actuation</th>
<th>Bike Signal</th>
<th>Crossing Treatment</th>
<th>Near-Side Intersection Treatment</th>
<th>Near-Side with Right Turn Lane Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bike LOS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Automatic</td>
<td>Bike signal on near and far side of intersection; leading bicycle phase or other bike-favorable signal timing</td>
<td>Solid or skip stripe green crossing</td>
<td>Green bike box; two-stage turn box at designated Bicycle Network intersections</td>
<td>Dutch intersection design</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Median refuge Island with RRFB for unsignalized crossings</td>
<td>Curb ramp to wide sidewalk</td>
</tr>
<tr>
<td>2</td>
<td>Automatic</td>
<td>Bike signal on near and far side of intersection; leading bicycle phase or other bike-favorable signal timing</td>
<td>Dotted line extensions/elephant feet striping</td>
<td>Standard bike box; two-stage turn box at designated Bicycle Network intersections</td>
<td>Green bike lanes to the left of right turning lane; green skip strip conflict zone</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Green colored conflict areas with sharrows</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>HAWK or RRFB with median island for unsignalized crossings</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Manual</td>
<td>Initial green is adequate for bicycle to clear intersection</td>
<td>Sharrows</td>
<td>None</td>
<td>For lanes &gt;150' through bike lane to left of right turning lane; for lanes &lt; 150' either above treatment or combined bike/turn lane with narrow (4') green striped bike lane</td>
</tr>
<tr>
<td>Trail</td>
<td>Automatic</td>
<td>Near and far side bike signal</td>
<td>Solid or skip stripe green crossing</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
BICYCLE LOS RECOMMENDED STANDARDS:
BICYCLE LOS: EXISTING CONDITIONS
BICYCLE LOS: EXISTING VS BRIP

% of network that meets LOS standard

- All Arterial Corridors: 46.2%
- Priority Arterial Corridors: 27.1%

% of network that meets LOS standard

- All Arterial Corridors: 70.5%
- Priority Arterial Corridors: 59.7%

Existing Bicycle LOS:
- Off Street Path
- City of Bellevue

Legend:
- 1
- 2
- 3
- 4
BICYCLE LOS

Discussion
TRANSIT LOS

1. Transit Stop/Station Amenity Factors (Passenger access in PedLOS)

2. Speed Factors (Corridor and Intersection Improvements)
   - Transit Priority Lane/Business Access and Transit (BAT) Lane
   - Queue Jump Lane/In-Lane Stop/Station
   - Transit Signal Priority

3. Standards consider planned urban form and quality of transit service
   - Local transit stop – single route, transit headway >30 minutes
   - Primary transit stop – multiple routes or 30 minute headway
   - Frequent Transit Network (FTN)/RapidRide stop – frequent headway on FTN or RapidRide
   - Multimodal Hub – Light rail station, BRT station, multiple bus routes

4. Adapted from recommendations for transit speed and transit stop amenities in the Transit Master Plan and Downtown Transportation Plan
## TRANSIT LOS: STOPS/STATIONS RECOMMENDED STANDARDS

<table>
<thead>
<tr>
<th>Context: Component</th>
<th>Local Stop</th>
<th>Primary Stop</th>
<th>Frequent Transit/RapidRide Stop</th>
<th>Multimodal Hub</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Component</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weather Protection*</td>
<td>Yes, 25+ daily boardings</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Seating</td>
<td>Yes, near uses like retail, healthcare, or senior housing</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Bicycle Parking</td>
<td>One short-term rack (2-4 bikes)</td>
<td>One short-term rack (2-4 bikes)</td>
<td>One short-term rack (2-4 bikes)</td>
<td>Two short term racks (4-8 bikes) Bike Cage or Lockers</td>
</tr>
<tr>
<td>Bike Share Station</td>
<td>No</td>
<td>No</td>
<td>Yes** In Activity Centers</td>
<td>Yes**</td>
</tr>
<tr>
<td>Wayfinding</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

* Building mounted protection is preferred in areas where no building setback is required
** Bike share station to be provided if there is an active bike share program in Bellevue and based on input from the Transportation Department. If there is no active bike share program, space must be provided to accommodate bike share station. Minimum size for station is 6’x12’
1. Focused on Frequent Transit Network Connections between Activity Centers
2. Based on target speeds in TMP
3. Standard: 14 mph or better speeds on FTN connections

<table>
<thead>
<tr>
<th>LOS Rating</th>
<th>Transit Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;10 mph</td>
</tr>
<tr>
<td></td>
<td>10-14 mph</td>
</tr>
<tr>
<td></td>
<td>&gt;14 mph</td>
</tr>
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</table>
TRANSIT LOS

Existing Conditions
TRANSIT LOS

Discussion
NEXT STEPS

1. Refine MMLOS Metrics and Standards per Commission Feedback
2. Identify Implementation Strategies
COMMENTS/QUESTIONS/OBSERVATIONS