Level-of-Service in Bellevue

Toward a Multimodal Approach to Mobility

MMLOS METRICS, STANDARDS AND GUIDELINES

TRANSPORTATION COMMISSION

APRIL 13, 2017

OBJECTIVE TONIGHT

STAFF RECOMMENDATION: Review and confirm recommended MMLOS metrics, standards and guidelines

COMMISSION ACTION: Staff seeks a motion and Vote to Approve MMLOS Metrics

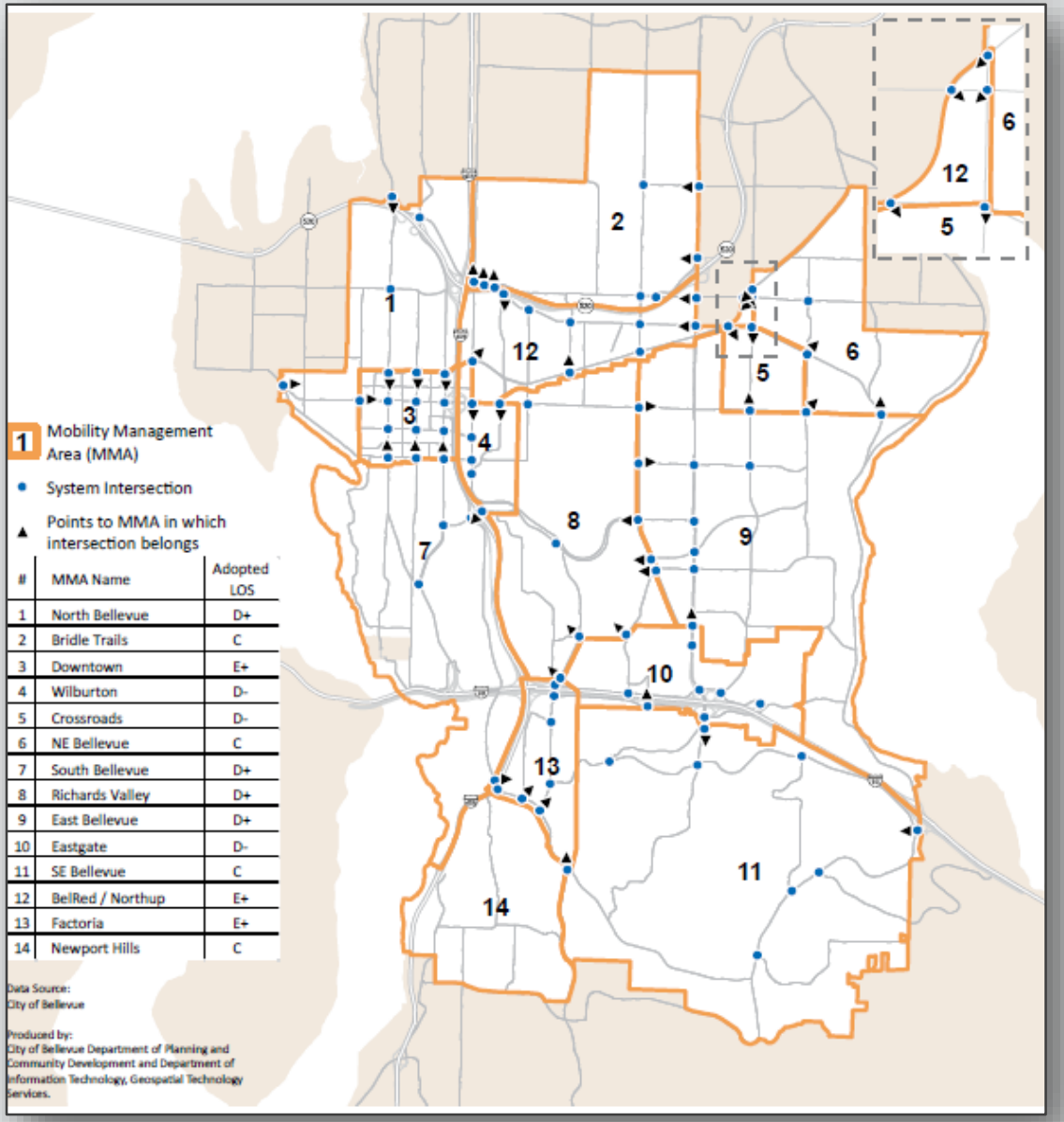
VEHICLE LOS METRICS, STANDARDS & GUIDELINES

Transportation Concurrency

Retain Mobility Management Areas and the volume/capacity ratio metric and **standard** at system intersections

Long Range Planning

Retain average vehicle delay metric and LOS **guideline** at system intersections in MMAs



#	MMA Name	Adopted LOS
1	North Bellevue	D+
2	Bridle Trails	C
3	Downtown	E+
4	Wilburton	D-
5	Crossroads	D-
6	NE Bellevue	C
7	South Bellevue	D+
8	Richards Valley	D+
9	East Bellevue	D+
10	Eastgate	D-
11	SE Bellevue	C
12	BelRed / Northup	E+
13	Factoria	E+
14	Newport Hills	C

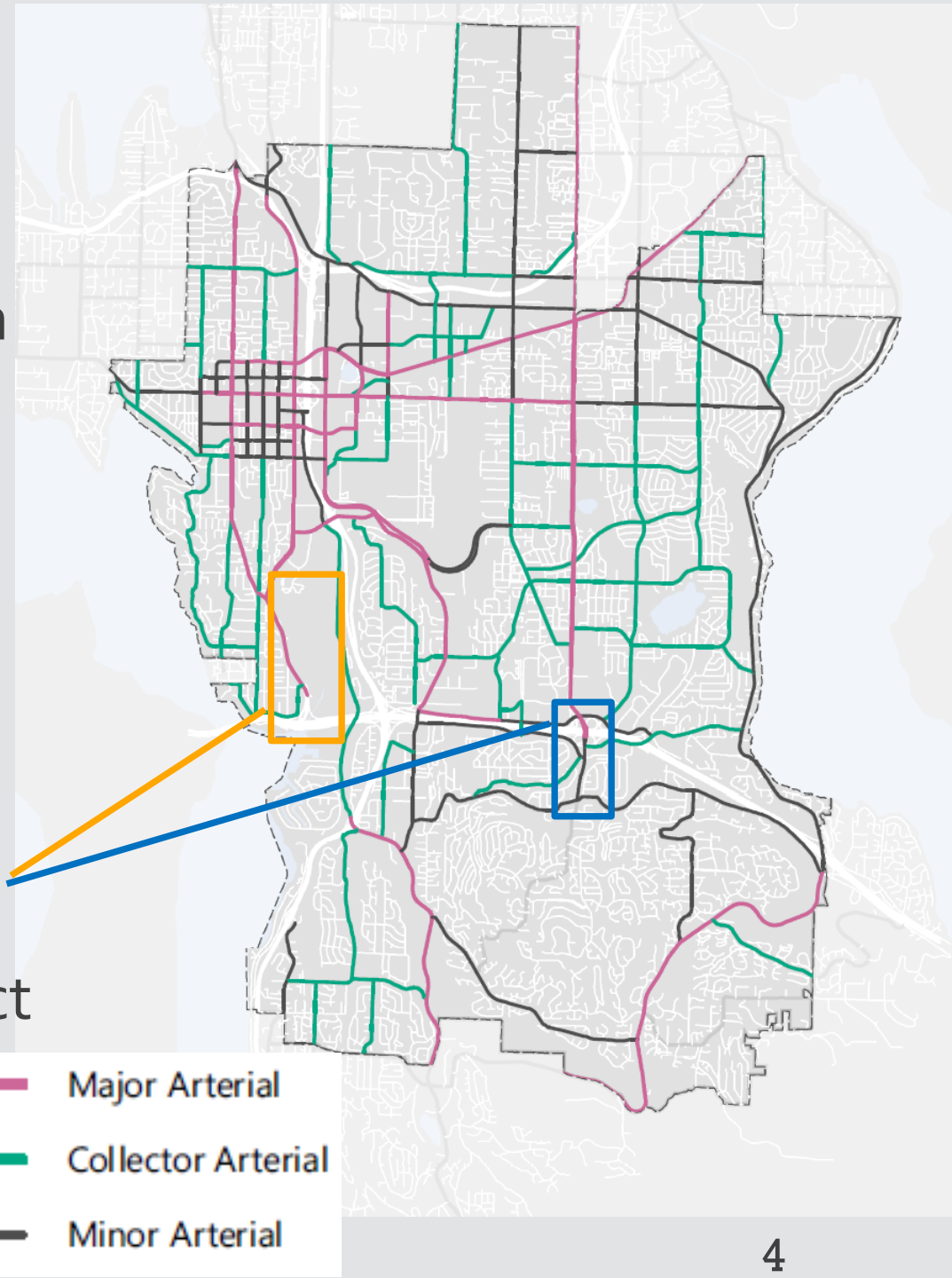
VEHICLE LOS: TRAVEL TIME METRIC & GUIDELINE

Tool to assist in project identification and prioritization

Apply to arterial segments as needed to evaluate existing or projected traffic flow

Metric is travel time expressed as a percent of posted speed

Note: Corridor evaluation on Bellevue Way SE and 150th Ave SE employed a travel time methodology to analyze project benefits



ARTERIAL CORRIDOR LOS METRIC & GUIDELINE

LOS	Percent of Typical Urban Travel Time Based on Posted Speed Limit*
	Less than 90% of typical urban travel time
	90-110% of typical urban travel time
	110-155% of typical urban travel time
	155-200% of typical urban travel time
	More than 200% of typical urban travel time

LOS Guideline	As applied to Mobility Management Areas
	Bridle Trails, East Bellevue, NE Bellevue, Newport Hills North Bellevue, SE Bellevue, South Bellevue, Richards Valley
	Crossroads, Eastgate, Wilburton
	BelRed/Northup, Downtown, Factoria

* Assumes typical urban travel time is equivalent to LOS C conditions based on the posted speed limit (HCM Ch. 16).

PEDESTRIAN LOS STANDARDS & GUIDELINES

Context: / Component	Downtown	Activity Center	Neighborhood Shopping Center	Pedestrian Destination	Elsewhere
Sidewalk Width Landscape Buffer Width Standard	Downtown Land Use Code	BelRed Land Use Code or 16 feet for other Activity Centers	13 feet total adjacent to shopping center	13 feet total at pedestrian destination or within 100 feet of a FTN stop	Bellevue Transportation Design Manual
Signalized Intersection Design Guideline*	Downtown Transportation Plan	BelRed Land Use Code or Downtown Transportation Plan "Enhanced" type	Bellevue Transportation Design Manual	Bellevue Transportation Design Manual	Bellevue Transportation Design Manual
Arterial Crossing Frequency Guideline*	Downtown Transportation Plan (≤ 300 feet)	≤800 feet: Factoria ≤600 feet: Elsewhere	One crossing every 600 feet or less within shopping center area	Within 600 feet of primary entrance. Within 300 feet of bus stop pair on FTN.	Not Applicable

* Intersection treatment and the location and design of mid-block crossing to be determined and approved by the Transportation Department

PEDESTRIAN LOS LAND USE CONTEXT

1. **Downtown**
2. **Activity Center**
   - BelRed
   - Crossroads
   - Factoria
   - Wilburton
   - Eastgate
3. **Neighborhood Shopping Center**
   - Northtowne
   - Lake Hills
   - Newport Hills
   - Other similar centers
4. **Pedestrian Destination**
   - School
   - Park
   - Community Center
   - Senior Center
   - Frequent Transit Network Stop
   - Trail Crossing
   - Library
5. **Elsewhere in the City**

BICYCLE RIDER LEVEL OF TRAFFIC STRESS (LTS): BASIS FOR LOS

LTS 1	LTS 2	LTS 3	LTS 4
Interested but Concerned – Children and Older Adults	Interested but Concerned – Adults	Enthused and Confident	Strong and Fearless

BICYCLE LTS/LOS

Roadway Characteristics		Bicycle Facility Components Guidelines to Achieve Intended Level of Service/Level of Traffic Stress					
Speed Limit (mph)	Arterial Traffic Volume*	No Marking	Sharrow Lane Marking	Striped Bike Lane	Buffered Bike Lane (Horizontal)	Protected Bike Lane (Vertical)	Physically Separated Bikeway
≤25	<3k	1	1	1	1	1	1
	3-7k	3	2	2	2	1	1
	≥7k	3	3	2	2	1	1
30	<15k	4	3	2	2	1	1
	15-25k	4	4	3	3	3	1
	≥25k	4	4	3	3	3	1
35	<25k	4	4	3	3	3	1
	≥25k	4	4	4	3	3	1
40	Any volume	4	4	4	4	3	1

* Approximate traffic volume thresholds

Number/color of each cell represents the approximate Bicycle LTS/LOS that may be achieved given the combination of roadway characteristics and bicycle facility components. Various combinations may be applied to achieve the intended LOS. Does not account for characteristics such as slope, pavement condition, heavy vehicles, etc. that may affect the LOS for a bicycle rider.

BICYCLE LOS INTERSECTION COMPONENT GUIDELINES

Intersection Treatment* / Bike LOS	Bike Signal	Street Crossing	Approach to Intersection	Approach to Intersection with Right Turn Lane
1	Bike signal Leading bicycle phase	Green solid or skip stripe Median refuge Island with RRFB at unsignalized intersection	Green bike box; Two-stage turn box Curb ramp to wide sidewalk Signal actuation	Dutch intersection design Curb ramp to wide sidewalk
2	Bike signal Leading bicycle phase	Dashed/dotted bike lane thru intersection	Bike box; Two-stage turn box Signal actuation	Green bike lane left of right turn lane, Green skip stripe conflict zone
3	Green cycle length adequate for bicycle to clear intersection	Sharrow lane markings thru intersection	Signal actuation	Right turn lane >150': bike lane to left of right turn lane Right turn lane < 150': either above treatment or combined bike/turn lane
Trail or Mid-Block Crossing	Full signal or HAWK or RRFB with median island	Green solid, skip stripe, piano key		N/A

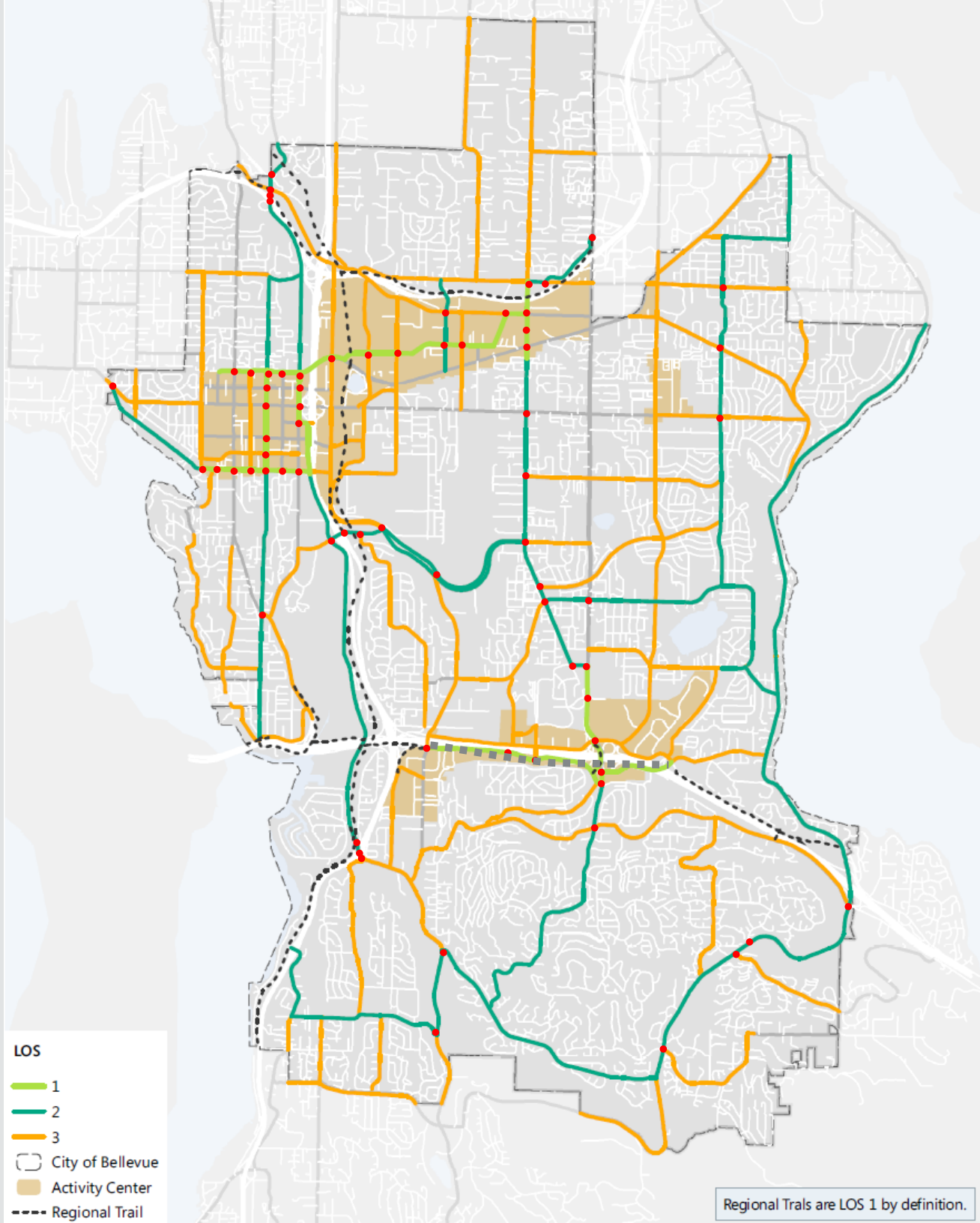
RRFB – **R**ectangular **R**apidly **F**lashing **B**eacon
HAWK - **H**igh-intensity **A**ctivated cross **W**al**K**
* Specific design tool/component from the above list or other best practice to be determined by staff

BICYCLE SIGNAL LOCATIONS

- Potential location for bicycle signal to provide LOS 1 or LOS 2 at a signalized intersection

71 intersections

Intersection design process may determine that not all potential locations may need bike signal



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TRANSIT LOS: STOPS/STATIONS COMPONENT GUIDELINE

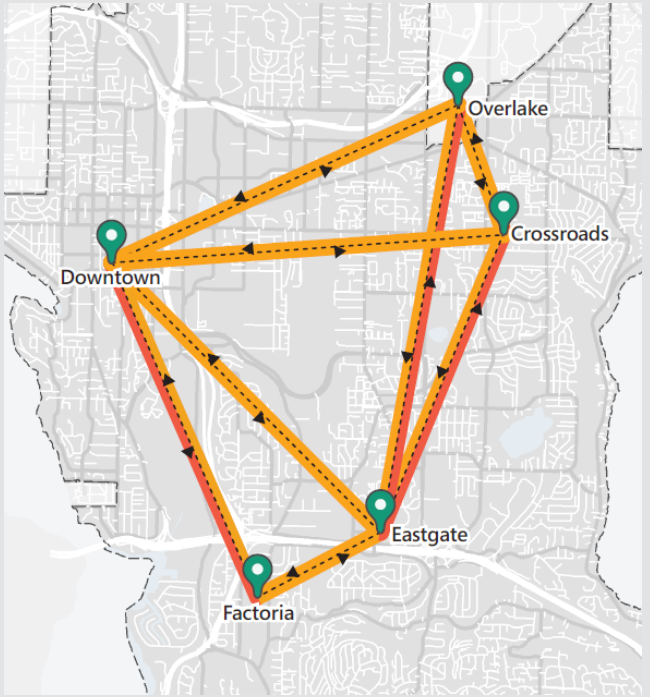
Context / Component Guideline	Local Stop Transit Master Plan	Primary Stop Transit Master Plan	Frequent Transit/ RapidRide Stop Transit Master Plan
Weather Protection*	Yes, priority with 25+ daily boardings	Yes	Yes
Seating*	Yes, near Pedestrian Destinations	Yes	Yes
Passenger Landing Zone**	Yes, length 15-30' Precise location and dimension TBD	Yes, length 40' Precise location and dimension TBD	Yes, length 60' Precise location and dimension TBD
Wayfinding***	Optional	Yes	Yes

* Building mounted weather protection and seating is preferred where building abuts the back of the sidewalk
** Passenger Landing Zone is a paved surface between the back of curb and sidewalk to facilitate passenger boarding and alighting.. Street trees in tree wells will meet the curbside landscape buffer requirement in this zone.
*** To be determined by City staff

TRANSIT LOS: SPEED GUIDELINE

1. Applied to Frequent Transit Network (FTN) Corridors between specified Activity Centers
2. Based on target FTN speed in the Bellevue Transit Master Plan (14 mph)
3. Transit LOS Guidance: 14 mph on FTN connections

Existing (2016) Transit Speeds



LOS Rating	Transit Speed Target on FTN Connections between Activity Centers
	<10 mph
	10-14 mph
	>14 mph

MMLOS RECOMMENDATIONS

Discussion

Motion to Approve

MMLOS Metrics, Standards and Guidelines

NEXT STEPS

Prepare Report:

- Document LOS Metrics, Standards, and Guidelines for Each Mode
- Identify specific updates to the Land Use Code, Transportation Development Code, Comprehensive Plan and other City documents (Commission recommendation and Council action)
- Integrate in Transportation Design Manual (Administrative)

Kevin and Chris present this work at APA National Planning Conference in NYC May 6, 2017