

Memorandum



To: Ellen Vanderslice, *Portland Bureau of Transportation*
From: Adrian Witte and Drew Meisel, *Alta Planning + Design*
Date: July 7, 2011
Re: Lloyd District Bikeway Development Projects
East-West Corridor Evaluation

This memorandum explores the opportunities and constraints associated with three corridors and their potential to serve as a major east-west bikeway through the District. Each of these routes: NE Multnomah Street, NE Holladay Street, and NE Lloyd Boulevard, provides connections to or through the Lloyd District, to the Rose Quarter Transit Center and Eastbank Esplanade, and to other nearby bikeways (See Figure 1).

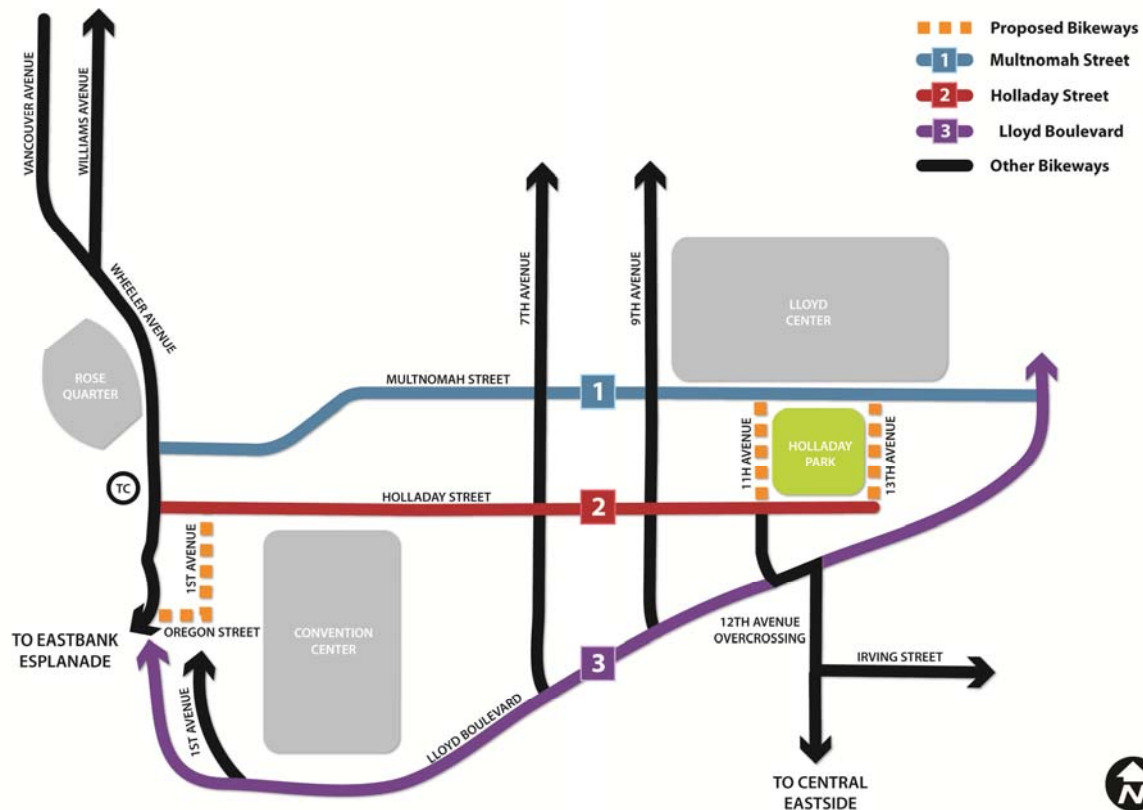


Figure 1. Potential East-West Bikeways in Lloyd District.

The characteristics of each street vary considerably and will need to be evaluated to determine the corridor best suited for developing a low stress east-west bikeway that is comfortable for all users. This memorandum summarizes existing conditions on each street, describes the criteria used in the evaluation, and presents the results of the evaluation.

NE Multnomah Street

NE Multnomah Street provides a direct connection from the Rose Quarter Transit Center through the heart of the Lloyd District. It is the only one of the three east-west routes in the study area that provides continuous connection east of the Lloyd District.

The roadway has four motor vehicle travel lanes, no on-street parking, and bike lanes in each direction for its entire length. In addition there is a center turn lane between NE 2nd Avenue and NE 21st Avenue.

Classified as an arterial roadway, the street's primary function is the movement of automobiles, but transit and bicycles also use the street. Traffic volumes are in the order of 10,000 vehicles per day. The street is posted at 25 miles per hour (mph) and observes an 85th percentile speed of 28 mph. Although there is a curbside bike lane, with no additional separation from traffic, many bicyclists find cycling on NE Multnomah Street uncomfortable. Cyclists also contend with frequent TriMet bus service resulting in bus / bike leapfrogging and conflicts with cyclists when buses need to pull across the bike lane to service stops. Despite these issues, NE Multnomah experiences approximately 750 daily bike trips.



Figure 2. View looking east on NE Multnomah Street

Existing businesses and buildings along NE Multnomah Street are generally either set back from the street or do not have active storefronts to engage passersby. There are a considerable number of surface parking lots and 1-2 level parking garages that may be opportunities for future redevelopment.

Providing an enhanced bikeway within the 60' curb-to-curb width would require conversion of at least one of the motor vehicle travel lanes. Possible designs include:

- Converting one of the travel lanes to provide additional space for enhanced bikeways.

- Converting the center turn lane (except west of 2nd Avenue) to provide additional space for enhanced bikeways.
- Convert two travel lanes (one in each direction) to provide enhanced bikeways and add parking onto one side of the street.

Any of these options would reduce motor vehicle capacity (moving away from the designated arterial function of the street), either through the loss of a travel lane or the center turn lane. The impact on intersection operations will need to be determined through a traffic engineering analysis and a determination made as to whether the shift away from a traffic arterial function to a major bikeway is appropriate.

NE Multnomah Street provides the most central route through the Lloyd District and direct or easy connections to other bikeways in the area. The route is gently sloped down westbound except for the section between NE Wheeler Avenue and NE 2nd Avenue.

NE Holladay Street

NE Holladay Street, a one-way eastbound street, is somewhat less central to the Lloyd District than NE Multnomah Street and has no designated bicycle facilities (eastbound cyclists currently share the roadway with motor vehicle traffic while there is no bicycle facility for westbound cyclists). Resulting in a far more comfortable bicycling and walking experience given that the traffic volumes (approximately 900 vehicles per day) and speeds (85th percentile speed is 22 mph) are significantly lower than other routes in the area.¹ NE Holladay Street also has synergies with the transit services along the street, however these do add to the complication of having to cross the MAX tracks to connect to other destinations to the north.

This street has excellent potential for the creation of a low stress bikeway that provides excellent connections to the Eastbank Esplanade, the Rose Quarter Transit Center, and the 12th Avenue Overcrossing. Other routes, east of the Lloyd District (on NE Multnomah Street) are connected via a number of north-south bike routes.

There is some activation of the street from businesses along NE Holladay although few, except between NE 11th Avenue and NE 13th Avenue and a handful of other businesses, rely on active street frontage for their customer base. The presence of street trees and wide sidewalks also makes the street more attractive to active transportation modes.



Figure 3. NE Holladay Street adjacent to a MAX platform station

¹ A traffic study has not been performed to determine the impact of each alternative

There are a number of blocks with the potential to redevelop in the future. Given its access to transit, future redevelopment may look to engage the street-front and could benefit from a major bikeway passing by the front door (which could deliver more person traffic than the existing motor vehicles on the street).

Creation of a two-way bikeway with only 22' curb-to-curb width requires that parking be removed from the street. This results in a loss of 47 spaces of on-street parking (26 two-hour stalls and 21 carpool stalls). Grades on the street are generally manageable, although the slope of the section between NE 1st Avenue and NE 3rd Avenue is enough to slow eastbound bicyclists that feel like they get “chased” up the hill by following motorists.

NE Lloyd Boulevard

NE Lloyd Boulevard is located on the southern periphery of the Lloyd District. It is classified as an arterial roadway and currently has four travel lanes, a center turn lane, and bike lanes in each direction. NE Lloyd Boulevard connects I-84 to NE Portland and the Central Eastside Industrial District. High traffic volumes (in the order of 13,000 vehicles per day) and speeds (posted speed 30 mph) are prevalent on this street.

NE Lloyd Boulevard provides continuous bikeway facilities from the Eastbank Esplanade to the Lloyd District and NE 15th Avenue. However, as a bikeway it is not particularly comfortable – a combination of high traffic speeds and volumes and generally steep eastbound grades (particularly between the Eastbank Esplanade and NE Grand Avenue and between NE Grand Avenue and NE 11th Avenue). Although the street has no on-street parking and 60 feet of pavement width, the introduction of an enhanced bikeway would require some tradeoffs in automobile capacity, i.e. either a travel lane or the center turn lane to accommodate wide buffered bike lanes in each direction.

The existing businesses are not oriented toward the street. Most of the buildings are government offices and services such as Metro, the Bonneville Power Administration, and the US Forest Service. There is no development (or development potential) on the south side of the street. There is likely to be little redevelopment along this street in the near future.



Figure 4. The uphill grade eastbound on NE Lloyd Blvd

Evaluation

The following eight categories were used to better assess each corridor's potential to serve as the Lloyd District's east-west bikeway:

- **Connectivity/Directness:** How well does the route connect to the Lloyd District (e.g. is it central or on the periphery of the Lloyd District)? How well (and directly) does the route connect to existing and future bikeways?
- **Roadway Functional Classification:** Is the roadway designed and classified to primarily move motor vehicle traffic or for other transportation modes?
- **Existing Curb-to-Curb Width:** Can travel/parking lanes be modified or converted to accommodate an enhanced bikeway?
- **Traffic Operations:** What are existing traffic volumes? Will modifications impact traffic operations, e.g. greatly increase delay or queues?
- **Parking:** Is there existing on-street parking? Will modifications increase or reduce on-street parking supply?
- **Land Use:** What are the primary land uses along the street? What is the relationship between building activities and the street (e.g. active street frontage, set back from street, reliance on on-street parking, etc.)? What is the potential for redevelopment?
- **Bicycling Comfort:** Are there bus/bike conflicts, pedestrian/bike conflicts, or motor vehicle/bike conflicts? How wide are existing bikeway facilities and do they provide comfortable conditions for cyclists given traffic speeds and volumes?
- **Grade and Barriers:** Are grades comfortable for the average cyclist? Are there any particularly difficult crossings or barriers for a cyclist to negotiate?

Findings

Table 1 summarizes and scores the performance of each route within each category with values of High (3), Medium (2), or Low (1) assigned to each. The total score for each route is shown at the bottom of the table and summarizes overall performance based on the scoring criteria.

Using these categories, NE Lloyd Boulevard scored worst. Its low score is largely due to it being the least direct route to the Lloyd District. In addition, the corridor has low redevelopment potential and bikeway redevelopment on NE Lloyd would require tradeoffs such as the conversion of a travel lane, which could have significant impacts on motor vehicle traffic and freight operations.

NE Multnomah Street scored second overall. The key factors influencing this route's higher score include it being the most direct connection between the Lloyd District, Rose Quarter TC, and Eastbank Esplanade and a net-zero impact to on-street parking. The weaker points for this route are its existing classification as an arterial roadway, with prioritization for motor vehicles, and the bikeway's proximity to higher traffic speeds/volumes. The posted speed limit is currently 25 mph, but the 85th percentile speed on the street is 28 mph.

The route demonstrating the highest overall score was NE Holladay Street. Though NE Multnomah Street and NE Holladay Street score similarly in many respects, Holladay's classification as a minor roadway and its nearly equal level of directness contributed to its score. The high redevelopment potential of the street, due to a large number of low-rise parking garages and surface parking lots facing the street, and its ability to provide excellent bicyclist comfort were also significant factors influencing its high score. These results indicate that the project team's original focus on the development of NE Holladay into an enhanced bikeway was not in error. NE Holladay provides the most direct route with the greatest cycling comfort, readily available links to high capacity transit and the fewest tradeoffs/impacts to motor vehicle traffic.

Table 1. Evaluation Matrix

Category		NE Multnomah Street	NE Holladay Street	NE Lloyd Boulevard
Connectivity / Directness				
<i>Directness</i>		High - This is the most central route through the Lloyd District	Med - Less central but connectivity to key services, employers, and MAX transit	Low - At the periphery of the Lloyd District.
<i>Connection to Other Bikeways</i>	<i>Eastbank Esplanade</i>	Via Wheeler Avenue	Via Wheeler Avenue	Direct
	<i>Rose Quarter</i>	Direct	Direct	Via Wheeler Avenue
	<i>NE 7th Avenue</i>	Direct	Direct	Direct
	<i>NE 9th Avenue</i>	Direct	Direct	Direct
	<i>NE 12th Avenue Overcrossing</i>	Indirect	Direct	Direct
	<i>Mulnomah Street (east of Lloyd District)</i>	Direct	Indirect	Indirect
	<i>Summary</i>	High - Connects to existing bikeways	High - Connects to existing bikeways	Medium - Connects to many of the existing bikeways
Roadway Functional Classification		Low - Classified an arterial, the street prioritizes motor vehicle traffic.	High - Classified as a Minor Street and a Transit Route.	Low - Classified an arterial, the street prioritizes motor vehicle traffic.
Existing Curb-to-Curb Width		High - Existing pavement width offers options but requires trade-offs (e.g. converting travel lanes for enhanced bikeways).	Medium - Existing pavement width constrains the number of options with trade-offs (in on-street parking) required.	High - Existing pavement width offers options but requires trade-offs (e.g. converting travel lanes for enhanced bikeways).
Traffic Operations		Medium - High traffic volumes. Converting travel lanes with divert traffic to other routes and/or increase delays and queuing at intersections.	High - Minimal effect on operations given low traffic volumes, but street plays an important local traffic circulation function.	Low - High traffic volumes. Converting travel lanes would impact traffic operations (e.g. delay, queue length, etc.). Minimal opportunities for traffic to divert to other routes.
Parking		High - No on-street parking.	Low - Creating a westbound bike lane requires removal of up to 43 on-street parking spaces.	High - No on-street parking.
Land Use		Medium - Minimal active street frontage, some potential for street-fronting redevelopment.	High - Active street-fronting land uses and high redevelopment potential.	Low - Minimal active street frontage, limited redevelopment potential.
Bicycling Comfort		Low - Proximity to multiple travel lanes and higher traffic speeds creates uncomfortable cycling experience.	High - No existing bike facilities, but low traffic volumes and traffic speeds.	Low - Proximity to multiple travel lanes and higher traffic speeds creates uncomfortable cycling experience.
Grade and Barriers		Medium - Steep grade EB between Rose Quarter Transit Center and MLK. A number of busy intersections with difficult conditions to turn left on a bicycle.	Medium - Managable grade EB between Rose Quarter Transit Center and MLK. MAX tracks are difficult to cross, particularly when turning.	Low - Steep grade from Eastbank Esplanade to 11th may act as a deterrant for some cyclists.
TOTAL SCORE		17	20	13