Level-of-Service in Bellevue

Toward a Multimodal Approach to Mobility

MMLOS IMPLEMENTATION

TRANSPORTATION COMMISSION DECEMBER 8, 2016

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DISCUSSION OUTLINE AND GOALS

1. **Updates to LOS Metrics and Standards Based on Transportation Commission Input**
   - Confirm changes to MMLOS Metrics and Standards
   - Identify preferred Vehicle Priority Corridor LOS Metric/Standard
2. **Implementing MMLOS on a Corridor**
   - Confirm that MMLOS Metrics and Standards are Mutually Supportive to Improve Mobility for ALL
   - Discuss Corridor MMLOS Results
3. **Discuss Next Steps**

PEDESTRIAN LOS RECOMMENDED STANDARDS:

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

* Meets BelRed Land Use Code in BelRed Subarea

** Must be an appropriately marked and potentially signalized crossing at locations determined by the Transportation Department

*** Downtown Transportation Plan

BICYCLE LOS RECOMMENDED ALONG STREET METHODOLOGY:

Speed Limit (mph)	Arterial Traffic Volume*	No marking	Sharrows	Striped Bike Lane	Buffered Bike Lane	Protected Bike Lane	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 volume thresholds
Number in each cell represents Bicycle LOS

BICYCLE LOS RECOMMENDED CROSSING METHODOLOGY:

Crossing Treatment: Bike LOS	Bike Signal	Crossing Treatment	Near-Side Intersection Treatment	Near-Side with Right Turn Lane Treatment
1	Bike signal on near and far side of intersection; leading bicycle phase or other bike-favorable signal timing as appropriate	Solid or skip stripe green crossing	Green bike box; two-stage turn box as appropriate	Dutch intersection design 
		Median refuge Island with RRFB for unsignalized crossings	Curb ramp to wide sidewalk	
2	Bike signal on near and far side of intersection; leading bicycle phase or other bike-favorable signal timing, as appropriate	Dotted line extensions/ elephant feet striping	Standard bike box; two-stage turn box as appropriate	Green bike lanes to the left of right turning lane; green skip stripe conflict zone
		Green colored conflict areas with sharrows		
		HAWK or RRFB with median island for unsignalized crossings		
3	Initial green cycle length is adequate for bicycle to clear intersection	Sharrows	None	For lanes >150' through bike lane to left of right turning lane
				For lanes < 150' either above treatment or combined bike/turn lane with narrow (4') green striped bike lane
Trail	Near and far side bike signal	Solid or skip stripe green crossing	N/A	N/A

TRANSIT LOS: STOPS/STATIONS RECOMMENDED STANDARDS

Context: / Component	Local Stop	Primary Stop	Frequent Transit/ RapidRide Stop
Weather Protection*	Yes, 25+ daily boardings	Yes	Yes
Seating*	Yes, near uses like retail, healthcare, or senior housing	Yes	Yes
Transit Landing Zone**	15-30'	40'	60'
Wayfinding***	No	Yes	Yes

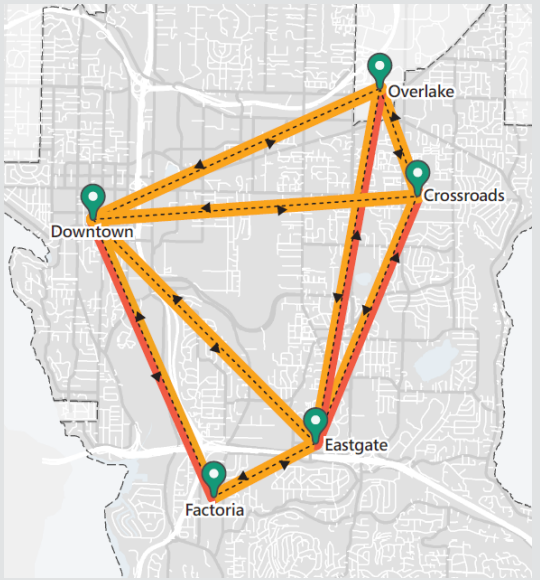
* Building mounted protection and seating is preferred in areas where no building setback is required

** Landing Zone to facilitate passenger boarding and alighting. Landscape requirements for streets must still be met, but a continuous landscape strip should be substituted with tree wells or other landscaping that offers more transit access and amenity space

*** To be determined by City staff

TRANSIT LOS: SPEED RECOMMENDED STANDARDS

1. Focused on Frequent Transit Network Connections between Activity Centers
2. Based on target speeds in TMP
3. 14 mph or better speeds on FTN connections

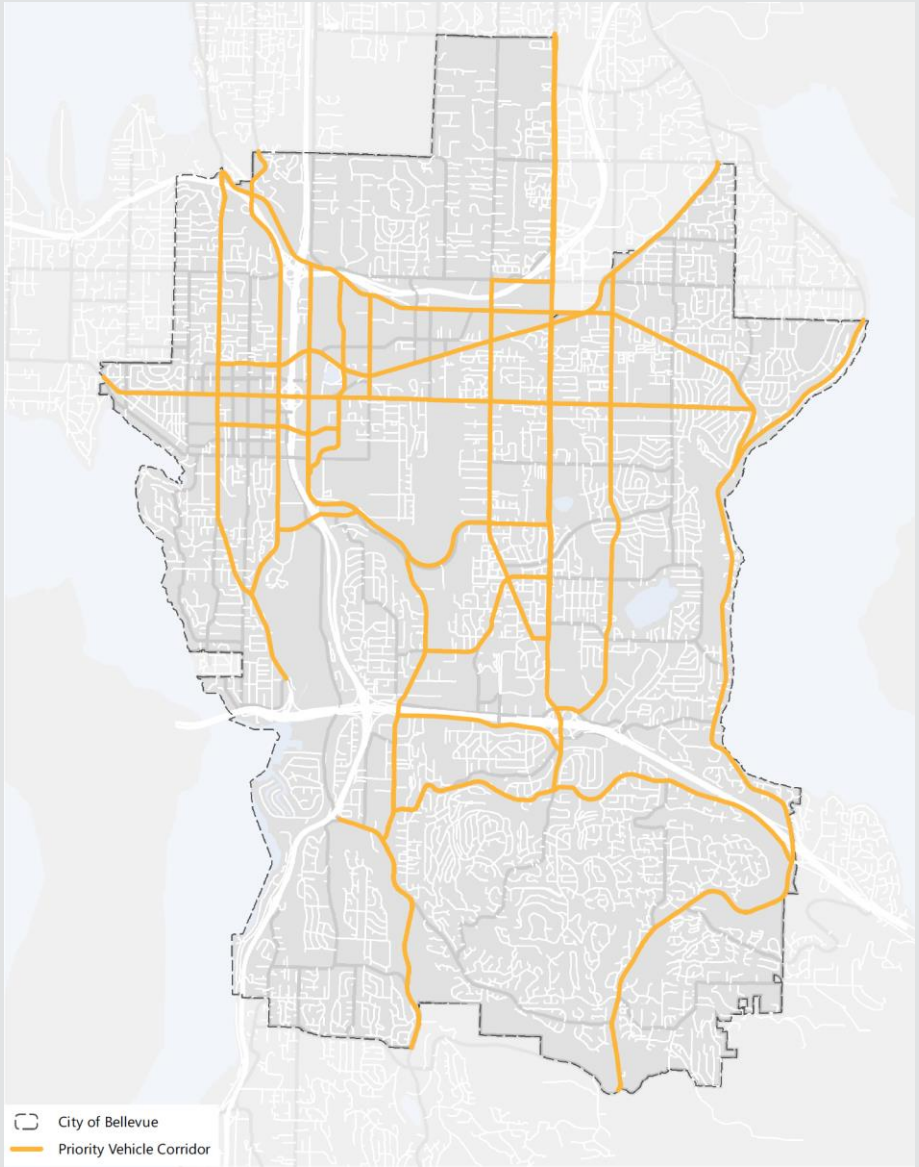


LOS Rating	Speed
	<10 mph
	10-14 mph
	>14 mph

VEHICLE LOS POTENTIAL CORRIDORS

Vehicle Priority Corridors

- New performance measure to better describe experience of drivers
- Expansion of Downtown Transportation Plan "auto focused streets" concept
- Put vehicles on a corridor footing like other MMLOS metrics
- Facilitate prioritization and fine-tune investments



VEHICLE LOS POTENTIAL CORRIDOR MEASURE

Two Options to Consider:

Option	Average Travel Speed on Corridors	Average Volume-Capacity Ratio on Corridors
Metric	Evaluate the average speed along corridor; LOS based on percent of speed limit	Evaluate the corridor average v/c ratio at system intersections; LOS based on ratio thresholds
Pros	More understandable metric Measures travel along corridors	Similar to existing system and uses BKR output Measures travel along corridors
Cons	May require substantial data collection May require new tool (other than BKR) to evaluate Generally more difficult to forecast	Not as relatable to the public May not be as responsive to smaller-scale investments

VEHICLE LOS POTENTIAL CORRIDOR MEASURE

LOS Description:

LOS	Qualitative Description	Average Speed	Average v/c
A	Free flow traffic – very few cars on the road. (2 AM)	More than 60% of speed limit	<0.5
B	Light traffic (6 AM)	60-45% of speed limit	0.6-0.5
C	Moderate traffic – some waiting at traffic signals (10 AM)	45-40% of speed limit	0.7-0.6
D	Heavy traffic – may have to wait more than one cycle at a traffic signal. (5 PM)	40-30% of speed limit	0.8-0.9
E	Very heavy traffic – frequently have to wait through multiple signals. Long queues at busy intersections. (5 PM on busy road)	30-20% of speed limit	0.9-1.0
F	Over-capacity. Very long queues, traffic may not move during a green cycle at intersection. (I-405 SB in afternoon)	Less than 20% of speed limit	>1.0

VEHICLE CORRIDOR LOS

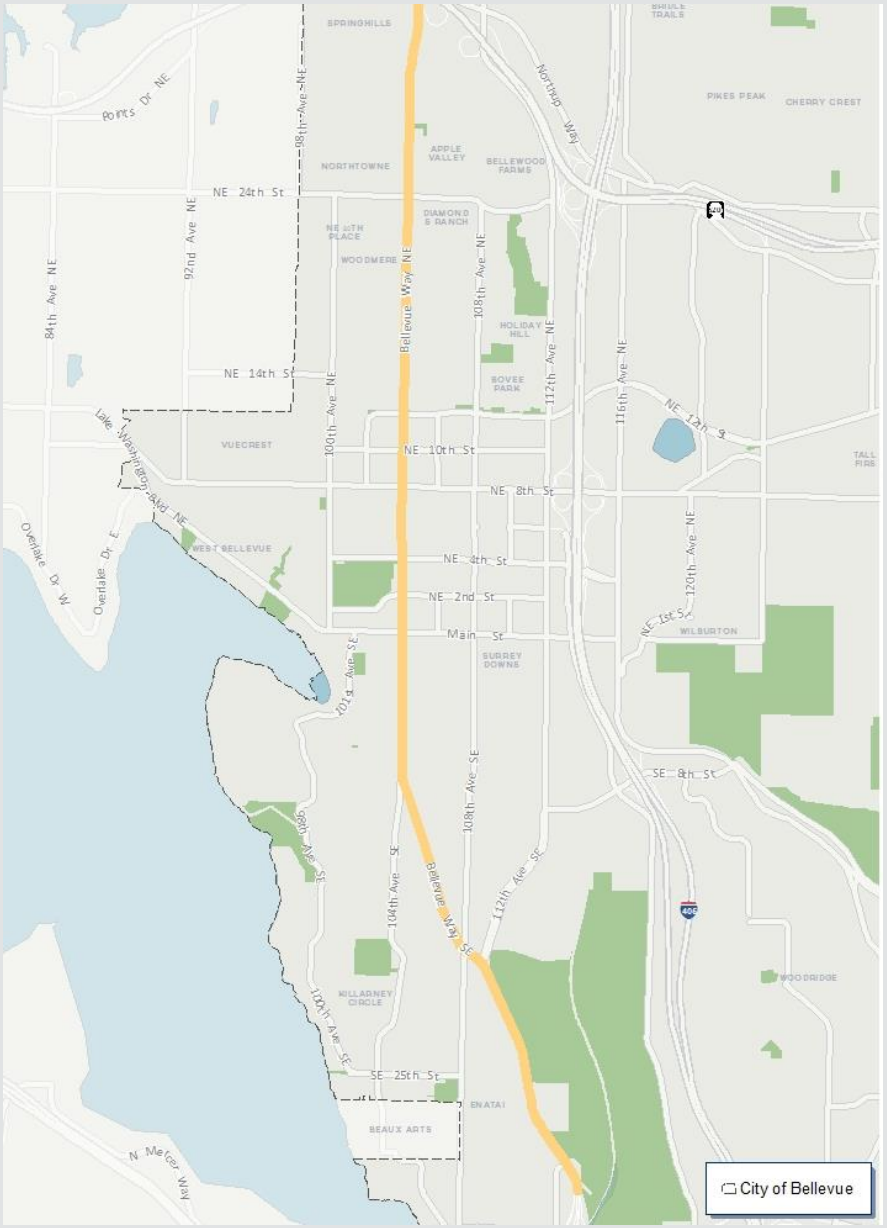
Discussion

IMPLEMENTING MMLOS ON BELLEVUE WAY

Apply MMLOS metrics and standards on Bellevue Way

Implementation of Complete Streets Policy

MMLOS Standards for each mode can be achieved simultaneously and are mutually supportive



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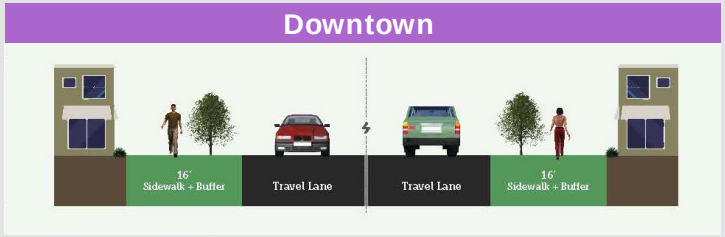
MMLOS ON BELLEVUE WAY

Pedestrian LOS



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MMLOS ON BELLEVUE WAY

Bicycle LOS

BLOS Crossing Treatments

1

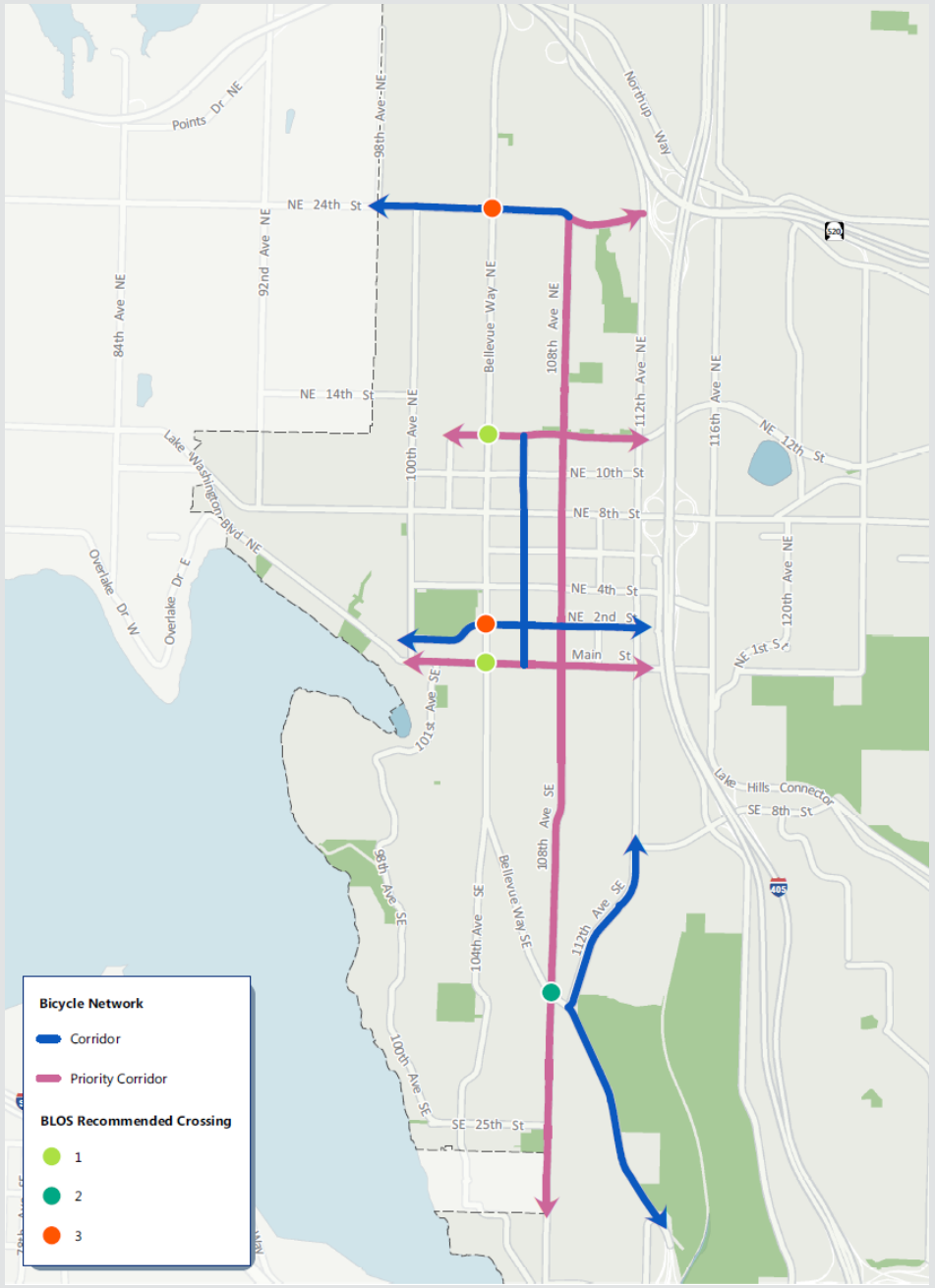
- Solid or skip stripe green crossing
- Green bike box
- Dutch intersection for right turns

2

- Dotted line extensions & green conflict areas with sharrows
- Standard bike box
- Green bike lanes to left of right turn lane; green skip strip conflict zone

3

- Sharrows in crossing
- Lanes > 150': Bike lane to left of right turn lane
- Lanes < 150': Green bike lane to left of right turn lane, OR combined bike/turn lane with narrow green striped bike lane



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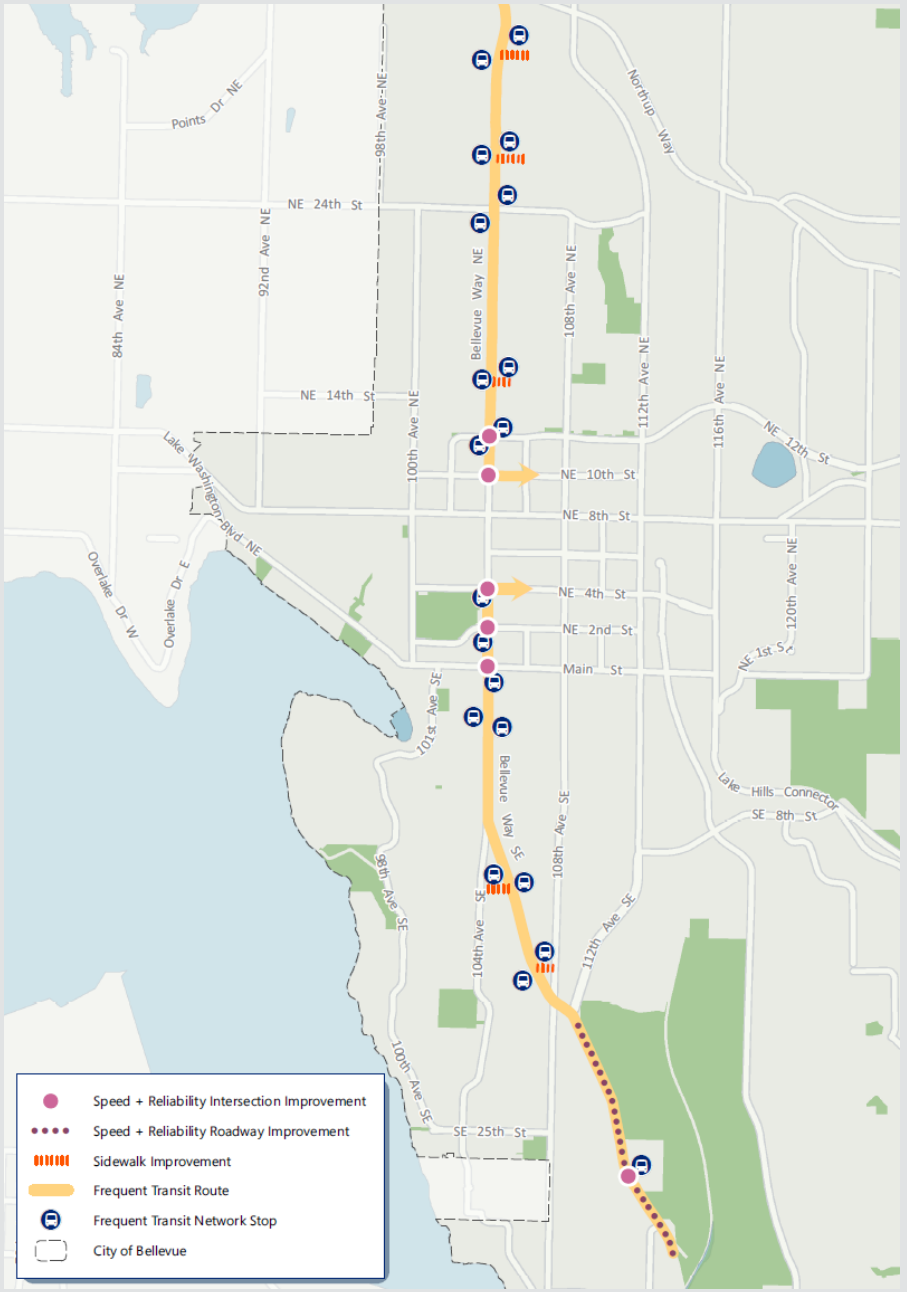
MMLOS ON BELLEVUE WAY

Transit LOS

Two Frequent Transit Network Routes

Speed and Reliability Improvements from Transit Master Plan

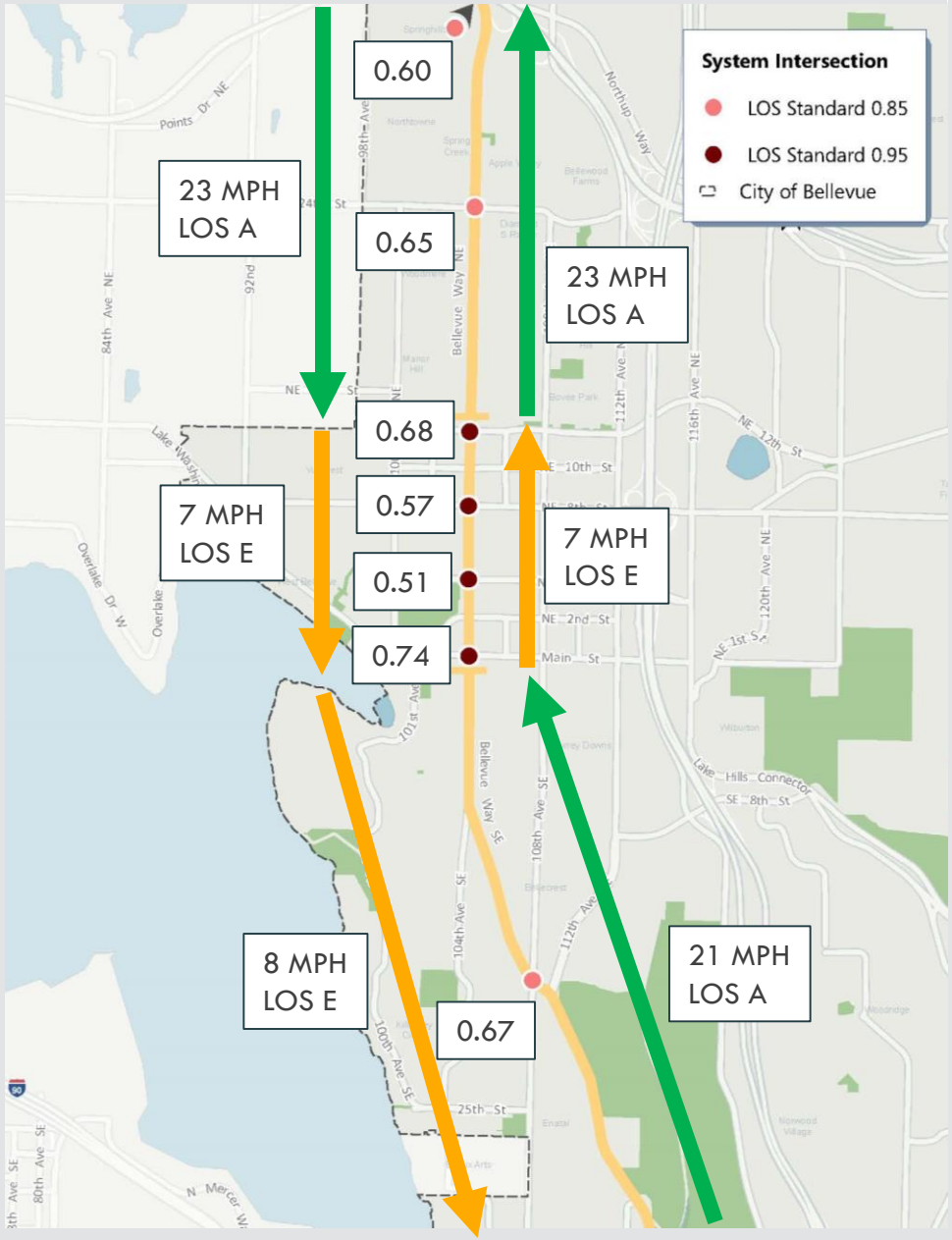
Pedestrian Access Improvements from Ped LOS



MMLOS ON BELLEVUE WAY

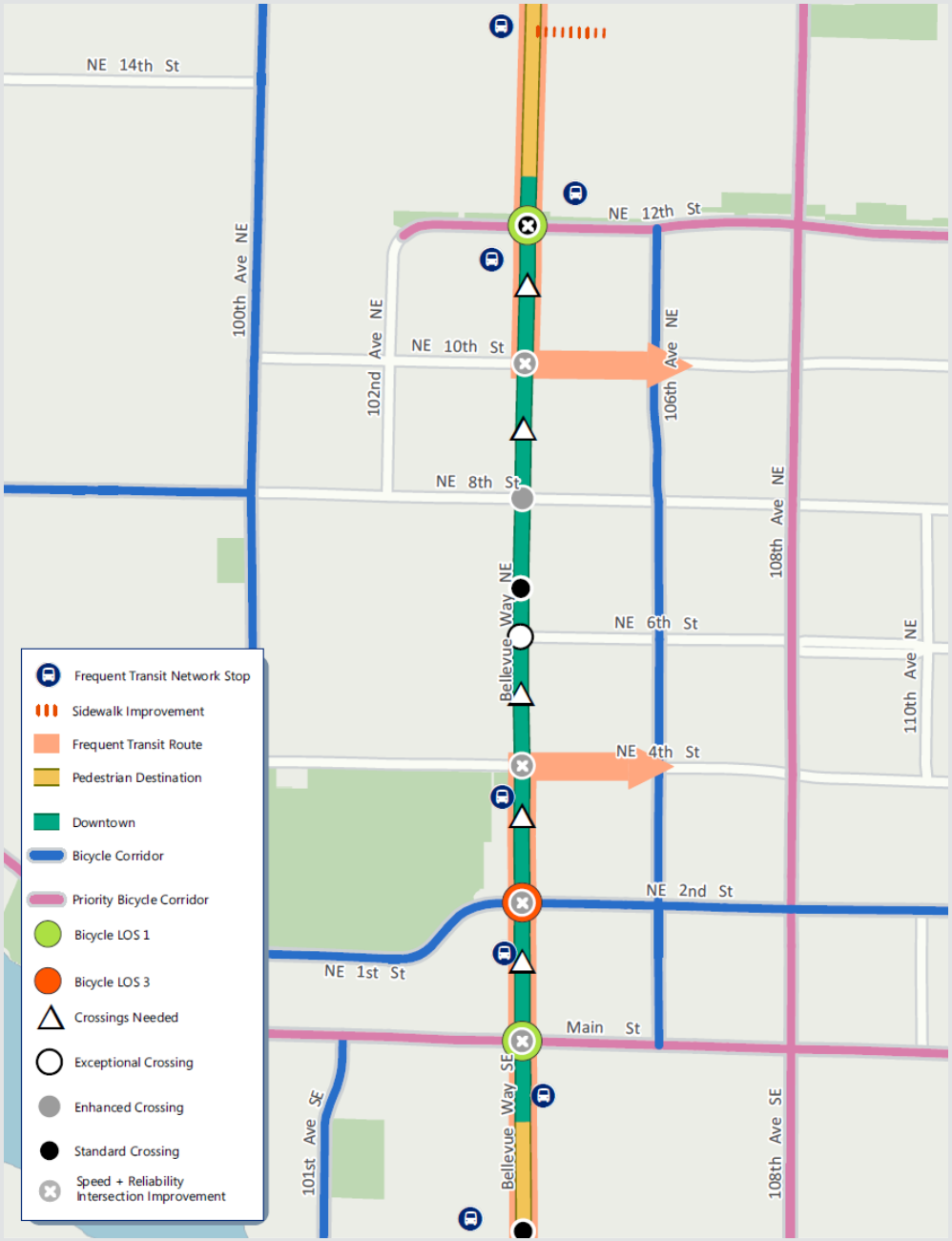
Vehicle LOS

Average speeds and v/c ratios



MMLOS ON BELLEVUE WAY

Putting it all together



CORRIDOR MMLOS IMPLEMENTATION

Discussion

NEXT STEPS

1. Discuss how MMLOS can facilitate prioritization options
2. Update Bellevue Transportation Standards Codes and Comprehensive Plan

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COMMENTS/QUESTIONS/OBSERVATIONS