

Portland-Milwaukie Light Rail Project

TRANSPORTATION ASSUMPTIONS AND METHODS SUMMARY

Presented by
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Information provided by
DKS Associates

Milwaukie Monthly Meeting
December 14, 2009

Tonight's Presentation

- Review basic traffic terminology.
- Explain traffic analysis methods.
- Define the performance measures and how mitigation is determined.

Transportation results and potential mitigation will be available at either January or February Milwaukie Monthly meeting.

Project Schedule Elements

- Preliminary Engineering 2/09-6/10
- Final Environmental Impact Statement 5/10
- Record of Decision 7/10
- Final Engineering 8/10-7/11
- Construction 7/11-8/15
- Opening September 2015

Final Environmental Impact Statement

- Federal Transit Administration (FTA) document.
- Discloses impacts and mitigation, where warranted.
- Analyzes local traffic, transit (bus and other LRT line) service, bicycle and pedestrian facilities, and parking.
- Guided by ODOT, City and County plans and policies.
- Based on forecasts for the year 2030. (Opening day is estimated to be 2015.)

FEIS Alternatives for Analysis

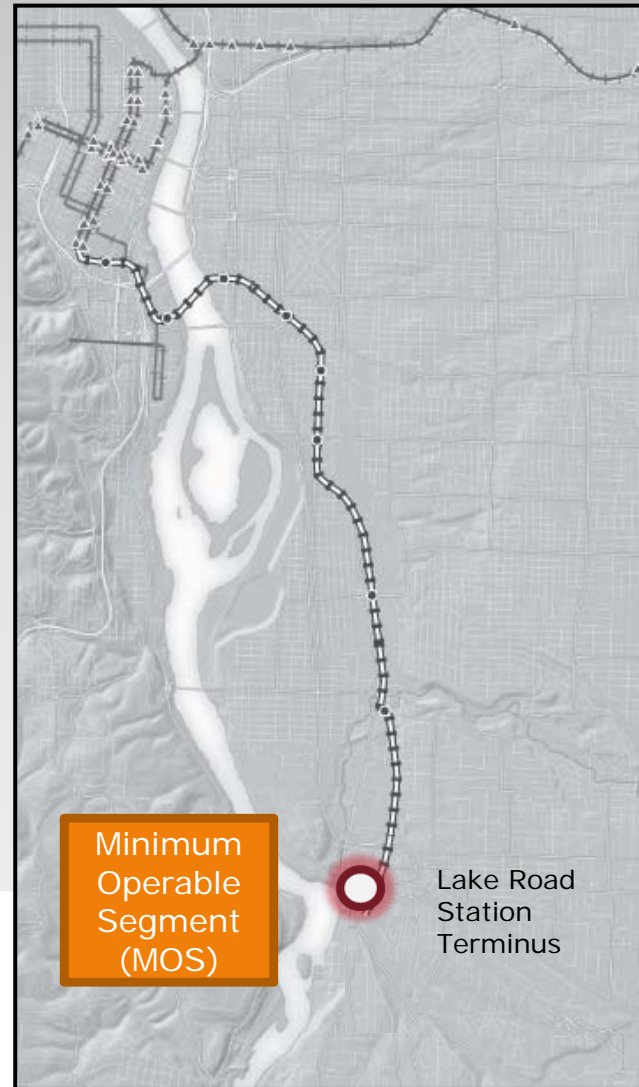
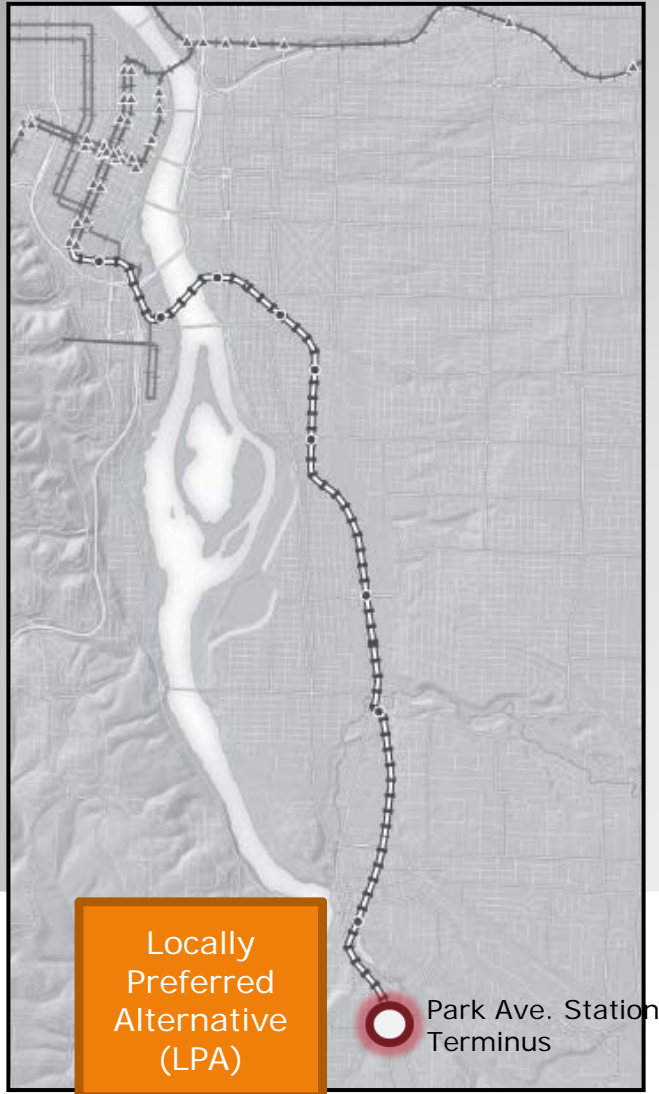
- No Build – Future conditions without light rail
- 2008 Locally Preferred Alternative (LPA) – Future conditions with light rail terminating at Park Ave
- Minimum Operable Segment (MOS) – Future conditions with light rail terminating at Lake Rd

All parties committed to building to Park Ave

Build Alternatives

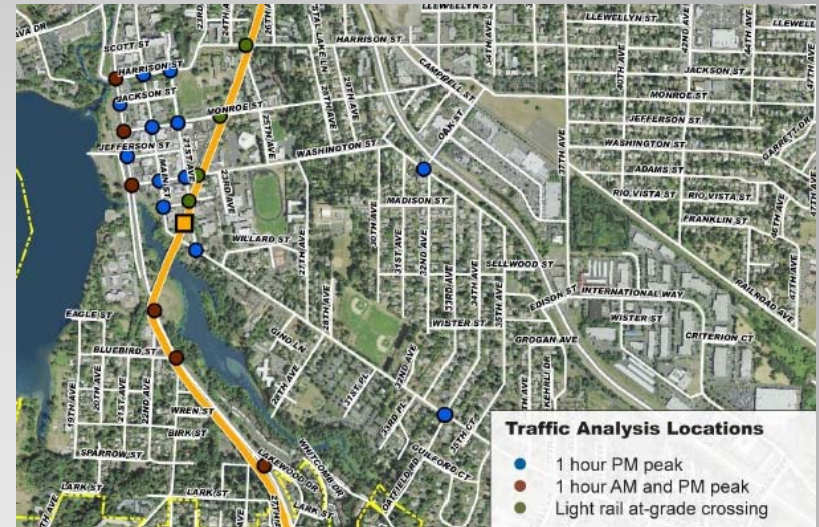
- The Locally Preferred Alternative (LPA) is the project that TriMet and the project partners prefer to build - not the Minimal Operable Segment (MOS).
- Due to cost considerations the project is studying an MOS.

Build Alternatives



Traffic 101

- Intersections
- Level of Service
- Volume-to-Capacity Ratio
- Signal Timing
- Queuing
- Traffic Warrants
- Transit Priority



Intersections

- Signalized intersections
- Unsignalized intersections
- At-grade crossings by light rail transit
- Intersections chosen to analyze were reviewed and approved by the City of Milwaukie, City of Portland, Clackamas County and ODOT.



Intersection Level of Service

- Ratings compute intersection delay at a range of A to F, like a report card for traffic operations
- A to C represent intersections with minor delay
- D, E and F represent progressively more congested operations, with F representing excessive delay.

Level of Service (LOS) Definition

Level of Service	Signalized Intersections Stopped Delay (seconds per vehicle)	Un-signalized Intersections Average Total Delay (seconds per vehicle)
A	< or = 10 .0	< or = 10 .0
B	10.1 to 20.0	10.1 to 15.0
C	20.1 to 35.0	15.1 to 25.0
D*	35.1 to 55.0	25.1 to 35.0
E	55.1 to 80.0	35.1 to 50.0
F	> 80.0	> 50.0

* City of Milwaukie Level of Service Standard is D or better during the first and second hour of the peak periods.

Volume to Capacity Ratio

- The local jurisdictions use Level of Service, ODOT uses a volume-to-capacity (V/C) ratio to define performance at intersections.
- When the hourly volumes at an intersection approach capacity, traffic flow becomes unstable and delay increases.
- A V/C ratio of 1.0 is when the hourly volumes at an intersection are equal to its capacity.

Signal Timing Optimization

- Changing signal timing at an intersection to minimize delay and maximize signal operations.
- Putting “green time” where you need it.



Vehicle Queuing

- A line of vehicles waiting to cross an intersection.
- Queuing analysis estimates the 95th percentile queue length for each approach. Only 5% of the time, is the queue length longer.
- Analysis uses worst 15 minutes of peak hour.



Traffic Warrants

The FEIS evaluated the need for intersection improvements:

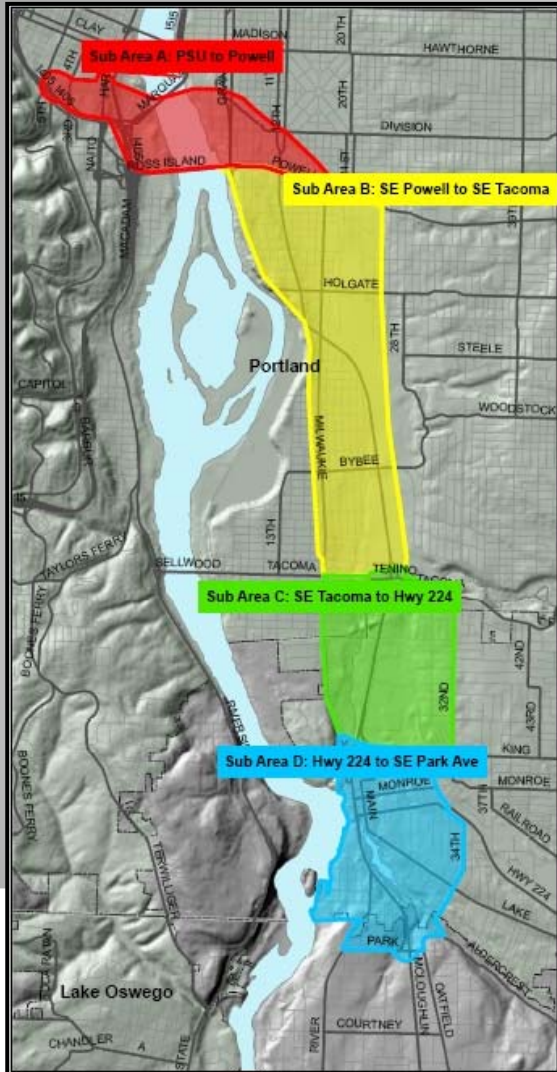
- Right turn lanes
- Left turn lanes
- Stop signs
- Signals

Meeting a warrant does not always mean that the warrant should be implemented.

Transit Priority

- Signal priority is when light rail is given a priority within the signal phasing.
- Signal preemption is when all conflicting traffic is stopped at the signal to let light rail go first.
- Both signal preemption and priority help the speed and reliability of transit service.

Study Area and Sub-Areas



Sub-Area A: PSU to SE Powell Blvd.

- 24 intersections
- City of Portland and ODOT
- No park-and-rides

Sub-Area B: SE Powell Blvd to SE Tacoma

- 17 intersections
- City of Portland and ODOT
- No park-and-rides

Sub-Area C: SE Tacoma St. to Hwy. 224

- 10 intersections (9 AM & PM and 1 PM only)
- City of Portland, City of Milwaukie and ODOT
- LPA - 1,000 space park-and-ride at Tacoma Street
- MOS – 1,250 space park-and-ride at Tacoma Street

Sub-Area D: Hwy. 224 to SE Park Ave.

- 24 intersections (9 AM & PM and 15 PM only)
- City of Milwaukie, Clackamas County and ODOT
- LPA – 1,000 space park-and-ride at Park Avenue
- MOS – 275 space park-and-ride at Lake Road

Data Collection

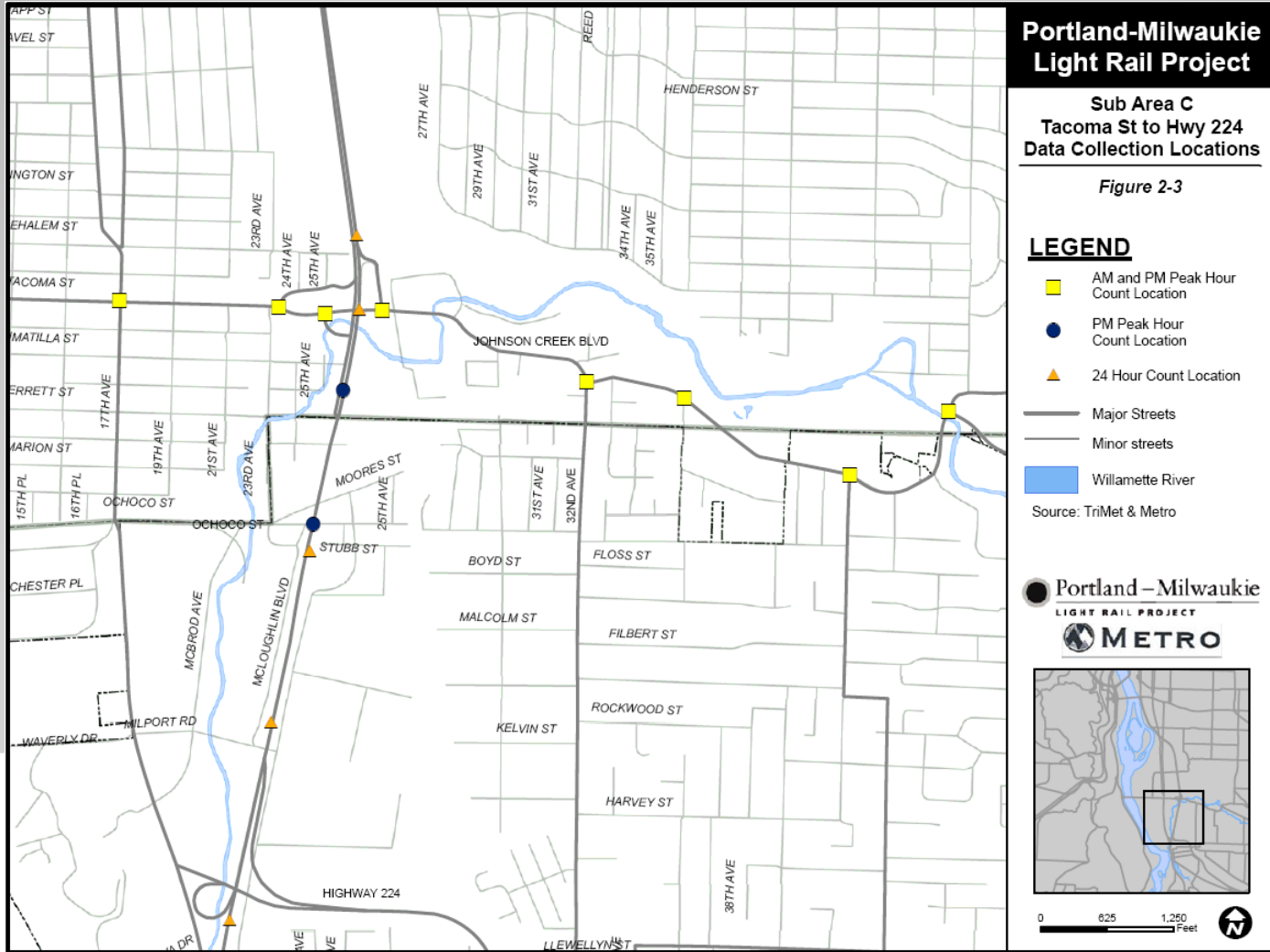
A variety of data was collected including:

- Existing peak hour turning movement counts*
- 24-hour traffic counts*
- Trip generation counts for park and ride facilities
- Existing street system including lane geometry, traffic signal phasing, and other items (such as proximity to bus stops on-street parking etc.)

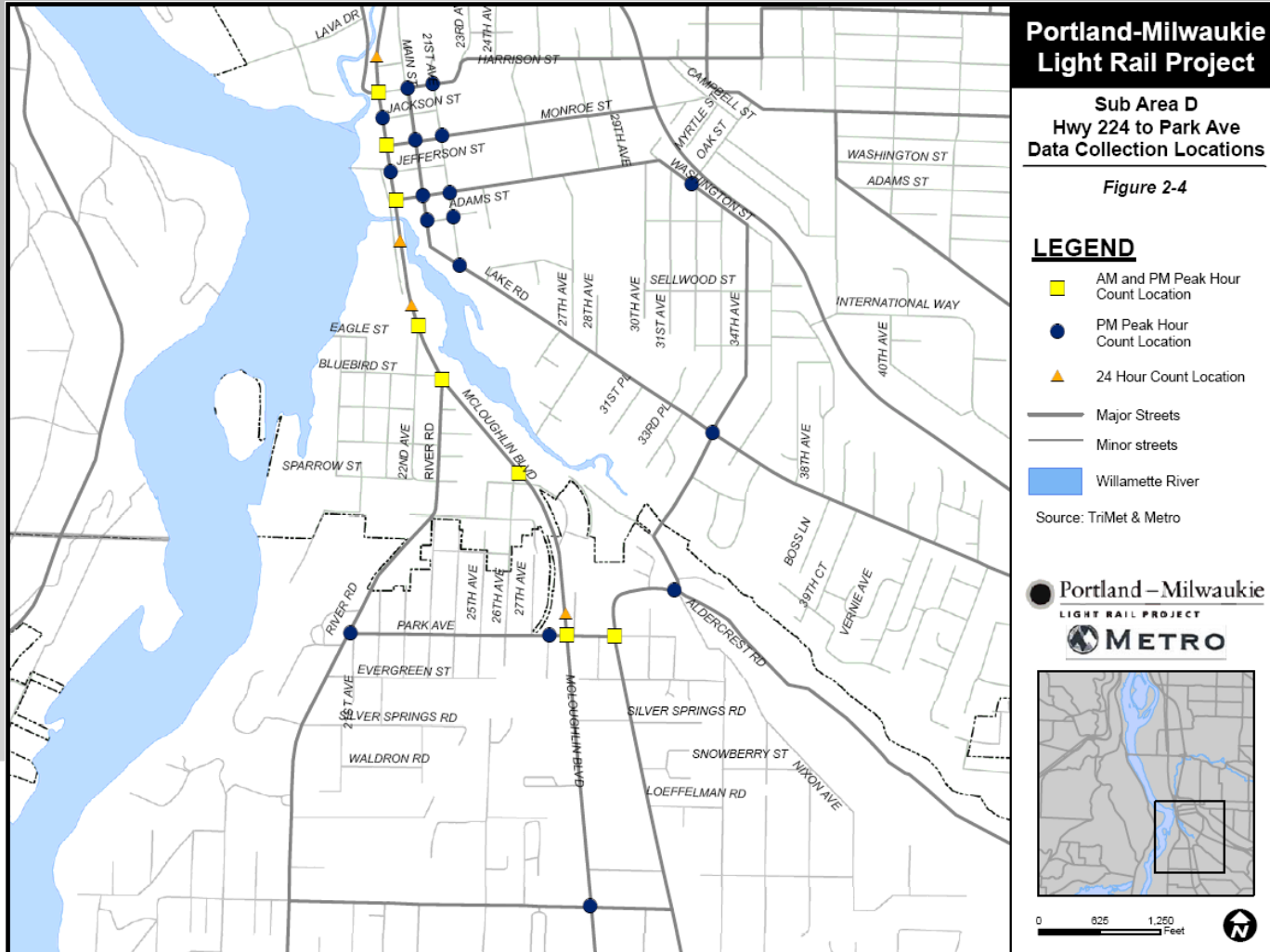


* Counts collected May through November 2007, or December 2008 through June 2009.

Data Collection Locations



Data Collection Locations (continued)



Existing Conditions Report

- Evaluate traffic operations at key study area intersections.
- Summarize data such as pedestrian activity, bicycle activity, transit usage and parking usage.

Traffic Forecast Elements

Future forecasts (2030) travel volumes based on:

1. Employment type
2. Household size, income, and age
3. Households, population and employment within transportation zones
4. Existing zoning and buildable land - after local review

Future volumes forecast for both the No Build and Build Alternatives.



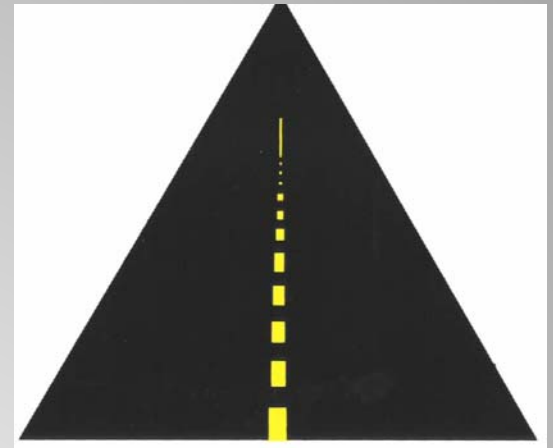
Forecast Accuracy (light rail ridership)

	Line	Opening Year Forecast	AWB 1st Full Year
Eastside	Banfield	19,000	19,225
Westside	1/2 of Blue	20,470	24,133
Airport Extension	Red	11,057	11,283
Interstate MAX	Yellow	13,900	11,725
I-205 Extension	Green	25,250	

Surface Street Analysis

Considers:

- Congestion and capacity.
- Changes in traffic patterns and the potential for traffic impacts associated with transit stations and park and ride facilities.



Traffic Impact Comparison









- Compare Build Alternatives to the No Build Alternative.
- Develop potential mitigation at locations where impacts do not meet performance standards and/or performance thresholds.

Vehicle Delay for At-grade Crossings


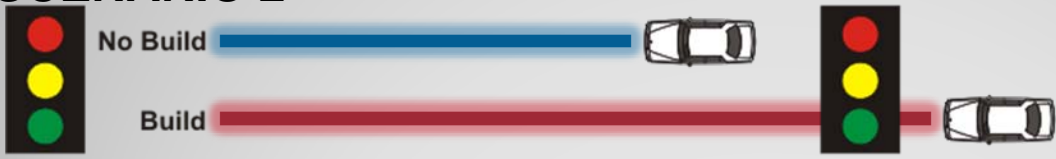
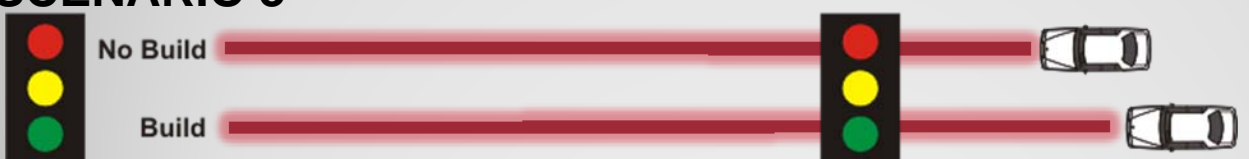
- In downtown Milwaukie the average delay (by location and direction) due to a light rail crossing is 6 to 17 seconds during the PM peak hour in 2030.
- By federal regulation, gated crossings are required, and gates are activated for 50 seconds.
- Unlike the delay due to freight trains, no vehicle would be delayed by a light rail train longer than 50 seconds.



Intersection Impacts & When to Mitigate

	Meet Standard?		Mitigate?
	No-build	Build	
Example 1	 Yes	 Yes	No
Example 2	 Yes	 No	Yes
Example 3	 No	 Less than 10 seconds delay	No
Example 4	 No	 More than 10 seconds delay	Yes

Queuing Impacts & When to Mitigate

		MITIGATE?
SCENARIO 1		NO
SCENARIO 2		YES
SCENARIO 3		NO

Traffic Warrants, Spacing & When to Mitigate

	Meets Traffic Warrant?		Mitigate?
	No-Build	Build	
Example 1	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> No	No
Example 2	<input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> Yes	Yes
Example 3	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Yes	Potentially*

*** Since warrant is met under No-Build, TriMet will need to coordinate with the local jurisdiction on project mitigation needed and the project share of the cost to mitigate.**

Performance Measures

Measure impacts to:

- Freight
- Transit
- Bicycles and pedestrians
- Parking
- Property access

Freight and Transit Performance Measures

- Freight system impacts were measured by out-of-direction travel caused by closure of a local street due to light rail.
- Transit impacts were measured by travel time.
- Transit station and park and ride lot traffic impacts were evaluated by analyzing adjacent key intersections.



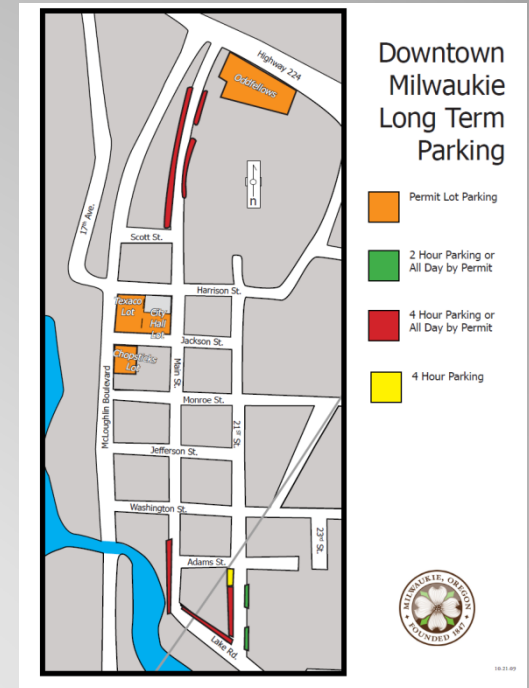
Bicycle and Pedestrian Performance Measures

- Primary concern is accessibility and connectivity to transit stations.
- Areas without sidewalks on roadways or having gaps in the existing bicycle network, within 1,000 feet of a light rail station, were evaluated.
- A second bicycle performance measure is adequate facilities provided at the transit stations (bike spaces and/or lockers).



Parking Criteria

- Inventoried existing on-street and off-street parking spaces within 1000 feet of stations.
- Developed data on existing parking demand.
- Calculated loss of existing parking spaces.
- Determined significance of parking loss and developed mitigation strategies.



Access Analysis

- Assessed impacts to property access.
- Developed potential mitigation for losses or changes to property access.



Construction Analysis

(short term impacts)

- Impacts to traffic operations related to potential road, sidewalk or other closures during construction.
- Impacts of construction related traffic.



Examples of Project Mitigation

FEIS Record of Decision for the Green Line:

- 96th Avenue/Park and Ride Entrance: Relocate Adventist High Scholl access on the east side of SE 96th and create a northbound left turn pocket for traffic accessing the park and ride lot from SE 96th Avenue.
- SW 4th Avenue/SW Market Street: Add a northbound right turn lane.
- Mall Segment Parking Mitigation: Employ management strategies to partially offset the on-street parking loss.

Next Step

What will be presented at the Milwaukie Monthly Meeting in January or February?

- Extent of traffic impacts
- Proposed mitigation

Questions and Comments?

Thank You.

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